

PROJECT MANUAL

for the

AASF Aircraft Apron Repairs – Phase 1

at

**Bradley Army National Guard Base
Windsor Locks, Connecticut**



PROJECT NO.

20MIL21201

Prepared By

**Burns & McDonnell
Engineering Company, Inc.**

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Wallingford CT 06492**

**CONNECTICUT ARMY NATIONAL GUARD
FACILITIES MANAGEMENT OFFICE
360 Broad Street, Hartford, Connecticut**

June, 2020

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not used

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Not used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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Not Used

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List of Drawings Included in Set

DWG. NO.	TITLE
G-100	COVER SHEET
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SE101	EROSION & SEDIMENT CONTROL PLAN
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SE502	EROSION & SEDIMENT CONTROL DETAILS

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INVITATION TO BID
(Major & Minor Capital Projects Greater Than \$500,000)

State of CT, Military Department
 Procurement Services Bidding and Contracts,
 Gov. Wm. A. O'Neill Armory, 360 Broad Street, Rm#143, Hartford, CT 06106

ADV. NO.: _____

ADV. DATE: _____

Sealed Bids from **Contractors who have been Prequalified in the DAS Classification** noted below shall be addressed to CT MILITARY DEPARTMENT for the following project:

Project Title:	
Project Number:	
Project Description:	
DAS Contractor Prequalification Classification Name:	SITWORK
DAS Contractor Prequalification Program Webpage Link :	www.das.ct.gov
Special Requirements:	All perspective bidders are required to attend a MANDATORY pre-bid conference and are encouraged to bring their sub-contractors with them. No other site visits will be available.
Cost Estimate Range Base Bid:	\$ _____ To \$ _____
Plans & Specs Ready For viewing:	Plans and Specs are available on line ONLY.
SPECIAL REQUIREMENT: Face Coverings: When in public and a six-foot distance is unavoidable, face coverings are required to be worn. This does not apply to anyone for whom doing so would be contrary to their health because of a medical condition.	
Pre-Bid Conference:	All prospective bidders are required to attend a MANDATORY Pre-Bid Conference.
Pre-Bid Conference Time:	<input type="checkbox"/> AM <input type="checkbox"/> PM
Pre-Bid Conference Date:	
Pre-Bid Conference Location	
Pre-Bid Conference Registration	All prospective bidders must <i>sign</i> his or her name on the official roster and <i>list</i> the name and address of the company he or she represents no later than the designated start time of the pre-bid conference. No attendee will be allowed to register <i>after</i> the advertised start time of the pre-bid conference. Bids submitted by contractors who have <i>not properly</i> registered and attended the mandatory pre-bid conference <i>shall be rejected as non-responsive</i> .
Pre-Bid Conference Contact:	
BID OPENING DATE:	
Receipt of Bid Package:	Bids will be received at the Gov Wm. A. O'Neill Armory, 360 Broad Street, Hartford, CT, 06105 in Room #143 UNTIL 2:00 P.M. on the date shown above and thereafter publicly opened and read aloud.

Bid Results:	Within approximately two (2) days after the Bid Opening Date, the Bid Results are posted on the CT DAS website www.das.ct.gov (click -on the “ State Contracting Portal ” link).	
Small Business Enterprise (SBE) Set-Aside Participation:	25%	
Minority Business Enterprise (MBE) Participation:	6.25%	
Date MIL Began Planning the Subject Project:		
Threshold Building Limits: (C.G.S. §29-276b)	<input type="checkbox"/> Does Exceed**	<input checked="" type="checkbox"/> Does Not Exceed
Major Contractor Registration License: (C.G.S. §20-341gg)	<input type="checkbox"/> Required**	<input checked="" type="checkbox"/> Not Required
	**IMPORTANT NOTE: Contractors and Subcontractors performing work on Projects that exceed the Threshold Limits must have a Major Contractor Registration License through the State of Connecticut Department of Consumer Protection.	
Work Includes But Is Not Limited To The Following:		
Guide to the Code of Ethics For Current or Potential State Contractors:	Anyone seeking a contract with a value of more than \$500,000 shall electronically download the “ Guide to the Code of Ethics For Current or Potential State Contractors ” from the of Office of State Ethics (OSE) website www.ct.gov/ethics , then click on the “ Forms ” link:	
Submission of Bid Proposal and Other Bid Submittal Requirements:	See Section 00 21 19 “Notice to Bidders” for Bid Proposal submission requirements, including requirements for electronically uploading and/or submitting hard copies of Affidavits, Certifications, and other bidding documents.	
Prevailing Wage Rates:	<p>Prevailing wages are required on this project, in accordance with the schedule provided in the bid documents, pursuant to Connecticut General Statutes Section 31-53 (a) through (h), as amended.</p> <p>Each contractor who is awarded a contract on or after October 1, 2002 shall be subject to provisions of the Connecticut General Statutes, Section 31-55a concerning annual adjustments to prevailing wages.</p> <p>Wage Rates will be posted each July 1st on the Department of Labor website www.ctdol.state.ct.us. Such prevailing wage adjustment shall not be considered a matter for any contract amendment.</p> <p>The wages paid on an hourly basis to any mechanic, laborer or workman employed upon the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such employee to any employee welfare fund, as defined in subsection (h) of section 31-53 of the Connecticut General Statutes, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification on each pay day.</p>	
To access Executive Orders:	Go to the Governor’s website www.ct.gov/governor , and then click on the “ Press Room ” link, and then click on “ Executive Orders ”.	
To access the Military Dept website:	Go to the MIL website www.ct.gov/mil .	

The Commissioner of the Military Department reserves the right to do any of the following without liability, including but not limited to: (a) waive technical defects in the bid proposal as he or she deems best for the interest of the State; (b) negotiate with a contractor in accordance with Connecticut General Statutes Section 4b-91;(c) reject any or all bids; (d) cancel the award or execution of any contract prior to the issuance of the "Notice To Proceed;" and, (e) advertise for new bids.

All **project** questions must be emailed **ONLY** to the Contract Administrator listed below.

Architect/Engineer/Consultant:	Burns & McDonnell Engineering Company, Inc.
Construction Administrator:	CTARNG-CFMO James Cavanna. james.a.cavanna2.nfg@mail.mil
MD Project Manager:	Michael Carragher

All **Bid** questions should be addressed to the **Contract Administrator** listed below **ONLY**.

Contract Administrator:	Ronna Cannata Ronna.Cannata@ct.gov
Contract Time Allowed:	270 Calendar Days
Liquidated Damages:	\$ _____ Per Calendar Day beyond Substantial Completion.
	\$ _____ Per Calendar Day beyond ninety (90) days after Substantial Completion

State of CT, Military Department - Procurement Services

**STATE OF CT - MILITARY DEPARTMENT
PROCUREMENT SERVICES
NOTICE TO BIDDERS**

ARTICLE 1 BIDS AND REJECTION OF BIDS:

1.1 Bids shall be for the complete work as specified and shall include the names of any subcontractors for the four classes of work specified in subsection (a) of C.G.S. § 4b-93 as revised, and for each other class of work for which the awarding authority has required a separate section pursuant to said subsection and the dollar amounts of their subcontracts, and the contractor shall be selected on the basis of such bids. It shall be presumed that the bidder intends to perform with its own employees all work in such four classes and such other classes, for which no subcontractor is named. The bidder's qualifications for performing such work shall be subject to review under C.G.S. § 4b-92, as revised. **For projects estimated to exceed Five Hundred Thousand Dollars (\$500,000.00) in total cost, the bidder must be prequalified by the Department of Administrative Services in the classification specified in the Invitation to Bid.**

1.2 The awarding authority may require the contractor to replace a **Named Subcontractor** whenever the awarding authority determines in their sole discretion that such **replacement** is in the **best interest of the State**.

1.3 Every **bid** which is conditional or obscure, **or which is not accompanied by a Department of Administrative Services Prequalification Certificate and Update Statement**, or which contains any addition not called for, shall be invalid, and the awarding authority shall *reject* every such bid. The awarding authority shall be authorized to waive **minor irregularities** which he considers in the best interest of the State, provided the reasons for any such waiver are stated in writing by the awarding authority and made a part of the contract file. No such bid shall be rejected because of the failure to submit prices for, or information relating to, any item or items for which no specific space is provided in the bid form furnished by the awarding authority, but this sentence shall not be applicable to any failure to furnish prices or information required by C.G.S. § 4b-95, as revised, to be furnished in the bid form provided by the awarding authority.

No person who's **Subcontract** exceeds five hundred thousand dollars in value may perform work as a Subcontractor on a project *estimated* to cost more than five hundred thousand dollars, unless the person is **prequalified** in accordance with C.G.S. § 4a-100, as amended by **Public Act 06-134**.

1.4 **Projects That Exceed Threshold Limits C.G.S §29-276b:**

Projects designated in **Section 00 41 00, Bid Proposal Form** as "Exceeding the Threshold Limits" must meet **C.G.S §20-341gg Registration of Major Contractors:**

Any person engaged in the business of construction, structural repair, structural alteration, dismantling or demolition of a structure or addition that exceeds the threshold limits provided in C.G.S §29-276b, or any person who, under the direction of a general contractor, performs or offers to perform any work that impacts upon the structural integrity of a structure or addition, including repair, alteration, dismantling or demolition of a structure or addition that exceeds the threshold limits shall engage in or offer to perform the work of a Major Contractor unless such person has first obtained a license or certificate of registration from the Department of Consumer Protection. Individuals must be licensed under the requirements of **C.G.S §20-341gg "Registration of Major Contractors"**. The Department of Consumer Protection shall issue a certificate of registration to any person who is prequalified pursuant to section 4a-100 who applies for registration in accordance with this section.

The contractor and all subcontractors that engage in work that impacts upon the structural integrity of a structure or addition must register as a **Major Contractor** with the Department Of Consumer Protection and obtain a **Major Contractor** License issued by the Department Of Consumer Protection prior to Bid Due Date/Time of this Project.

For further information visit the Department Of Consumer Protection Website: www.dcp.state.ct.us

1.5 **Bids** shall be publicly opened and read by the awarding authority forthwith. The awarding authority *may* require in the bid form that the contractor agree to perform a stated, minimum percentage of work with its **own forces**. The awarding authority *may* also require the contractor to set aside a portion of the contract for subcontractors who are eligible for **set-aside contracts**. The awarding authority shall not permit **substitution** of a subcontractor for one named in accordance with the provisions of said C.G.S. § 4b-95 or **substitution** of a subcontractor for any designated sub-trade work bid to be performed by the contractor's own forces, *except* for **good cause**. The term "good cause" includes but is not limited to a subcontractor's or, where appropriate, a contractor's: (1) Death or physical disability, if the listed subcontractor is an individual; (2) dissolution, if a

corporation or partnership; (3) bankruptcy; (4) inability to furnish any performance and payment bond shown on the bid form; (5) inability to obtain, or loss of, a license necessary for the performance of the particular category of work; (6) failure or inability to comply with a requirement of law applicable to contractors, subcontractors, or construction, alteration, or repair projects; (7) failure to perform its agreement to execute a subcontract under C.G.S. § 4b-96, as revised.

- 1.6 The **bid price** shall be the price set forth in the space provided on the **bid form**. No bid shall be rejected (1) because of error in setting forth the name of a subcontractor as long as the subcontractor or subcontractors designated are clearly identifiable, or (2) because the plans and specifications do not accompany the bid or are not submitted with the bid. Failure to correctly state a **subcontractor's price** shall be cause for rejection of the bid.
- 1.7 Each contractor who is awarded a contract on or after October 1, 2002 shall be subject to provisions of the C.G.S. § 31-53 as amended by Public Act 02-69, "An Act Concerning Annual Adjustments to Prevailing Wages."
- 1.8 In determining bid price, consideration should be given to C.G.S. § 31-53 and 31-55a of the Connecticut General Statutes regarding **annual adjustment of prevailing wage rates**. Annual adjustments of prevailing wage rates will not be considered a matter for a contract amendment.
- 1.9 Any contractor who violates any **provision** of said **C.G.S. § 4b-95** may be **disqualified** from bidding on other contracts that are subject to the provisions of **Chapter 60** of the Connecticut General Statutes, as revised, for a **period** not to exceed twenty-four months, commencing from the date on which the violation is discovered, for each violation. The awarding authority shall periodically review the contractor's subcontracts to insure compliance with such provisions, and shall after each such review prepare a written report setting forth his findings and conclusions.
- 1.10 **Bids** shall be submitted *only* on the **forms furnished** for the specific project. In *no* event will bids or changes in bids made by telephone, telegraph, facsimile or other communication technology be considered. *Any* bid form omitting or adding items, altering the form, containing conditional or alternative bids, or *without* the original signature of the bidder or its authorized representative, will be *rejected*.
- 1.11 Any bid received *after* the **scheduled closing time** for the receipt of bids will be returned to the bidder unopened.
- 1.12 Any **bid** once deposited with the **Military Department (CT MIL)** may only be **withdrawn** by **letter** of request, signed by the depositing bidder and presented to the **Military Department Supervisor**, Bidding and Contracts Unit, *prior* to the time of opening of any bid for the project designated or identified project.
- 1.13 **Gift And Campaign Contribution Certification:** In accordance with Executive Order 7C, and pursuant to Public Act 11-229, any principal or key personnel of the person, firm or corporation submitting a bid or proposal for a contract that has a value of **\$50,000** or more, shall be required to **electronically upload** a **Gift And Campaign Contribution Certification** prior to or at the time of the bid proposal submission. Instructions on how to electronically upload the **Gift And Campaign Contribution Certification** are available from the website of the Connecticut Department of Administrative Services (CT DAS), "Vendor Guide to Uploading Affidavits and Nondiscrimination Forms Online". Copy and Paste the link below for **The Vendor Guide**:
<https://portal.ct.gov/-/media/DAS/DAS-Procurement-Services/Contracting/Upload-Instructions.pdf?la=en>

Pursuant to C.G.S. § 4-252(d), and Public Act 11-229, any bidder or proposer that does not **electronically upload** the certification as required under this section shall be disqualified and CT MIL shall award the contract to the next highest ranked proposer or the next lowest responsible qualified bidder or seek new bids or proposals.

Once uploaded, an updated **Gift and Campaign Contribution Certification** shall be **electronically uploaded** within **30 days** of any changes to the submitted information.

Annually, on or within two (2) weeks of the **anniversary** date of the execution of this contract, the Contractor shall **electronically upload** a completed **Annual Certification** with authorizing resolution. For the purposes of this paragraph, the execution date of the contract will be the date the Commissioner of CT MIL signs the contract.

- 1.14 **Affirmation of Receipt of State Ethics Laws Summary:** Pursuant to Section 37 of **Public Act 05-287**, when the CT MIL is seeking a contract for a large state construction or procurement contract having a cost of more than **\$500,000**, CT MIL shall inform all potential consultant and contractor firms to **electronically download** the **"[Guide to the Code of Ethics For Current or Potential State Contractors](#)"** from the website of Office of State Ethics (OSE).

Pursuant to Public Act 11-229, CT MIL is also required to notify all potential consultant and contractor firms for a large state construction or procurement contract that they must **electronically upload** prior to or at the time of the bid proposal submission an **"Affirmation of Receipt of State Ethics Laws Summary"** affirming that their key employees have read and understand the summary and agree to comply with the provisions of state ethics law. Instructions on how to electronically upload an **"Affirmation of Receipt of State Ethics Laws Summary"** are available from the website of the Connecticut Department of Administrative Services (CT DAS), "Vendor Guide to Uploading Affidavits and Nondiscrimination Forms Online". **The Vendor Guide** can be found at <http://www.ct.gov> click on Doing Business > Doing Business with the State > State Procurement > **Business Friendly Initiatives** > Vendor Guide to Uploading Affidavits and Nondiscrimination Forms Online (PDF).

Failure to provide this affidavit with the bid proposal shall result in **rejection** of the bid. The **summary** includes a **note** regarding the more stringent CT MIL policy regarding gifts. *If* you decide to use the **Ethics Summary** posted on the [OSE web site](#) you must also add to it the **Note** which is set forth below.

Furthermore, the successful bidder shall provide the **Summary of the State Ethics Laws**, to each **named subcontractor** and any other **subcontractor** or **subconsultant** with a contract valued over \$500,000 and obtain a **Subcontractor and Subconsultant State Ethics Affidavit** that the key personnel of the subcontractor have read, understand, and agree to comply with provisions of the state ethics laws. The successful bidder shall provide such subcontractor(s) affidavit to the Military Department.

- 1.15 Consulting Agreement Affidavit and Certificate (of Authority):** A **Consulting Agreement Affidavit** must be completed and electronically uploaded prior to or at the time of the bid proposal submission for contracts with a value of \$50,000 or more. A **Certificate (of Authority)** shall be submitted with the bid proposal to CT MIL Procurement Services for contracts with a value of \$50,000 or more.

Instructions on how to electronically submit the **Consulting Agreement Affidavit** are available from the website of the Connecticut Department of Administrative Services (CT DAS), "Vendor Guide to Uploading Affidavits and Nondiscrimination Forms Online": **The Vendor Guide** can be found at <http://www.ct.gov> click on Doing Business > Doing Business with the State > State Procurement > **Business Friendly Initiatives** > Vendor Guide to Uploading Affidavits and Nondiscrimination Forms Online (PDF).

Once uploaded, an updated **Consulting Agreement Affidavit** shall be **electronically uploaded** within **30 days** of any changes to the submitted information. Once uploaded, the Affidavit shall be updated and submitted as required by the Office of Policy and Management and the Connecticut Department of Administrative Services. For the purposes of this paragraph, the **execution date** of the contract will be the date the Commissioner of CT MIL signs the contract.

In the event that a bidder or vendor *refuses* to submit the *affidavit* required under Conn. Gen. Stat. § 4a-81, such bidder shall be *disqualified* and the award shall be made to the next lowest responsible qualified bidder or new bids or proposals shall be sought.

The **Certificate (of Authority)** can be found in **Section 00 40 14 Certificate (of Authority)**.

- 1.16 State Election Enforcement Commission:** For all State contracts as defined in C.G.S. § 9-612 having a value in a calendar year of \$50,000 or more or a combination or series of such agreements or contracts having a value of \$100,000 or more, the **authorized signatory** to this submission in response to the State's solicitation expressly acknowledges receipt of the State Elections Enforcement

Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice, as set forth in "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations" See the SEEC website www.ct.gov/seec for downloading **SEEC Form 10**.

1.17 Nondiscrimination Certification: (a) For purposes of this Section, the following terms are defined as follows:

- (1) "Commission" means the Commission on Human Rights and Opportunities;
- (2) "Contract" and "contract" include any extension or modification of the Contract or contract;
- (3) "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor;
- (4) "Gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose.
- (5) "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations;
- (6) "good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements;
- (7) "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced;
- (8) "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders;
- (9) "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of Connecticut General Statutes § 32-9n; and
- (10) "public works contract" means any agreement between any individual, firm or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.

For purposes of this Section, the terms "Contract" and "contract" do not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, unless the contract is a municipal public works contract or quasi-public agency project contract, (2) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in C.G.S. § 1-267, (3) the federal government, (4) a foreign government, or (5) an agency of a subdivision, state or government described in the immediately preceding enumerated items (1), (2), (3), or (4).

(b) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Contractor further agrees to take

affirmative action to ensure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved;

(2) the Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission;

(3) the Contractor agrees to provide each labor union or representative of workers with which the Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which the Contractor has a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the Contractor's commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment;

(4) the Contractor agrees to comply with each provision of this Section and C.G.S. §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to C.G.S. §§ 46a-56, 46a-68e, 46a-68f and 46a-86; and

(5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this Section and C.G.S. § 46a-56. If the contract is a public works contract, municipal public works contract or contract for a quasi-public agency project, the Contractor agrees and warrants that he or she will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works or quasi-public agency projects.

(c) Determination of the Contractor's good faith efforts shall include, but shall not be limited to, the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.

(d) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.

(e) The Contractor shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes §46a-56; provided if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

(f) The Contractor agrees to comply with the regulations referred to in this Section as they exist on the date of this Contract and as they may be adopted or amended from time to time during the term of this Contract and any amendments thereto.

(g)(1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation;

(2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Contractor's

commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment;

(3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes § 46a-56; and

(4) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this Section and Connecticut General Statutes § 46a-56.

(h) The Contractor shall include the provisions of the foregoing paragraph in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes § 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter."

1.18 When a **mandatory bid conference** is required, bids submitted by contractors who have **not properly registered** and attended the mandatory pre-bid conference shall be rejected as **non-responsive**. All attendees of the pre-bid conference will be required to register. **Proper registration** means that the attendee has signed his or her name to the official roster and listed the name and address of the company he or she represents on the official roster no later than the designated start time of the pre-bid conference. Bidders are advised to register early as **no** attendee will be allowed to register *after* the advertised start time of the pre-bid conference.

1.19 In the event that a bidder or vendor refuses to submit the **consulting affidavit** required under subsection (b) of section 51 of Public Act 05-287, such bidder shall be *disqualified* and the award shall be made to the next lowest responsible qualified bidder or new bids or proposals shall be sought.

1.20 All acquisitions, agreements and contracts are subject to the provisions of the C.G.S. § 9-333n (transferred to 9- 612) regarding **CAMPAIGN CONTRIBUTION RESTRICTION**.

1.21 Each contract between a state or quasi-public agency and a large state contractor shall provide that, if an officer, employee, or appointing authority of a large state contractor takes or threatens to take any personnel action against any employee of the contractor in **retaliation** for such employee's **disclosure** of information to the Auditors of Public Accounts or the Attorney General under the provisions of subsection (a) of Section 4-61dd of the Connecticut General Statutes, the contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of the contract. Each violation shall be a separate and distinct offense and in the case of a continuing violation each calendar day's continuance of the violation shall be deemed to be a separate and distinct offense. The executive head of the state or quasi-public agency may request the Attorney General to bring a civil action in the Superior Court for the judicial district of Hartford to seek imposition and recovery of such civil penalty.

Each large state contractor shall post a **notice** of the provisions of Section 4-61dd relating to large state contractors in a conspicuous place that is readily available for viewing by the employees of the contractor.

1.22 It is agreed that this contract shall be governed by, construed, and enforced in accordance with the **laws of the State of Connecticut**. The State of Connecticut shall be the venue for this contract.

1.23 Nothing in this Agreement shall be construed as a waiver or limitation upon the **State's sovereign immunity**. To the extent this Section is found to be inconsistent with any other part of this Agreement, this Section shall control. This Section of the Agreement shall survive the completion and/or termination of this Agreement.

1.24 Pursuant to Connecticut General Statutes Sec. 31-53b (a) each contract entered into on or after July 1, 2007, for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public building project by the state or any of its agents, or by any political subdivision of

the state or any of its agents, where the total cost of all work to be performed by all contractors and subcontractors in connection with the contract is at least one hundred thousand dollars, shall contain a provision requiring that, not later than thirty days after the date such contract is awarded, each contractor furnish proof to the Labor Commissioner that all employees performing manual labor on or in such public building, pursuant to such contract, have completed a **course** of at least ten hours in duration in **construction safety and health** approved by the federal Occupational Safety and Health Administration or, in the case of telecommunications employees, have completed at least ten hours of training in accordance with 29 CFR 1910.268.

- 1.25 Bidders are responsible for **addenda** as noted in Article 4 of this notice. **Failure to acknowledge all addenda** in the space provided in Bid Proposal Form shall be cause for **rejection** of the bid.
- 1.26 The Military Department *may* reject a bid as **non-responsive** if the bidder does *not* make all required **pre- award submittals** *within* the time designated by the Military Department.

ARTICLE 2 BID SECURITY:

Each bid must be accompanied by a **certified check** made payable to "Treasurer, State of Connecticut," or the bid must be accompanied by a **bid bond**, in the form required by the awarding authority, having as **surety** thereto such surety company or companies acceptable to the Commissioner of the Military Department and as are authorized to do business in this State, for an amount not less than 10 percent of the bid. All **checks** submitted by **unsuccessful** bidders shall be returned to them *after* the contract has been awarded.

ARTICLE 3 Forfeit Of Bid Security:

Failure of the successful bidder to execute a contract awarded as specified and bid shall result in the **forfeiture** of the bid bond or certified check.

ARTICLE 4 Addenda And Interpretations:

No interpretations of the meaning of the plans, specifications or other contract documents will be made orally to any bidder. Every **request** for such interpretation should be in writing to the awarding authority and to be given consideration *must* be received at least **ten (10)** days *prior* to the date fixed for the opening of bids. Any and all such **interpretations** and any **supplemental instructions** will be in the form of written **addenda** to the specifications which, *if* issued, will be posted on the **State Contracting Portal**. However, at the discretion of the awarding authority the addenda *may* be *mailed* no later than **seven (7)** days *prior* to the date fixed for the opening of bids to those prospective bidders (at the respective addresses furnished for such purposes) who do not have email accounts and request the fiscal officer to mail them the addenda; failure of any bidder to receive any such **addendum** or **interpretation** shall not release any bidder from any obligations under its bid as submitted. It shall be the **bidder's responsibility** to make inquiry as to, and to obtain, the addenda issued, if any.

ARTICLE 5 Executive Orders:

This Contract is subject to Executive Order No. 3 of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices; Executive Order No. 17 of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings; Executive Order No. 16 of Governor John G. Rowland, promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and made a part of the Contract as if they had been fully set forth in it. The Contract may also be subject to Executive Order 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services and to Executive Order No. 49 of Governor Dannel P. Malloy, promulgated May 22, 2015, mandating disclosure of certain gifts to public employees and contributions to certain candidates for office. If Executive Order 14 and/or Executive Order 49 are applicable, they are deemed to be incorporated into and are made a part of the Contract as if they had been fully set forth in it. At the Contractor's request, the Client Agency or the Connecticut Department of Administrative Services shall provide a copy of these orders to the Contractor.

ARTICLE 6 Americans with Disabilities Act.

The Contractor shall be and remain in compliance with the Americans with Disabilities Act of 1990 (<http://www.ada.gov/>) as amended from time to time ("ADA") to the extent applicable, during the term of the Contract. The Agency may cancel or terminate this Contract if the Contractor fails to comply with the ADA. The Contractor represents that it is familiar with the terms of this Act and that it is in compliance with the law. The Contractor warrants that it shall hold the State harmless from any liability which may be imposed upon the state as a result of any failure of the Contractor to be in compliance with this ADA. As applicable, the Contractor shall comply with § 504 of the Federal Rehabilitation Act of 1973, as amended from time to time, 29 U.S.C. § 794 (Supp. 1993), regarding access to programs and facilities by people with disabilities.

ARTICLE 7 (Intentionally left Blank)

ARTICLE 8 Sexual Harassment Policy

This contract is subject to the provisions of the Military Department Sexual Harassment Policy ("Policy") and, as such, the contract may be canceled, terminated, or suspended by the CT MIL for violation of or noncompliance with said Policy. Said document is hereby incorporated herein by reference and made a part hereof as though fully set forth herein. This policy may be found at the **Military Department Website** at <http://www.ct.gov/mil>, under **Publications**.

ARTICLE 9 Certificate of Legal Existence:

A **corporation** that is awarded the contract must comply with the laws of this State regarding the procurement of a certificate of authority to transact business in this State from the **Secretary of the State**. A Certificate of Legal Existence which is not older than ninety (90) days from the date of the contract signing must be filed with the Military Department' Purchasing Officer.

ARTICLE 10 Security For Faithful Performance:

10.1 Performance Bond:

On or before the contract award date, the successful bidder shall substitute for the **certified check or bid bond** accompanying its bid an executed **performance bond**, in the amount not less than 100 percent of the contract price, conditioned upon the faithful performance of the contract, and having as surety thereto such surety company or companies satisfactory to the Commissioner and as are authorized to transact business in this State. This bond is to be furnished pursuant to **C.G.S. § 49-41**, as revised.

10.2 Labor and Material Bond:

At this same time, the successful bidder shall submit a labor and material bond in the amount not less than 100 percent of the contract price which shall be binding upon the award of the contract to such bidder, with surety or sureties satisfactory to the Commissioner and as are authorized to transact business in this State, for the protection of persons supplying labor or materials in the prosecution of the work provided for in the contract for the use of each such person. Any such bond furnished shall have as principal the name of the successful bidder. This bond is to be furnished pursuant to **C.G.S. § 49-41**, as revised.

The following sections of the General Statutes of Connecticut, as revised, are inserted as information concerning this bond:

C.G.S. § 49-41a. Enforcement of payment by general contractor to subcontractor and by subcontractor to his subcontractors.

- (a) When any public work is awarded by a contract for which a payment bond is required by section 49-41, the contract for the public work shall contain the following provisions: (1) A requirement that the general contractor, within thirty days after payment to the contractor by the State or a municipality, pay any amounts due any subcontractor, whether for labor performed or materials furnished, when the labor or materials have been included in a requisition submitted by the contractor and paid by the State or a municipality; (2) a requirement that the general contractor shall include in each of its **subcontracts** a **provision** requiring each **subcontractor** to pay any amounts due any of its subcontractors, whether for labor performed or materials furnished, *within* thirty days *after* such subcontractor receives a payment from the general contractor which encompasses labor or materials furnished by such subcontractor.
- (b) If payment is not made by the general contractor or any of its subcontractors in accordance with such requirements, the subcontractor shall set forth his claim against the general contractor and the subcontractor of a subcontractor shall set forth its claim against the subcontractor through notice by registered or certified mail. Ten days after the receipt of that notice, the general contractor shall be liable to its subcontractor, and the subcontractor shall be liable to its subcontractor, for interest on the amount due and owing at the rate of one percent per month. In addition, the general contractor, upon written demand of its subcontractor, or the subcontractor, upon written demand of its subcontractor, shall be required to place funds in the amount of the claim, plus interest of one per cent, in an interest-bearing escrow account in a bank in this State, provided the general contractor or subcontractor may refuse to place the funds in escrow on the grounds that the subcontractor has not substantially performed the work according to the terms of his or its employment. In the event that such general contractor or subcontractor refuses to place such funds in escrow, and the party making a claim against it under this section is found to have substantially performed its work in accordance with the

terms of its employment in any arbitration or litigation to determine the validity of such claim, then such general contractor or subcontractor shall pay the attorney's fees of such party.

- (c) No payment may be withheld from a subcontractor for work performed because of a dispute between the general contractor and another contractor or subcontractor.
- (d) This section shall not be construed to prohibit progress payments prior to final payment of the contract and is applicable to all subcontractors for material or labor whether they have contracted directly with the general contractor or with some other subcontractor on the work.

C.G.S. § 49-42. Enforcement of right to payment on bond. Suit on bond, procedure and judgment.

Any person who performed work or supplied materials for which a requisition was submitted to, or for which an estimate was prepared by, the awarding authority and who does not receive full payment for such work or materials within sixty days of the applicable payment date provided for in subsection (a) of section 49-41a, or any person who supplied materials or performed subcontracting work not included on a requisition or estimate who has not received full payment for such materials or work within sixty days after the date such materials were supplied or such work was performed, may enforce such right to payment under the bond by serving a notice of claim on the surety that issued the bond and a copy of such notice to the contractor named as principal in the bond within one hundred eighty days of the applicable payment date provided for in subsection (a) of section 49-41a, or, in the case of a person supplying materials or performing subcontracting work not included on a requisition or estimate, within one hundred eighty days after the date such materials were supplied or such work was performed. The notice of claim shall state with substantial accuracy the amount claimed and the name of the party for whom the work was performed or to whom the materials were supplied, and shall provide a detailed description of the bonded project for which the work or materials were provided. If the content of a notice prepared in accordance with subsection (b) of section 49-41a complies with the requirements of this section, a copy of such notice, served within one hundred eighty days of the payment date provided for in subsection (a) of section 49-41a upon the surety that issued the bond and upon the contractor named as principal in the bond, shall satisfy the notice requirements of this section. Within ninety days after service of the notice of claim, the surety shall make payment under the bond and satisfy the claim, or any portion of the claim which is not subject to a good faith dispute, and shall serve a notice on the claimant denying liability for any unpaid portion of the claim. The notices required under this section shall be served by registered or certified mail, postage prepaid in envelopes addressed to any office at which the surety, principal or claimant conducts his business, or in any manner in which civil process may be served. If the surety denies liability on the claim, or any portion thereof, the claimant may bring action upon the payment bond in the superior court for such sums and prosecute the action to final execution and judgment. An action to recover on a payment bond under this section shall be privileged with respect to assignment for trial. The court shall not consolidate for trial any action brought under this section with any other action brought on the same bond unless the court finds that a substantial portion of the evidence to be adduced, other than the fact that the claims sought to be consolidated arise under the same general contract, is common to such actions and that consolidation will not result in excessive delays to any claimant whose action was instituted at a time significantly prior to the motion to consolidate. In any such proceeding, the court judgment shall award the prevailing party the costs for bringing such proceeding and allow interest at the rate of interest specified in the labor or materials contract under which the claim arises or, if no such interest rate is specified, at the rate of interest as provided in section 37-3a upon the amount recovered, computed from the date of service of the notice of claim, provided, for any portion of the claim which the court finds was due and payable after the date of service of the notice of claim, such interest shall be computed from the date such portion became due and payable. The court judgment may award reasonable attorney's fees to either party if upon reviewing the entire record, it appears that either the original claim, the surety's denial of liability, or the defense interposed to the claim is without substantial basis in fact or law. Any person having direct contractual relationship with a subcontractor but no contractual relationship express or implied with the contractor furnishing the payment bond shall have a right of action upon the payment bond upon giving written notice of claim as provided in this section.

- (a) Every suit instituted under this section shall be brought in the name of the person suing, in the superior court for the judicial district where the contract was to be performed, irrespective of the amount in controversy in the suit, but no such suit may be commenced after the expiration of one year after the applicable payment date provided for in subsection (a) of section 49-41a, or, in the case of a person supplying materials or performing subcontracting work not included on a requisition or estimate, no such suit may be commenced after the expiration of one year after the date such materials were supplied or such work was performed.
- (b) The word "material" as used in section 49-41 to 49-43, inclusive, includes the rental of equipment used in the prosecution of work provided for in the contract.

ARTICLE 11 CONNECTICUT SALES AND USE TAXES:

All bidders shall familiarize themselves with the current statutes and regulations of the **Department of Revenue Services**. The tax on materials or supplies exempted by such statutes and regulations shall not be included as part of a bid.

Nonresident contractors must comply with the **provisions C.S.G. § 12-430(7), Bond requirement for nonresident contractors**, and the regulations established pursuant to that section.

ARTICLE 12 Contractor's Qualifications:

All bidders shall file with their bids a **statement of qualifications** on the appropriate form.

ARTICLE 13. Subcontractors:

As required by the **Bid Proposal Form**, each bidder shall furnish with its submitted bid, and in the place on the bid form provided for such purpose, the **names of responsible and qualified subcontractors** who are actually to perform the work required by the division or portion of the specifications listed for the base bid. **Failure to so list a subcontractor** for any division or portion of the specifications will result in the **rejection** of the entire bid.

ARTICLE 14 NOT USED

ARTICLE 15 Nondiscrimination and Affirmative Action Provisions:

This section is inserted in connection with Subsection (a) of C.G.S. § 4a-60 of the General Statutes of Connecticut, as revised.

References in this section to "contract" shall mean this Contract and references to "contractor" shall mean the Contractor.

(1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the state of Connecticut. The contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved; (2) the contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the commission; (3) the contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the commission advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the contractor agrees to comply with each provision of this section and sections 46a-68e and 46a-68f and with each regulation or relevant order issued by said commission pursuant to sections 46a-56, 46a-68e and 46a-68f; (5) the contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor as relate to the provisions of this section and section 46a-56.

- a. Utilization of Minority Business Enterprises. The Contractor shall perform under this Contract in accordance with 45 C.F.R. Part 74; and, as applicable, C.G.S. §§ 4a-60 to 4a-60a and 4a-60g to carry out this policy in the award of any subcontracts

"Minority business enterprise" means any small contractor or supplier of materials fifty-one per cent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) Who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise and (3) who are members of a

minority, as such term is defined in subsection (a) of section 32-9n; and "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations. "Good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements.

- b. Determination** of the contractor's good faith efforts shall include but shall not be limited to the following factors: The contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the commission may prescribe that are designed to ensure the participation of minority business enterprises in CT MIL projects.
- c.** The contractor shall develop and maintain adequate documentation, in a manner prescribed by the commission, of its good faith efforts.
- d.** The contractor shall include the **provisions** of sections (a) and (b) above in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. The contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with section 46a-56; provided, if such contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the commission, the contractor may request the state of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the state and the state may so enter.

ARTICLE 16 Nondiscrimination Provisions Regarding Sexual Orientation:

This section is inserted in connection with Subsection (a) of Section 4a-60a of the General Statutes of Connecticut, as revised.

- a. (1)** The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the state of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said commission pursuant to section 46a-56; and (4) the contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor which relate to the provisions of this section and section 46a-56.
- b.** The contractor shall include the provisions of section (a) above in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. The contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with section 46a-56; provided, if such contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the commission, the

- contractor may request the state of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the state and the state may so enter.
- c. For the purposes of this entire Non-Discrimination section, "contract" includes any extension or modification of the contract, "contractor" includes any successors or assigns of the contractor, "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced, and "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders. For the purposes of this section, "contract" does not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, (2) a quasi-public agency, as defined in Conn. Gen. Stat. Section 1-120, (3) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in Conn. Gen. Stat. Section 1-267, (4) the federal government, (5) a foreign government, or (6) an agency of a subdivision, agency, state or government described in the immediately preceding enumerated items (1), (2), (3), (4) or (5).

A **nondiscrimination certification** is required for all State contracts, regardless of type, term, cost or value. The **appropriate form** must be **electronically uploaded** *prior to or at the time of the bid proposal submission*. Instructions on how to electronically upload the **Nondiscrimination Certification** are available from the website of the Connecticut Department of Administrative Services (CT DAS), "Vendor Guide to Uploading Affidavits and Nondiscrimination Forms Online": **The Vendor Guide** can be found at <http://www.ct.gov> click on Doing Business > Doing Business with the State > State Procurement > **Business Friendly Initiatives** > Vendor Guide to Uploading Affidavits and Nondiscrimination Forms Online (PDF).

For the **list of Nondiscrimination forms and descriptions** go to the **Office of Policy and Management (OPM) website**, www.ct.gov/opm, under **Featured Links** > Nondiscrimination Certification.

ARTICLE 17 Union Labor:

Attention is called to the fact that there may be construction work now being carried on at the site at which construction is contemplated being done by union labor. This fact must be kept in mind by all bidders.

ARTICLE 18 Labor Market Area:

All bidders shall have read **Sections 31-52 and 31-52a** of the **Connecticut General Statutes**, as revised. These sections relate to the **preference of State citizens** and the **preference of residents of the labor market area** in which the work under the contract is to be done and the **penalties for violations** thereof.

Priority Hiring. Subject to the Contractor's exclusive right to determine the qualifications for all employment positions, the Contractor shall give priority to hiring welfare recipients who are subject to time-limited welfare and must find employment. The Contractor and the Agency shall work cooperatively to determine the number and types of positions to which this Section shall apply

In order to avoid violations by the contractor and to cooperate with and assist the State in the implementation of the statutory mandates, any bidder awarded a contract with the State shall be required to provide the State with the following information:

- 18.1** The names and addresses of employees utilized by the contractor and by its subcontractors and how long each such employee has resided in Connecticut.
- 18.2** How long each employee has resided in the labor market area, as established by the State Labor Commissioner, in which the work under the contract is to be done. Labor market areas are indicated on the end of this section.
- 18.3** Within thirty (30) days after the start of work, the contractor shall submit a signed statement setting forth the procedures the contractor and its subcontractors have taken to assure that they have sought out qualified residents of the labor market area. Also, the statement shall include information as to how many persons were considered for employment and how many were actually hired. Such procedures will include, but not be limited to, obtaining names of available persons from area Employment Security Offices.

18.4 In the same manner as item (18.3) above, the statement shall indicate the steps taken to assure that the contractor and its subcontractors have sought out qualified residents of this State.

18.5 The contractor shall cooperate with and provide information to the construction supervisor or inspector of the State assigned to collect and verify the information required. The State may request that all such information be updated during the term of the contract at reasonable times.

18.6 All such information gathered and compiled by the State shall be forwarded to the Labor Commissioner.

18.7 *Pursuant to C.G.S. § 31-52b, as revised:*

"The provisions of C.G.S. § 31-52 and 31-52a shall not apply where the State or any subdivision thereof may suffer the loss of revenue granted or to be granted from any agency or department of the federal government as a result of said sections or regulative procedures pursuant thereto."

However, no exception shall be determined to be applicable unless stated in writing by the Commissioner of the Military Department.

18.8 **Website Link:**

For guidance on the CT Department of Labor (DOL) Labor Market Areas (LMA) visit CT-DOL Website Link:

<http://www1.ctdol.state.ct.us/lmi/misc/lmatowns.asp>.

END OF SECTION

Pre-Bid Meeting Agenda:
CT MILITARY DEPARTMENT ● PURCHASING & CONTRACTING

1.0 Pre-Bid Meeting:

1.1	<p>The State of Connecticut, Burns & McDonnell Engineering Company, Inc., CTARNG-CFMO will conduct a Pre-Bid Meeting.</p> <p>For the Pre-Bid Meeting Date, Time, and Location see Section 00 11 16 Invitation To Bid for this Specific Bid.</p>
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1.2	Attendance:	
	1.2.1 General Contractor:	Attendance at the Pre-Bid Meeting is MANDATORY . At the Pre-Bid Meeting, all prospective bidders shall <i>sign</i> his or her name on the official roster and <i>list</i> the name and address of the company he or she represents. For MANDATORY Pre-Bid Meetings, this shall be done no later than the designated start time of the Pre-Bid Meeting. Prospective bidders are advised to register early as no attendee will be allowed to register <i>after</i> the advertised start time. Bids submitted by contractors who have <i>not properly</i> registered and attended the MANDATORY Pre-Bid Meeting <i>shall be rejected</i> as non-responsive .
	1.2.2 Subcontractors:	Attendance at the Pre-Bid Meeting is recommended.
	1.2.3 Pre-Bid Meeting Sign-in Sheet:	It is MANDATORY that all attendees sign the Pre-Bid Meeting Sign-in Sheet .

1.3	Site/Facility Visit or Walkthrough: No other site visits will be available.	
	<input checked="" type="checkbox"/>	1.3.1 A Site/Facility Visit or Walkthrough is scheduled for the Pre-Bid Meeting
	<input type="checkbox"/>	1.3.2 A Site/Facility Visit or Walkthrough is NOT scheduled for the Pre-Bid Meeting

1.4	Bidder Questions:	
		<p>Submit written questions to be discussed at the Pre-Bid Meeting a minimum of two (2) Calendar Days prior to Pre-Bid Meeting date. See the Invitation to Bid for instructions on submitting questions.</p> <p>IMPORTANT NOTE: In accordance with CT Regulations, no participants in any Selection, Proposal, or Bidding process, including User Agency representative(s), shall communicate with any potential Offeror prior to, during, or upon conclusion of the entire Selection, Proposal, or Bidding procedure, with the exception of information necessary to complete the administrative steps of the Selection process.</p>

2.0 Pre-Bid Meeting Agenda:

The Pre-Bid Meeting Agenda will include a review of topics, **as applicable to the Project**, which may affect proper preparation and submittal of bids, including, but not limited to, the following:

2.1	Introduction of Participants:	
	2.1.1 Architect/Engineer:	Burns & McDonnell Engineering Company, Inc.
	2.1.2 CA:	CTARNG
	2.1.3 Representative:	James Cavanna
	2.1.4 Agency Representative:	Michael Carragher

2.0 Pre-Bid Meeting Agenda (continued):

2.2	Project Summary:
2.2.1	Summary of Work: See General Requirements Section 01 11 00
2.2.2	Temporary Facilities and Controls: See General Requirements Section 01 14 00
2.2.3	Work Sequence: See General Requirements Section 01 11 00
2.2.4	Contractor Use of Premises: See General Requirements Section 01 11 00
2.2.5	Project Schedule Nov 1, 2020 to Jul 31, 2021
2.2.6	Contract Time 270 days approx
2.2.7	Liquidated Damages: See General Conditions Section 00 72 13, Articles 1 and 8, and 00 41 00 Bid Proposal Form.

2.3	Procurement and Contracting Requirements:
2.3.1	Section 00 11 16 – Invitation to Bid
2.3.2	Section 00 21 19 – Instructions to Bidders
2.3.3	Section 00 41 00 – Bid Proposal Form
2.3.4	Section 00 41 10 – Bid Package Submittal Requirements
2.3.5	Section 00 30 00 – General Statements for Available information
2.3.6	Division 50 – Project-Specific Available Information
2.3.7	Bonding
2.3.8	Insurance
2.3.9	Bid Security
2.3.10	Notice of Award

2.4	Communication During Bidding Period:
2.4.1	Obtaining Bid Documents
2.4.2	Access to DAS Website, BizNet, and State Contracting Portal
2.4.3	Bidder's Requests for Information: See General Requirements Sections 01 26 00
2.4.4	Substitution Procedures (Prior to Bid): See General Requirements Section 01 25 00
2.4.5	<p>Substitutions following Contract Award: See General Requirements Section 01 25 00 & General Conditions Section 00 72 13, Article 15.</p> <p>Subject to the Architect or Engineer's determination, if the material or equipment is Equal to the one specified or pre-qualified and the MIL Project Manager's approval of such determination, Substitution of Material or Equipment may be allowed after the Letter of Award is issued, as specified in the Conditions Section 00 72 13, Article 15.</p>
2.4.6	Addenda Procedures: See Item No. 2.7 of this form

2.0 Pre-Bid Meeting Agenda (continued):

2.5	Contract Considerations:
2.5.1	Allowances: See General Requirements Section 01 20 00
2.5.2	Unit Prices: See General Requirements Section 01 20 00
2.5.3	Supplemental Bid: See General Require and 00 41 00 Bid Proposal Form.
2.6	Separate Contracts:
2.6.1	Work by Owner
2.6.2	Work of Other Contracts
2.7	Post Pre-Bid Meeting Addendum:
2.7.1	No Interpretations of the meaning of the plans, specifications or other contract documents will be made orally at any time. Every bidder request for such interpretation shall be in writing to the awarding authority and to be given consideration shall be received by 17 August 2020 . Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, <i>if</i> issued, will be posted on the State Contracting Portal.
2.7.2	Other Bidder Questions
2.8	Other Agenda Topics and Notes:
2.8.1	
2.8.2	

3.0 Pre-Bid Meeting Minutes:

3.1 Recording and Distribution of Pre-Bid Meeting Minutes:

- 3.1.1 The [Owner], [Architect], [Construction Administrator] is responsible for conducting the Pre-Bid Meeting and will record and distribute meeting minutes to attendees [and others known by the issuing office to have received a complete set of Procurement and Contracting Documents].

3.2 Pre-Bid Meeting Minutes as “Available Information”

- 3.2.1 Minutes of the Pre-Bid Meeting are issued as “Available Information” and **do not** constitute a modification to the Procurement and Contracting Documents. **Modifications to the Procurement and Contracting Documents are issued by written Addendum only.**

3.3 Pre-Bid Meeting Sign-in Sheet:

- 3.3.1 Minutes will include the list of meeting attendees.

3.4 List of Planholders:

- 3.4.1 Minutes will include the list of planholders.

End of Section
00 25 13 Pre-Bid Meeting Agenda

CERTIFICATE (of Authority)	
I _____ (Signer's Name) ¹	_____ (Signer's Title)
of _____ (Name of Entity)	an entity lawfully organized and existing under the laws
of _____ (Name of State or Commonwealth)	do hereby certify that the following is a true and correct
copy of a resolution adopted on the _____ day of _____, 20_____ (Day) ² (Month) ² (Year) ²	by the governing body of
_____ (Name Of Entity)	in accordance with all of its documents of governance and
management and the laws of _____ (Name of State or Commonwealth)	and further certify that such resolution has not
been modified, rescinded or revoked, and is at present in full force and effect.	
RESOLVED: that _____ (Name and Title of Signer of Contract Documents) ³	
of _____ (name of entity)	is empowered and authorized, on behalf of the entity,
to execute and deliver contracts and amendments thereto, and all documents required by the Governor, the Connecticut Department of Administrative Services, the Connecticut State Properties Review Board and the Office of the Attorney General associated with such contracts and amendments.	
IN WITNESS WHEREOF , the undersigned has executed this certificate this _____ day of _____, 20_____ (Day) ⁴ (Month) ⁴ (Year) ⁴	
_____ (Signature)	
_____ (Print Name)	_____ (Title)

1 - The signer of this certificate must be someone *other than* the signer of the contract documents *except for* a sole managing member of an LLC or the sole officer or sole principal of a corporation. *If* the signer is a sole managing member of an LLC, *then* along with this certificate the signer must provide a letter on company letterhead that indicates the signer is a sole member and managing member. If the signer is the sole officer or sole principal of a corporation, then the signer must provide with the certificate a letter on company letterhead setting forth this fact.

2 - This date must be on or before the **date of signing** of the Bid Proposal or (contract).

3 - This person shall sign the contract document and other required documents.

4 - This date must be on or after the **date of signing** of the Bid Proposal or (contract).

**FOR YOUR
INFORMATION**

Certificate (of Authority)

What the **Certificate** is saying is that the organization authorized the signatory to sign the pertinent **documents other than** the Certificate (of Authority) and that, as of the date of **execution** of the CERTIFICATE (i.e., the date set forth in the "In Witness Whereof" blanks) there has been no change in that authorization.

Instructions for completing the Certificate (of Authority)

The Certificate (Authority) to Accompany the Bid Proposal Form:

1. **1st Paragraph:**
 - a. First, enter the name and title of the individual signing the Certificate (of Authority).
 - b. Second, enter the legal name of the entity (exactly as it is shown on the Secretary of State registry).
 - c. Third, enter the name of the state or commonwealth the entity is registered in.
 - d. Fourth, enter the date the resolution was adopted by the governing body. This **date** is **on** or **before** the date the **Bid Proposal** is signed.
 - e. Fifth, enter the name of the state or commonwealth the entity is registered in.
2. **2nd Paragraph:**
 - a. First enter the name and title of the individual signing bid documents for the entity.
 - b. Second, enter the legal name of the entity (exactly as it is shown on the Secretary of State registry).
3. **Last Paragraph:**
 - a. Enter the Witness date. This date will likely be the date of execution of the **Bid Proposal form**. **THE DATE SHOULD NOT BE BEFORE THE DATE OF EXECUTION OF THE BID PROPOSAL.**

The Certificate (Authority) to Accompany the Contract:

1. **1st Paragraph:**
 - a. First, enter the name and title of the individual signing the Certificate (of Authority).
 - b. Second, enter the legal name the entity (exactly as it is shown on the Secretary of State registry).
 - c. Third, enter the name of the state or commonwealth the entity is registered in.
 - d. Fourth, enter the date the resolution was adopted by the governing body. This **date** is **on** or **before** the date the **Contract** is signed.
 - e. Fifth, enter the name of the state or commonwealth the entity is registered in.
2. **2nd Paragraph:**
 - a. First enter the name and title of the individual signing contract documents for the entity.
 - b. Second, enter the legal name of the entity (exactly as it is shown on the Secretary of State registry).
3. **Last Paragraph:**
 - a. Enter the Witness date. This date will likely be the date of execution of the **CONTRACT**. **THE DATE SHOULD NOT BE BEFORE THE DATE OF EXECUTION OF THE CONTRACT.**

END SECTION 00 40 14
CERTIFICATE (of
Authority)

State of Connecticut Department of Administrative Services Contractor Prequalification Program

IMPORTANT INFORMATION - PLEASE READ

Directions for Retrieving Your Prequalification Certificate:

In order to print out your Prequalification Certificate please go to the On Line Contractor Directory:

<http://www.biznet.ct.gov/prequalSearch/>

Once in the directory, just type in your company name and click on "Go" to pull up your company. When your company information appears you will notice that your company name is shown as a blue link. Just click on this link and it will take you to your Prequalification Certificate.

WHEN YOU SUBMIT A BID YOU MUST INCLUDE WITH YOUR OTHER DOCUMENTS THE FOLLOWING:

- 1. A copy of your Prequalification Certificate.**
This document may be found and completed on-line at the Contractor Prequalification Application website.
- 2. An Update (Bid) Statement.**
This document may be found and completed on-line at the Contractor Prequalification Application website.

Should you have any questions or concerns, contact us at (860) 713-

5280. Web Address: <http://www.das.state.ct.us>



STATE OF CONNECTICUT

State of Connecticut
 Department of Administrative Services



AI00TOAS FAQS PRESSROOM SITEMAP CONTACT US HOME

Quick Links: >> GOVERNMENT >> B

» DAS Contractor Prequalification Certificate

Contractor Prequalification Company Information

Company: **Sample Corporation**

Address: 165 Capitol Avenue
 Hartford, CT 06106

Prequalification
 Contact: John T. Reed

Telephone: (860) 111-2222 Fax: (860) 111-3333

Email: freed@sample.com

Web Addr: www.sample.com

Contractor Prequalification History

Active Date	Expiration Date	Single Project	AWC
Oct 8, 2004	Oct 7, 2005	\$20,000,000	\$50,000,000

Prequalification Classification(s)

Classification	Description
GENERAL BUILDING CONSTRUCTION (GROUP C)	The undertaking of general contracts for the construction of buildings (i.e. new construction, renovation, rehabilitation, alteration, addition, etc.). The contract must include a variety of construction practices and specialties of a minimum of three sub-trades. Includes buildings that are truly custom, requiring extensive detailing, or that have large amounts of integrated scientific or complex mechanical/electrical equipment in order for them to function. Examples include hospitals, chemistry buildings, special collections buildings, historic preservation to a landmark structure, and/or any other structure that is truly one of a kind within the State's inventory.

Note: If you are prequalified for General Building Construction under Group C, you are automatically prequalified for Group A and Group B.

Prequalification Licenses

License #	Trade	Active	Expire
000009	Asbestos Contractor	Sep 8, 2004	Aug 31, 2005
900235	Major Contractor	Jul 1, 2004	Jun 30, 2005
667 Class A	Demolition Contractor	Apr 1, 2004	Mar 31, 2005

This certificate prequalifies the named company to bid solely. It is not a statement of the company's capacity to perform a specific project. That responsibility lies with the awarding authority.

Company Licenses/Registrations: It is the contractor's responsibility to update their licensure information by editing their electronic application. Licensure is confirmed by the DAS at time of initial application and at each renewal.

It is the Department of Administrative Services' (DAS) recommendation that all awarding authorities verify the above information by visiting the DAS Prequalification website.

For information regarding the DAS Contractor Prequalification Program visit the above mentioned website.

State of Connecticut
Department of Administrative Services (DAS) Contractor Prequalification
Update Bid Statement

(Statement to be included with the bid)

Public Act No. 04-141 - AN ACT REVISING PREQUALIFICATION REQUIREMENTS FOR STATE CONSTRUCTION CONTRACTS.

On and after October 1, 2004, each bid submitted for a contract shall include a copy of a prequalification certificate issued by the Commissioner of Administrative Services. The bid shall also be accompanied by an update statement in such form as the Commissioner of Administrative Services prescribes. The form for such update statement shall provide space for information regarding all projects completed by the bidder since the date the bidder's prequalification certificate was issued or renewed, all projects the bidder currently has under contract, including the percentage of work on such projects not completed, the names and qualifications of the personnel who will have supervisory responsibility for the performance of the contract, any significant changes in the bidder's financial position or corporate structure since the date the certificate was issued or renewed, any change in the contractor's qualification status and such other relevant information as the Commissioner of Administrative Services prescribes. Any bid submitted without a copy of the prequalification certificate and an update statement shall be invalid.

SAMPLE

Name of Project that company is bidding on:		
Project Number:		
Name of Company:		
FEIN:		
Company Address:		
Prequalification Contact and Telephone Number		
Date of Prequalification with the DAS:	Single Limit:	Aggregate Work Capacity (AWC):
* This amount equals your company's AWC minus the Total \$ Amount of Work Remaining.		* Remaining Aggregate Work Capacity:

Please list all of your company's **(100%) completed projects** since date of Prequalification:
(Please add additional page(s) if required)

Name of Project	Owner of Project	Date Project Completed	Total Contract Amount

(Please add additional page(s) if required. Please total the Work Remaining column)

Name of Project	Owner of Project	Total Contract Amount	% Complete	Work Remaining (\$)
Total \$ Amount of Work Remaining				

Please list the names and titles of the personnel who will have supervisory responsibility for the performance of the contract being bid on:
(Please add additional page(s) if required)

Individual Name	Title of individual

Have there been any changes in your company's financial condition or business organization, which might affect your company's ability to successfully complete this contract?

Yes or No

If yes, please explain:

I, certify under penalty of law that all of the information contained in this Update Statement is true and accurate to the best of my knowledge as of the date below.

Signature

Date

It is the responsibility of the Awarding Authority to determine if any of the information provided above will impact the contractor's performance on this project.

The DAS' Contractor Prequalification Program can be reached at (860) 713-5280

Rev.12.22.2004

**BID PROPOSAL FORM
FOR MAJOR & MINOR CAPITAL PROJECTS
WITH AN ESTIMATED CONSTRUCTION COST GREATER THAN \$500,000**

This Project:

Does Not Exceed the Threshold Limits of C.G.S §29-276b.

Does Exceed the Threshold Limits of C.G.S §29-276b.

All Bidders shall read "Section 00 21 19 Notice To Bidders" for Contractors and Subcontractors performing work on Projects that Exceed the Threshold Limits of C.G.S §29-276b to Register and obtain a "Major Contractor" License with the CT Department of Consumer Protection prior to Bid Due Date/Time of this Project .

**STATE OF CONNECTICUT
MILITARY DEPARTMENT**

DATE: _____

PROPOSAL OF

BIDDER'S LEGAL COMPANY NAME

BIDDER'S ADDRESS

**To the Commissioner, Military Department
360 Broad Street
Hartford, Connecticut 06105**

Dear Sir:

1.0 In accordance with Chapter 60 Part II of the Connecticut General Statutes, as amended, and pursuant to, and in compliance with your Invitation to Bid, the Notice to Bidders, the Contract, including the conditions thereto, the Bid Security, I (we) propose to furnish the labor and/or materials, installed as required for the project named and numbered on this Bid Proposal Form, submitted herein, furnishing all necessary equipment, machinery, tools, labor and other means of construction, and all materials specified in the manner and at the time prescribed strictly in accordance with the provisions of the Contract including, but not limited to, the specifications and/or drawings together with all addenda issued by your authority and received prior to the scheduled closing time for the receipt of the bids, and in conformity with requirements of the Awarding Authority and any laws or Departmental regulations of the State of Connecticut or of the United States which may affect the same, for and in consideration of the price(s) stated on the said Bid Proposal Form, hereof.

2.0 The **Lump Sum Base Bid** by me (us) on the Bid Proposal Form *includes all* work indicated on the drawings and/or described in the specifications, except:

2.1 Work covered by **Supplemental Bids** as may be listed on the Bid Proposal Form and General Requirements.

2.2 Contingent Work covered by the **Unit Prices** included within the **General Requirements**.

2.3 Contingent Work covered by the **Contractor Provided Unit Prices** as may be listed on the **Bid Proposal Form** in Section 00 41 00, Item 7.7.

3.0 I (we) *acknowledge* and *agree* to the following:

- 3.1 To use and accept the **Contractor Provided Unit Prices** on the **Bid Proposal Form**, Section 00 41 00, Item 7.7, as provided by the Contractor in evaluating either additions to or deductions from the Work.
- 3.2 To use and accept the **Unit Prices** in Section 01 22 00 "UNIT PRICES" Division 01 as provided by the Owner in evaluating either additions to or deductions from the Work.
- 3.3 To use and accept the **Allowances** in Section 01 21 00 "ALLOWANCES" Division 1, as part of the Total Contract Sum as listed in Section 7.3 of this Bid Proposal form.
- 3.4 To use and accept the **Supplemental Bids** in Section 01 23 13, Division 1, as provided by the Contractor, when authorized by the Owner as scheduled in Section 7.6 of this Bid proposal form.
- 3.5 **Submission of Bid Proposal and other bid submittal requirements:**
- All potential bidders must **electronically upload** to CT DAS and/or **submit** to CT DAS Procurement Services (as applicable) including but not limited to **Affidavits and Certifications**.
- For the requirements to submit the Bid Proposal, and electronically upload Affidavits and Certifications, and other bidding documents, see **Article 1 of 00 21 19 Notice to Bidders - (Major & Minor Capital Projects Greater than \$500,000)**.
- 3.6 To hold the bid price for ninety (90) calendar days and any extensions caused by the Contractor's delays in required submissions. The Contractor and the State may mutually agree to extend this period. The agreement to extend the 90-day period may occur after the expiration of the original 90-day period.
- The apparent low bidder is required to submit key supporting documents as noted under the caption **Bid Submittal Time Line** at the end of this Section 00 41 00, within ten (10) calendar days of the bid opening, and to submit their Affirmative Action Plan to CHRO within fifteen (15) calendar days of bid opening. If there are any delays in the receipt of these materials then the Bid shall remain valid for the same additional number of days. For example, if the materials are submitted four (4) days later; then the bid shall remain valid for ninety-four (94) days.
- 3.7 To comply with the Military Department's **Security Regulations For Contract Forces**, Section 00 73 63.
- 4.0 This Bid Proposal Form is submitted to and in compliance with the foregoing and following conditions and/or information:
- 4.1 **AWARD:**
- 4.1.1 All proposals shall be subject to provisions of **Article 1 of the Notice to Bidders** and for purpose of award, consideration shall be given only to Bid Proposals submitted by qualified and responsible bidders.
- 4.1.2 The award shall be made on the **lowest Lump Sum Bid** as stated in Section 7.3 of this Bid Proposal Form and any or all **Supplemental Bids** as stated in Section 7.6 of this **Bid Proposal Form**, taken sequentially, as applicable, provided funds are available.
- 4.1.3 In the event of any **discrepancy** between the amount written in words and the amount written in numerical figures, the amount written in words shall be controlling.
- 4.2 **COMMENCEMENT AND ACCEPTANCE (ARTICLE 4 GENERAL CONDITIONS):**
- 4.2.1 The General Contractor shall commence Work within **fourteen (14) calendar days** after receiving "Construction Start Date and Notice To Proceed" by the Commissioner or the authorized representative and continue for one-hundred and eighty (180) calendar days for completion of the project.
- 4.3 **LIQUIDATED DAMAGES: (ARTICLE 8, GENERAL CONDITIONS):**

4.3.1 The General Contractor shall be assessed \$ 839.00 per day for each calendar day *beyond* the Date established for Substantial Completion of the Contract according to the **Contract Time** as defined in Article 1.28 of the General Conditions, and not otherwise excused or waived pursuant to the Contract Documents, as defined in Article 1.23 of the General Conditions.

4.3.2 The General Contractor shall be assessed \$ 839.00 per day for each calendar day *beyond* ninety (90) days *after* the date of said Substantial Completion that the Contractor fails to achieve **Acceptance**, as defined in Article 1.1 of the General Conditions and not otherwise excused or waived as described above.

4.4 **CONTRACTOR'S INSURANCE REQUIRED: (ARTICLE 35, GENERAL CONDITIONS):**

4.4.1 The **limits of liability** for the Insurance required for this project shall be those listed in Article 35 of the General Conditions.

4.4.2 **SPECIAL HAZARDS INSURANCE REQUIRED:**

4.4.3 **BUILDERS RISK INSURANCE:**

The General Contractor shall maintain Builder's Risk insurance providing coverage for the entire Work at the project site, and shall also cover portions of the Work located away from the site but intended for use at the site, and shall also cover portions of the Work in transit. Coverage shall be written on an All-Risk, Replacement Cost, and completed Value Form basis in an amount at least equal to the projected completed value of the Work and the policy shall state that it is for the benefit of and payable to the state of Connecticut.

4.5 NOT USED

4.6 THROUGH 4.6.1 NOT APPLICABLE FOR PROJECT: 20MIL21201

4.6 The General Contractor shall perform under this Contract in accordance with 45 C.F.R. Part 74; and, as applicable, C.G.S. §§ 4a-60 to 4a-60a and 4a-60g to carry out this policy in the award of any subcontracts. The General Contractor on this project shall be required to award not less than 25% of the total Contract Sum to contractors who are certified and eligible to participate under The State of Connecticut Set-Aside Program for **small** contractors, including 6.25% to certified and eligible **Minority Business Enterprises**.

4.6.1 This requirement *must be met even if* the **General Contractor** is *certified and eligible* to participate in the **Small Business Set-Aside Program**. To facilitate compliance with this requirement for set-aside subcontractors, the three (3) **apparent low bidders** will have ten (10) calendar days from the date of bid opening within which to submit a **list of certified set-aside contractors** to be used on this project along with the **dollar amounts** to be paid to each, on the form provided, and a copy of their **current certification** must be attached. This information will be considered as part of your Bid Proposal Form and **failure** to comply with any portion of this requirement within the ten (10) days, including but not limited to **failure** to list or meet the necessary dollar amount or percentage of the bid price will be cause to **reject** your bid.

4.7 BIDDER'S QUALIFICATION STATEMENT AND OBJECTIVE CRITERIA FOR EVALUATING QUALIFICATIONS OF BIDDERS:

4.7.1 Information in regards to the General Contractor's and the Named Subcontractor's Bidder's Qualification is submitted and is made part of this Bid Proposal Form. **Note: Individual Specification Sections may contain General Contractor and/or Subcontractor Qualification requirements that exceed those in Section 00 45 15, "Objective Criteria Established for Evaluating Qualifications of Bidders."**

4.7.1.1 The **General Contractor** is required to complete the **General Contractor Bidder's Qualification Statement** in section 00 45 14.

4.7.1.2 Any **Named Subcontractor** as listed in schedule 7.5.1 of this Bid Proposal Form is required to complete the **Named Subcontractor Bidder's Qualification Statement** in section 00 45 17. To facilitate compliance with this requirement, the three (3) apparent low bidders will have **ten** (10) calendar days, from the bid opening date, to submit the completed **Named Subcontractor Bidder's Qualification Statement** as required in section 00 45 17. This information will be considered as part of your Bid Proposal Form and failure to comply with any portion of this requirement will be **cause to reject** your bid.

4.7.2 The **Objective Criteria for Evaluating Bidders** that are included in Division 0, Section 00 45 15, of this Project Manual, is to assure that the State of Connecticut will secure the "lowest

responsible and qualified bidder" who has the ability and capacity to successfully complete the Bid Proposal Form and the Work.

4.8 NONDISCRIMINATION AND LABOR RECRUITMENT:

4.8.1 This Contract is subject to Executive Order No. 3 of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices; Executive Order No. 17 of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings; Executive Order No. 16 of Governor John G. Rowland, promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and made a part of the Contract as if they had been fully set forth in it. The Contract may also be subject to Executive Order 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services and to Executive Order No. 49 of Governor Dannel P. Malloy, promulgated May 22, 2015, mandating disclosure of certain gifts to public employees and contributions to certain candidates for office. If Executive Order 14 and/or Executive Order 49 are applicable, they are deemed to be incorporated into and are made a part of the Contract as if they had been fully set forth in it. At the Contractor's request, the Client Agency or the Connecticut Department of Administrative Services shall provide a copy of these orders to the Contractor.

4.9 FEDERAL & STATE WAGE DETERMINATIONS:

4.9.1 The U. S. Secretary of Labor's latest decision and the State of Connecticut Wage Schedule are all incorporated in the documents. The higher rate (Federal or State) for any given occupation shall prevail. At the time of bidding, the bidder agrees to accept the current prevailing wage scale, as well as the annual adjustment to the prevailing wage scale, as provided by the Connecticut Department of Labor.

4.10 CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY & NON-SEGREGATED FACILITIES:

4.10.1 The General Contractor and Subcontractors are hereby advised that upon acceptance of their bids they are obligated to fill out within seven (7) calendar days the certification required pursuant to Executive Order No. 11246, and agree to certify to the compliance of non-segregated facilities.

4.11 EQUALS AND SUBSTITUTION REQUESTS PROCEDURES:

4.11.1 All submissions requesting "Equals and/or Substitutions" shall be made by the **Contractor** in accordance with **Article 15** of the **General Conditions** and **Section 01 25 00** of the **General Requirements**. All submissions shall contain all the information necessary for the Military Department to evaluate the submission and the request. Failure to submit sufficient information to make a proper evaluation, including submittal of data for the first manufacturer listed as well as the data for the "Equals and/or Substitutions" proposed, shall result in a **rejection** of the submission and request. Upon receipt of the submission and request the Military Department shall notify the Contractor the request has been received and as soon as possible shall render a decision on such submission and request.

4.11.2 Pre-Bid Opening Substitution of Materials and Equipment: The Owner will consider requests for equals or substitutions *if* received **fourteen (14) days prior** to the **Bid Opening**.

4.11.3 Request for Equal or Substitution shall be submitted to the **CT MIL Project Manager and Architect or Engineer**.

4.11.4 Any substitution request not complying with requirements will be denied. Substitution request sent *after* the **deadline** will be denied.

4.11.5 An **Addendum** shall be issued to inform all prospective bidder of any accepted substitution in accordance with our addenda procedures.

4.11.6 No extension of time will be allowed for the time period required for consideration of any Substitution or Equal.

4.11.7 Post Contract Award Substitution Of Materials And Equipment: All Requests For "Equals And Substitutions" *after* the Award of the Contract shall be made *only* by the **General Contractor** in accordance with Article 15, Materials: Standards, Section 00 72 00 General Conditions Of The Contract For Construction.

5.0 ACCOMPANYING THIS PROPOSAL IS:

5.1 A CERTIFIED CHECK drawn to the order of – Treasurer, State of Connecticut, in the which it is understood shall be cashed and the proceeds thereof used so far as may be necessary to reimburse the State of Connecticut for losses and damages arising by virtue of my (our) failure to file the required Bonds and execute the required contract if this proposal is accepted by the Awarding Authority.

OR

5.2 A BID BOND having as surety thereto a Surety Company or Companies authorized to transact business in the State of Connecticut and made out in the penal sum of 10% of the bid.

5.3 CHECKLIST OF INCLUDED ITEMS WITH BID PROPOSAL AT TIME OF BID PROPOSAL SUBMITTAL:

IMPORTANT:		
Item	A. All forms below must be either uploaded to the DAS website as indicated or included when you submit your bid package. B. Failure to submit any of items marked below with an asterisk (*) shall cause rejection of the bid and shall not be considered a minor irregularity under CGS 4b-95.	Location
Include the following in Bid Package to DAS Procurement Services:		
1*	Bid Proposal Form*	00 41 00
2	Appropriate Certificate (of authority)	00 40 14
3*	Department of Administrative Services Pre-qualification Certificate*	00 40 15
4*	Department of Administrative Services Update Statement *	00 40 15
5*	Standard Bid Bond or Certified Check*	00 43 16
6*	General Contractor Bidder's Qualification Statement	00 45 14
7*	SEEC Form 10	SEEC Website
Upload the following to the DAS Website prior to, or at time of, Bid Proposal:		
1*	Ethics Affidavit (Regarding State Ethics) (New July 1, 2005)	OPM Website
2*	Gift and Campaign Contribution Certification	OPM Website
3*	Consulting Agreement Affidavit	OPM Website
4*	Nondiscrimination Certification	OPM Website

6.0 I (we), the undersigned, hereby declare that I am (we are) the only person(s) interested in the Bid Proposal and that it is made without any connection with any other person making any Bid Proposal for the same work. No person acting for, or employed by, the State of Connecticut is directly or indirectly interested in this Bid Proposal, or in any Contract which may be made under it, or in expected profits to arise therefrom. This Bid Proposal is made without directly or indirectly influencing or attempting to influence any other person or corporation to bid or refrain from bidding or to influence the amount of the Bid Proposal of any other person or corporation. This Bid Proposal is made in good faith without collusion or connection with any other person bidding for the same work and this proposal is made with distinct reference and relation to the plans and specifications prepared for this Contract. I (we) further declare that in regard to the conditions affecting the Work to be done and the labor and materials needed, this Bid Proposal is based solely on my (our) own investigation and research and not in reliance upon any representations of any employee, officer or agent of the State.

7.0 Each **class of Work** set forth in a separate section of the specifications pursuant to this Section shall be a **subtrade** designated in Schedule 7.5.1 of this Bid Proposal Form and shall be the matter of a **subcontract** made in accordance with the procedure set forth in this chapter.

7.1 The undersigned proposes to furnish all labor and materials required for
Project Number: 20MIL21201
Project Title: AASF Aircraft Apron Repair Phase 1 Bradley
in accordance with the accompanying Plans and Specifications
Prepared by: Burns & McDonnell Engineering Company, Inc.
Engineer/Architect

for the Contract Sum specified in Section 7.3 subject to **additions** and **deductions** according to the terms of the specifications.

7.2 This Bid Proposal includes _____ number of **Addenda/Addendum**.

7.2.1 The **Contractor is to fill in item 7.2 above**, acknowledging the number of Addenda that the Contractor is including in the Bid Proposal Form. Failure to acknowledge all **addenda** in the space provided in the Bid Proposal Form shall be cause for **rejection** of the bid.

7.3 THE PROPOSED CONTRACT PRICE IS AS FOLLOWS:

\$

--	--

 ,

--	--	--

 ,

--	--	--

 .

--	--

(Place figures in appropriate boxes.)

_____ DOLLARS
(Written Amount)

7.3.1 Small Business Enterprise/ Minority Business Enterprise FOR PROJECT: 20MIL21201

7.3.1 In Accordance With Section 4.6 Not Less Than 25 % Of This Total Must be Awarded to Certified **Set-Aside** Contractors, including 6.25 % **Minority Business Enterprises**. **Failure** to Meet This Requirement Will Be Cause To **Reject** Your Bid.

7.4. NOT USED

7.5 Subcontractors and their price must be listed for the trades identified in Schedule 7.5.1.

FAILURE TO PROPERLY COMPLETE THIS SECTION ACCORDING TO THE BELOW INSTRUCTIONS SHALL RESULT IN REJECTION OF THE BID.

The GC shall indicate the subcontractor name and contract value for the largest single subcontractor in each named sub trade.

SCHEDULE 7.5.1 – NAMED SUBCONTRACTORS				
Description	Name of Subcontractor	Amount Dollars	Labor & Material Payment Bond	Performance Bond
1. _____	_____	\$ _____	_____ %	_____ %
2. _____	_____	\$ _____	_____ %	_____ %
3. _____	_____	\$ _____	_____ %	_____ %
4. _____	_____	\$ _____	_____ %	_____ %

On and after October 1, 2007, **no** person whose **subcontract** exceeds five hundred thousand dollars in value may perform work as a **subcontractor** on a project estimated to cost more than five hundred thousand dollars, *unless* the person is **prequalified** in accordance with section 4a-100, as amended by **Public Act 06-134**.

7.5.2 List the *name* and *price* of each **Named Subcontractor** that will perform the **work** of the trades *listed* in **Schedule 7.5.1**.

7.5.3 The **General Contractor** *may* list **itself** together with its **price (failure to provide both will be cause for rejection)**, *if* it customarily performs any of the trades specified. *If* the General Contractor leaves the spaces for a specific "Trade Description" *completely blank*, it will be *assumed* that the General Contractor will perform that Work.

7.5.4 *If* the General Contractor requires a **Performance** and/or **Labor and Material Payment Bond**, *then* the General Contractor must indicate in Schedule 7.5.1 which of the Named Subcontractors are subject to this requirement. The amount (%) shall not exceed the Named Subcontractor's price listed in Schedule 7.5.1.

7.5.5 The undersigned *agrees* that each of the **Named Subcontractors** listed in Schedule 7.5.1 of the Bid Proposal Form will be used for the **Work indicated at the amount stated**, *unless* a **substitution** is permitted by the awarding authority as provided for in section 00 21 19 Notice to Bidders.

7.6 Any **Supplemental Bids** listed in schedule 7.6.1, *if* accepted by the Owner, will be taken cumulatively and in numerical order as scheduled. No Supplemental Bid will be skipped or taken out of numerical order as scheduled. Supplemental Bids: Division 1, Section 01 11 00 1.2.1 of the **General Requirements** identify and describe the Supplemental Bids as shown in Schedule 7.6.1.

SCHEDULE 7.6.1 – SUPPLEMENTAL BIDS	
Supplemental Bid No.: 1	Provide all labor, material and equipment to complete the Work in accordance with Division 1, Section 01 11 00 1.2.1
ADD: _____ Dollars	\$ _____ .
(Written Amount)	

7.7 Contractor Provided Unit Prices per Div 01 11 00 Unit Price Chart

Division	Section	Description	Estimated Quantities	Unit of Measure	Unit Price

Division	Section	Description	Estimated Quantities	Unit of Measure	Unit Price

- 7.8 The **undersigned** agrees that *if* selected as the General Contractor, I (we) shall, within **seven (7)** calendar days (legal State holidays excluded) *after* notification thereof by the awarding authority, **execute a Contract** in accordance with the terms of this Bid Proposal Form and Contract.
- 7.9 The undersigned agrees and warrants that they have made **good faith efforts** to employ **minority business enterprises** as **Subcontractors** and **suppliers** of materials under such Contract and shall provide the Commission on Human Rights and Opportunities with such information as is requested by the Commission concerning their **employment practices and procedures** as they relate to the current provisions of the Connecticut General Statutes governing Contract requirements.

8.0 CONFIDENTIALITY OF DOCUMENTS:

- 8.1 The **undersigned** agrees that if not selected as the General Contractor for this project, all plans and specifications in their possession for the project shall be destroyed.
- 8.2 The **undersigned** agrees that if selected as the General Contractor for this project:
- 8.2.1 The **plans and specifications** shall not be disseminated to anyone except for construction of this project.
- 8.2.2 The following **provision** shall be included in all of its contracts with subcontractors and sub-consultants:
- “Any and all drawings, specifications, maps, reports, records or other documents associated with the contract shall only be utilized to the extent necessary for the performance of the work and duties under this contract. Said drawings, specifications, maps, reports, records and other documents may not be released to any other entity or person except for the sole purpose of the work described in this contract. No other disclosure shall be permitted without the prior written consent of the Military Department. When any such drawings, specifications, maps, reports, records or other documents are no longer needed, they shall be destroyed.”
- 8.2.3 Upon completion of the construction and the issuance of a certificate of occupancy, the plans and specifications shall be returned to the Military Department, or destroyed, or retained in a secure location and not released to anyone without first obtaining the permission of the Military Department.

- 9.0 A duly authorized representative of the Bidder or Bidder's partnership, firm, corporation or business organization must sign all Bid Proposals Forms.

(NO FACSIMILE SIGNATURE IS PERMITTED).
ALL INFORMATION BELOW IS TO BE FILLED IN BY THE BIDDER.

Project Number _____

Firm Name _____
Complete BIDDER'S LEGAL COMPANY NAME

General Contractor's State of Connecticut, D.C.P. License/ Registration No. _____
(Applicable for Threshold Building projects only. Insert "N/A" if not applicable. Refer to page 1)

Firm Federal Employer Identification Number _____

Firm CT Tax Registration Number _____

Firm Address _____
Street City State Zip Code

Telephone Number _____

FAX Number _____

E-mail Address _____

Type of Business (check one):

Corporate Seal, if a Corporation

- ___ Corporation
- ___ Limited Liability Corporation (LLC)
- ___ Partnership
- ___ Sole Proprietor
- ___ Doing Business As (d/b/a), if yes, provide complete name **below:**



Provide Exact Wording on Corporate Seal **below:**

This Bid Submission is **only** for Contractors who are **Certified** in the **DAS Prequalification Classification** noted in the **Invitation to Bid**.

A Certificate (of Authority) (Section 00 40 14) must be submitted with your Bid Proposal.

Signed this _____ day of _____ 20 _____

Bidder's Signature _____
Duly Authorized Title

Print Name Date

The apparent three low bidders are required to submit key supporting documents as noted below, while the apparent low bidder is required to submit his Affirmative Action Plan to CT DAS CHRO as noted below. If there are any delays in the receipt of these materials then the Bids shall remain valid for the same additional number of days. For example, since the apparent three low bidders are required to hold the bid price for ninety (90) calendar days and any extensions caused by the Contractor's delays in required submissions, if materials are submitted four (4) days later, then the bid shall remain valid for ninety-four (94) days.

Failure to meet the below stated deadlines may result in rejection of the bid at the sole discretion of the Commissioner of Construction Services.

**NOTE: All of the following submittals shall be submitted directly to:
Military Department, Procurement Office
Room #143, Gov. Wm. A. O'Neill Armory
360 Broad Street, Hartford, CT, 06105**

Bid Submittal Time Line to CT MIL Procurement Services

SUBMITTALS **DUE** WITHIN 10 CALENDAR DAYS **AFTER** SET-ASIDE CONTRACTOR SCHEDULE REQUEST
(From the Apparent **Three** Low Bidders):

1. Section 00 73 27 Set-Aside Contractor Schedule
2. Listing of certified set aside contractors Subs with name, address, amount and whether a subcontractor or a supplier or both
3. DAS Set-Aside Subcontractor Certificate of Eligibility (SBEs & MBEs)
4. Section 00 45 17 Named Subcontractor Bidder's Qualification Statements
5. Named Subcontractor's DAS Prequalification Certificate, when applicable

SUBMITTALS **DUE** WITHIN 15 CALENDAR DAYS **AFTER** REQUEST FOR AFFIRMATIVE ACTION PLAN AND EMPLOYMENT INFORMATION LETTER
(From the **Apparent Low Bidder**):

1. Affirmative Action Plan to CT DAS CHRO
2. Affirmative Action Plan Transmittal Letter Copy to CT DAS Procurement Services
3. Section 00 73 53 Affidavit for Certified Subcontractors as MBEs
4. Section 00 73 44 Wage Certification to DOL
5. On your letterhead, list of all named subcontractors, address and contact person
6. Scope Review conducted

SUBMITTALS **DUE** WITHIN 10 BUSINESS DAYS **AFTER** THE LETTER OF INTENT:

1. Section 00 62 16 Insurance Certificate Form
2. Section 00 92 10 Performance Bond
3. 00 92 10 Labor & Material Bond
4. Section 00 92 10 Surety Sheet
5. Power of Attorney from the Surety Company
6. Section 00 40 14 Certificate (of authority)
7. Asbestos Abatement Liability Insurance (for asbestos abatement only)
8. Motor Vehicle Pollution Liability for Asbestos Abatement (for asbestos abatement only)
9. Section 00 92 10 Non-Residents Certificate - DRS — Guarantee Bond (form AU-766)
10. Section 00 92 10 Bidder's Certificate: Financial Position & Corporate Structure
11. Section 00 52 03 Contract
12. Section 00 52 73 Subcontractor Agreement Form (Named & Listed)
13. Affidavit Regarding State Ethics – for each Named Subcontractor
14. Certificate of Legal Existence from Corporations

END OF SECTION

**STATE OF CT, MILITARY DEPARTMENT
STANDARD BID BOND**

KNOW ALL MEN BY THESE PRESENTS, That we, _____
_____, hereinafter called the Principal,
of _____, as Principal,
and _____, hereinafter
called the Surety, a corporation organized and existing under the laws of the
State of _____, and duly authorized to transact a
surety business in the State of Connecticut, as Surety, are held and firmly bound unto the State of
Connecticut, as Obligee, in the penal sum of ten (10) percent of the amount of the bid set forth in a
proposal hereinafter mentioned, _____

_____,
lawful money of the United States of America, for the payment of which, well and truly to be made to the Obligee, the
Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and
severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, That, whereas the Principal has submitted
or is about to submit a proposal to the Obligee related to a contract for Project No.:

NOW, THEREFORE, if the said contract be awarded to the Principal and the Principal shall, within such time as
may be specified, enter into the said contract in writing with the State of Connecticut and give the required
bonds, with surety acceptable to the Obligee, or if the Principal shall fail to do so, pay to the Obligee the
damages which the Obligee may suffer by reason of such failure not exceeding the penalty of this bond, then this
obligation shall be void, otherwise to remain in full force and effect.

SIGNED, SEALED AND DELIVERED this _____ day of _____, 20 _____

Principal's Signature _____ by _____
(Print name) _____ Its attorney in fact _____

Company Name _____ (Print name) _____

**GENERAL CONTRACTOR
BIDDER'S QUALIFICATION STATEMENT**

All bidders are required to file this form, properly completed, **WITH THEIR PROPOSAL**. Failure of a bidder to answer any question or provide required information may be grounds for the awarding authority to disqualify and reject the bid. If a question or request for information does not pertain to your organization in any way, use the symbol "NA" (Not Applicable). Use additional 8 1/2" x 11" sheets with your letterhead as necessary.

THE DEPARTMENT RESERVES THE RIGHT TO REQUEST ANY ADDITIONAL OR SUPPLEMENTAL INFORMATION NECESSARY TO COMPLETE ITS EVALUATION OF A BIDDER'S QUALIFICATION.

- 1. Indicate exactly the name by which this organization is known:
Name: _____

- 2. How many years has this organization been in business under its present business name?
Years: _____

- 3. How many years has this organization been in business as a General Contractor?
Years: _____

- 4. Indicate all other names by which this organization has been known and the length of time known by each name:
 - 4.1 _____
 - 4.2 _____
 - 4.3 _____

- 5. This firm is a:
 - Corporation
 - Partnership
 - Sole
 - Proprietorship
 - Joint Venture
 - Other _____

- 6. Attach **resumes** of all **supervisory personnel**, such as **Principals, Project Managers, and Superintendents**, and **Construction Scheduler** (see Section 01 32 16 or 01 32 16.13 of the General Requirements, as applicable) who will be directly involved with the project on which you are now a bidder. Indicate their construction related training, certifications and licenses and the number of years of actual construction experience. Indicate the number of years of this actual construction experience which were in a Supervisory capacity.

- 7. List all sub-trades, which your firm customarily performs with own employees:
 - 7.1 _____
 - 7.2 _____
 - 7.3 _____
 - 7.4 _____
 - 7.5 _____

8. All Construction Projects your organization has in process (attach separate sheets using the following format as necessary):

8.1 Specific Title & Location:

8.2 Contract Amount:

8.3 Description of your scope of work performed:

8.4 Owners Representative:

(Name)

Telephone Number

9. Has your organization ever failed to complete a contract, or has any officer or partner of your organization ever been an officer or partner of another organization that failed to complete a contract?

NO YES

If yes, indicate the circumstances leading to the project failure and the name of the company which provided the bonding for the failed contract(s):

10. Has your organization ever had a contract terminated?

NO YES

If yes, indicate the circumstances leading to the project termination of contract(s):

11. Has your organization had any legal or administrative proceedings against the organization, or any officers, principals, partners, members, or employees of the organization currently pending or concluded adversely within the last five years, and any judicial or administrative sanctions that are still in effect against such organization, and any of its officers, principals, partners, members, or employees? (Exclude OSHA violations which are called for elsewhere in this statement.)

NO YES

If yes, list and explain: _____

12. Has your organization had any disbarments or suspensions that have been imposed in the past five years or that was still in effect during the five year period or is still in effect?

NO YES

If yes, list and explain; such list must include disbarments and suspensions of officers, principals, partners, members, and employees of your organization: _____

13. Has your organization had any other reason that precludes your organization or any officer, principal, partner, member, or employees thereof from bidding on a contract in Connecticut or any other jurisdiction?

NO YES

If yes, list and explain: _____

14. Has your organization had any willful or serious violations of any Occupational Safety and Health Act (OSHA) or of any standard, order or regulation promulgated pursuant to such act, during the three-year period preceding the bid, provided such violations were cited in accordance with the provisions of any State Occupational Safety and Health Act or Occupational Safety and Health Act of 1970?

NO YES

If yes, list and explain; indicate whether these were abated within the time fixed by the citation or whether the citation was appealed. If appealed, what is the status or disposition? _____

15. Has your organization had any criminal convictions related to the injury or death of any employee in the three-year period preceding the bid?

NO YES

If yes, list and explain any such convictions: _____

16. Have there been any changes in your company's financial condition or business organization, which might affect your company's ability to successfully complete this contract?

NO YES

If yes, list and explain: _____

17. List and explain if your firm has ever failed to submit an Affirmative Action Plan to the Commission on Human Rights and Opportunities (CHRO). Indicate below the circumstances leading to the failure to submit the Affirmative Action Plan to CHRO:

NO YES

If yes, list and explain: _____

18. List and explain if your firm's Affirmative Action Plan has ever been disapproved by the Commission on Human Rights and Opportunities (CHRO) or determined to be noncompliant. Indicate below the circumstances leading to the disapproval or finding of noncompliance of your Affirmative Action Plan by CHRO:

NO YES

If yes, list and explain: _____

Dated at _____

Signed this _____ day of _____ 20 _____

Name of Organization: _____

Signature _____
(Print Name) _____
Title _____

Notary Statement:

Mr./Mrs./Ms. _____ being duly sworn
Deposes and says that he/she is the _____ of
(Position or Title)

END OF SECTION

OBJECTIVE CRITERIA

ESTABLISHED FOR EVALUATING QUALIFICATIONS OF BIDDERS

The following items are established pursuant to Sections 4b-92, 4b-94 and 4b-95a of the Connecticut General Statutes as amended.

THE BIDDER MUST HAVE OR HAVE COMPLETED THE FOLLOWING:

1. If applicable, submit with the **bid** a valid **Department of Administrative Services Prequalification Certificate** and **Update Statement** for *bids estimated to be in excess of \$500,000.00*.
2. Demonstrate that the Bidder and if applicable Named Subcontractors meet the **objective criteria** for this specific project. In connection therewith, the Bidder must submit Section 00 45 14 **General Contractor's Bidder Qualifications Statement** and, if applicable, Section 00 45 17 **Named Subcontractor's Bidder Qualification Statement(s)**. The responses to the **Statement(s)** must identify two (2) **projects completed** during the past five (5) Years within the Cost Estimate Range stated in Section 00 11 16 **Invitation to Bid** for this project, and of the size and complexity of this project. The State's evaluation shall be based on the **performance record** of the prospective Bidder and its named subcontractors during the course of the two (2) comparable projects, and not just the end result. Evaluation **criteria** shall include: Faithful and efficient performance; financial, managerial and technical abilities; and integrity and the absence of any conflicts of interest.
3. Furnished **references from architects, engineers or owners** indicating that it has satisfactorily completed in a timely manner contract work of the nature of this bid and provided explanations where delays have occurred. This information should cover work done over the past three years. Review of Military Department (CT MIL) shall be included in the evaluation of the bidder's qualifications and anticipated future performance.
4. Shown that it customarily employs or has on its payroll **supervisory personnel qualified** to perform the work called for in the bid specifications.

Submit the **name, resume** and **references** of the **Construction Scheduler** in accordance with the requirements called for in Section 01 32 16 or 0132 16.13 as applicable.

5. Demonstrated a good track record of **past performance** on State or other projects relative to quantity, quality, timeliness, cost, cooperation and harmonious working relationships with subcontractors, suppliers and client agencies. CT MIL will review the Bidders past performance ratings prepared by CT MIL or prepared as part of the Connecticut Department of Administrative Services Contractor Pre-Qualifications System. This review may focus on the comments relative to: Quality of Supervision, Adherence to Contract Documents, On Time Project Completion, Subcontractor performance, and the handling of Change Orders. Unacceptable ratings for several criteria shall be sufficient cause to deem a bidder not responsible.
6. Shown that it is **financially responsible** to perform the work as bid. If requested, additional financial information shall be provided. Prompt and proper payments to its subcontractors and material suppliers is a critical factor to be considered by CT MIL.
7. Demonstrated **staff expertise** in the various types of major trades or work required for this project or maintains **competent supervisory personnel** on its payroll that can coordinate multiple trades.
8. Shown that it owns or possesses rented or leased **equipment** of the type customarily required by contractors in the performance of contract work and that such equipment, if needed, is available for this project.
9. Purchased **materials** over the past three years from suppliers who customarily sell such materials in quantity to contractors.
10. Control of adequate **physical facilities** from which the work can be performed.
11. Demonstrated that on **previous state projects** the bidder complied in good faith with the requirements of listing subcontractors as outlined in Sections 4b-93 and 4b-95 of the Connecticut General Statutes.

12. Demonstrated that **all major subcontractors** are in compliance with the provisions of Connecticut General Statutes Section 20-341gg , as revised, concerning licensure requirements to perform work on any structure that exceeds the threshold limits contained in Connecticut General Statutes Section 29-276b , as revised.
13. Proven that the Bidder has not been found to be in violation of three or more willful or serious violations of OSHA regulations in the past three years.
14. Not received a **criminal conviction** related to the injury or death of any employee in the three-year period preceding the bid.
15. Listed all **legal** (court and/or arbitration) or **administrative proceedings** currently pending as well as any legal (court and/or arbitration) or administrative proceeding related to procurement or performance any public or private construction contracts which has concluded adversely within the last three years.
16. Identified any situations where; (1 the bidder failed to complete a construction contract; or (2 bonds were called during the past three years. If applicable, attach a sheet providing explanation including date(s) and location(s).
17. Not been found to be in violation of any state **tax** requirements of the Connecticut Department of Revenue Services in the five (5)-year period preceding the bid.
18. Not been found to be in violation of any State or Federal **labor laws** as required through the Department of Labor including violations of prevailing wage laws in the five (5)-year period preceding the bid.
19. Been found to be in compliance with all statutory and regulatory requirements. This Item shall include any CT MIL determinations related to improper Change Order pricing relative to CGS 1- 101nn of The State Ethics Statutes.
20. Not been found in violation of any of the **Internal Revenue Service Tax Requirements** regarding classification of employees and independent contractors in the five (5)-year period preceding the bid.
21. Not been found to be in any violation of Connecticut General Statutes Section 31-288 relating to employee classification for purposes of Workers' Compensation insurance premiums in the five (5)-year period preceding the bid.

NOTE: The foregoing items No. 13 and 14 are meant to comport with Sec. 31-57b of the Connecticut General Statutes.

END OF SECTION

NAMED SUBCONTRACTOR
BIDDER'S QUALIFICATION STATEMENT
MUST BE SUBMITTED WITH THIS FORM

If a question or request for information does not pertain to your organization in any way, use the symbol "NA" (Not Applicable). Use additional 8 ½" x 11" sheets with your letterhead as necessary.

1. Indicate exactly the name by which this organization is known:

Name: _____

2. How many years has this organization been in business under its present business name?

Years: _____

3. How many years has this organization been in business as a Subcontractor?

Years: _____

4. If this organization has not always been a Subcontractor, list the trade(s) that your firm customarily performed prior to the time that you became a Subcontractor:

4.1 _____
4.2 _____
4.3 _____

5. Indicate all other names by which this organization has been known and the length of time known by each name:

5.1 _____
5.2 _____
5.3 _____

6. This firm is a:

- Corporation
 - Partnership
 - Sole
 - Proprietorship
 - Joint Venture
 - Other
- _____

7. Attach resumes of all supervisory personnel, such as Principals, Project Managers, and Superintendents, who will be directly involved with the project on which you are now a bidder. Indicate the number of years of construction experience and number of years of which they were in a Supervisory capacity.

8. List all sub-trades which your firm customarily performs with own employees – **this table must be completed for electrical and mechanical trades for all projects, and also for all named trades for threshold projects.**

	Trade	Name of License holder	State of CT D.C.P. License/Registration No. Format: Prefix-Number-Suffix
8.1			
8.2			
8.3			
8.4			
8.5			

9. **Trade References:** Names, addresses and telephone numbers of several firms with whom your organization has regular business dealings (attach separate sheets as necessary):

10. **All** Construction Projects your organization has in process (attach separate sheets using the following format as necessary):

10.1 Specific Title & Location: _____

10.2 Contract Amount: _____

10.3 Description of your scope of work performed: _____

10.4 Owner: _____

10.5 General Contractor: _____

10.6 Designer: _____

10.7 Start Date: _____

10.8 Finish Date: _____

*10.9 Any complaint on Quality or Management: _____

10.10 Owners Representative: _____
(Name) Telephone Number

10.11 G.C. Representative: _____
(Name) Telephone Number

*Please attach a separate sheet explaining any negative entry in this row.

11. All Construction Projects your organization has completed in the past five years or the 20 projects most recently completed (attach separate sheets using the following format as necessary):

11.1 Specific Title & Location: _____

11.2 Contract Amount: _____

11.3 Description of your scope of work performed: _____

11.4 Owner: _____

11.5 General Contractor: _____

11.6 Designer: _____

11.7 Start Date: _____

11.8 Finish Date: _____

*11.9 Any complaint on Quality or Management: _____

11.10 Owners Representative: _____
(Name) Telephone Number

11.11 G.C. Representative: _____
(Name) Telephone Number

***Please attach a separate sheet explaining any negative entry in this row.**

12. Has your organization ever failed to complete a contract, or has any officer or partner of your organization ever been an officer or partner of another organization that failed to complete a contract? If so, indicate the circumstances leading to the project failure and the name of the company which provided the bonding for the failed contract(s):

13. List all legal or administrative proceedings currently pending or concluded adversely within the last five years which relate to procurement or performance of any public or private construction contracts. (Exclude OSHA violations which are called for elsewhere in this statement).

13.1 Attached:

13.2 N/A:

14. List all willful or serious violations of any Occupational Safety and Health Act (OSHA) or of any standard, order or regulation promulgated pursuant to such act, during the three year period preceding the bid, provided such violations were cited in accordance with the provisions of any State Occupational Safety and Health Act or Occupational Safety and Health Act of 1970. Indicate whether these were abated within the time fixed by the citation or whether the citation was appealed. If appealed what is the status or disposition.

14.1

14.2

14.3

15. Has your organization had any criminal convictions related to the injury or death of any employee in the three-year period preceding the bid. Please list any such convictions below.

15.1

15.2

15.3

Dated at

Signed this _____ day of _____, 20 _____

Name of Organization: _____

Signature

(Print Name)

Title

Notary Statement:

Mr./Mrs./Ms. _____ being duly sworn

deposes and says that he/she is the _____ of
(Position or Title)

_____, and that the answers to the foregoing
(Firm Name)

questions and all statements therein contained are true and correct.

Subscribed and sworn before me this _____ day of _____, 20 _____

Notary Public _____

My Commission Expires _____, 20 _____

This form must be submitted for each of the Named Subcontractors, within ten (10) calendar days from the bid opening, to the State of Connecticut, Department of Administrative Services Procurement Services, 165 Capitol Ave. Hartford, CT 06106, Room G-35.

END OF SECTION

CONTRACT

CONTRACT FOR: _____

Dated as of _____ by and between the **State of Connecticut, Military Department** (herein called the "State") acting herein by its Commissioner, Military Department authorized to enter into this Agreement pursuant to CGS 4b-52 and Public Act No. 16-110, An Act Concerning State Military Construction Projects and _____ (herein called the "Contractor").

WITNESSETH, that the State and the Contractor in consideration of the hereinafter contained mutual promises and covenants, do hereby agree as follows:

1. CONTRACT AND CONTRACT DOCUMENTS:

The **Invitation for Bids**, the enumerated **Plans**, the **Specifications** and **Amendments** thereto, the **Addenda**, the **Bid Proposal** as accepted by the Commissioner, Military Department, **Order of Award**, which Order is made a part of this **Contract**, the **General Conditions**, the **General Requirements**, the **Contract** and the **Bonds** shall form part of this **Contract** and the **provisions** thereof shall be as binding upon the parties as if they were fully set forth herein. The tables of contents, titles, headings, running headlines and marginal notes contained herein and in said Documents, are solely to facilitate to various provisions of the Contract Documents and in no way affect, limit, or cast light upon the interpretations of the provisions to which they refer. Whenever the term "Contract Documents" is used, it shall mean and include this **Contract**, the **Invitation for Bids**, the enumerated **Plans**, **Specifications** and **Amendments** thereto, the **Addenda**, the **Bid Proposal** as accepted by the Commissioner, Military Department, the **General Conditions**, the **General Requirements**, the **Bonds**, the **Notice to Bidders**, the **Wage Scales**, the **Supplementary Conditions**, and the **Insurance Certificates**.

2. SCOPE OF THE WORK:

The Contractor shall furnish all plant, labor, materials, supplies, equipment, and other facilities and things necessary or proper for or incidental to the work contemplated by this Contract as required by and in strict accordance with applicable Plans, Specifications and Amendments thereto, and Addenda (hereinafter enumerated), and as required by and in strict accordance with such changes as are ordered and approved pursuant to this Contract, and will perform all other obligations imposed on him by this Contract.

3. ENUMERATION OF PLANS, SPECIFICATIONS AND ADDENDA:

The following is an enumeration of the Plans, Specifications, and Addenda:

PLANS: Prepared by: _____

SPECIFICATIONS: _____

ADDENDA: _____

4. COMPENSATION TO BE PAID THE CONTRACTOR

The State will pay and the Contractor will accept in full consideration for the performance of the Contractor's obligation hereunder the sum of _____ Dollars and 00/100 (\$ _____).

5. PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

For all State contracts as defined in P.A. 07-1 having a value in a calendar year of \$50,000 or more or a combination or series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this Agreement expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice. See SEEC FORM 10.

Pursuant to CGS #4e-29, each contract of a State contracting agency shall provide that a State contracting agency may, at reasonable times, inspect the part of the plant or place of business of a contractor or any subcontractor which is related to the performance of any contract awarded, or to be awarded by the State to ensure compliance with the contract.

Pursuant to CGS #4e-14, each contract of a State contracting agency that takes effect on or after June 1, 2010, shall contain provisions to ensure accountability, transparency and results based outcomes, as prescribed by the State Contracting Standards Board.

IN WITNESS WHEREOF, the Commissioner, Military Department for and on behalf of the State of Connecticut, and the Contractor have executed this contract on the day and year first written.

[] Original Contract
[] Amendment #
(For Internal Use Only)

SIGNATURES AND APPROVAL

Contractor

Contractor (Corporate/Legal Name of Contractor)

Signature (Authorized Official) Date

(Typed/Printed Name and Title of Authorized Official)

State of Connecticut Military Department

Connecticut Military Department

Signature (Authorized Official) Date

(Typed/Printed Name and Title of Authorized Official)

State of Connecticut Attorney General (Approved as to form)

SUBCONTRACT AGREEMENT FORM

In accordance with the requirements of Section 4b-96 of the Connecticut General Statutes, the Contractor selected for the Contract shall provide to each of its listed or substitute subcontractors the relevant subcontract, along with a notice setting forth the time limit for execution of such subcontract. The Contractor selected for the Contract shall file with the Military Department an executed copy of each subcontract within ten (10) days (Saturdays, Sundays and legal holidays excluded) of presentation of the subcontract to each subcontractor. Each subcontract shall include at least the provisions set forth in the **Subcontract** form found in Section 4b-96 and shall follow the order of the **Subcontract** form.

Sec. 4b-96. (Formerly Sec. 4-137g). Subcontract, form. Procedure on failure of subcontractor to execute subcontract. General bidder's responsibilities.

Within five days after being notified of the award of a general contract by the awarding authority, or, in the case of an approval of a substitute subcontractor by the awarding authority, within five days after being notified of such approval, the general bidder shall present to each listed or substitute subcontractor (1) a subcontract in the form set forth in this section and (2) a notice of the time limit under this section for executing a subcontract. If a listed subcontractor fails within five days, Saturdays, Sundays and legal holidays excluded, after presentation of a subcontract by the general bidder selected as a general contractor, to perform his agreement to execute a subcontract in the form hereinafter set forth with such general bidder, contingent upon the execution of the general contract, the general contractor shall select another subcontractor, with the approval of the awarding authority. When seeking approval for a substitute subcontractor, the general bidder shall provide the awarding authority with all documents showing (A) the general bidder's proper presentation of a subcontract to the listed subcontractor and (B) communications to or from such subcontractor after such presentation. The awarding authority shall adjust the contract price to reflect the difference between the amount of the price of the new subcontractor and the amount of the price of the listed subcontractor if the new subcontractor's price is lower and may adjust such contract price if the new subcontractor's price is higher. The general bidder shall, with respect to each listed subcontractor or approved substitute subcontractor, file with the awarding authority a copy of each executed subcontract within ten days, Saturdays, Sundays and legal holidays excluded, of presentation of a subcontract to such subcontractor. The subcontract shall be in the following form:

(See page 2)

SUBCONTRACT

THIS AGREEMENT made this _____ day of _____, 20__, by and between _____ a corporation organized and existing under the laws of ____ (a partnership consisting of _____) (an individual doing business as _____) hereinafter called the "Contractor" located at (insert complete address) _____, and _____ a corporation organized and existing under the laws of _____ (a partnership consisting of _____) (an individual doing business as _____) hereinafter called the "Subcontractor", located at (insert complete address) _____.

WITNESSETH that the Contractor and the Subcontractor for the considerations hereafter named, agree as follows:

1. The Subcontractor agrees to furnish all labor and materials required for the completion of all work specified in Section No. _____ of the specifications for _____ (Name of Subtrade) _____ and the plans referred to therein and addenda No. _____, and for the (Complete title of project and the project number taken from the title page of the specifications) _____ all as prepared by _____ (Name of Architect or Engineer) _____ for the sum of _____ (\$ _____) and the Contractor agrees to pay the Subcontractor said sum for said work. This price includes the following alternates:

Supplemental No. (s) _____, _____, _____, _____, _____, _____, _____, _____.

(a) The Subcontractor agrees to be bound to the Contractor by the terms of the hereinbefore described plans, specifications (including all general conditions stated therein which apply to his trade) and addenda No. _____, _____, _____, and _____, and to assume to the Contractor all the obligations and responsibilities that the Contractor by those documents assumes to the _____ (Awarding Authority) _____, hereinafter called the "Awarding Authority", except to the extent that provisions contained therein are by their terms or by law applicable only to the Contractor.

(b) The Contractor agrees to be bound to the Subcontractor by the terms of the hereinbefore described documents and to assume to the Subcontractor all the obligations and responsibilities that the Awarding Authority by the terms of the hereinbefore described documents assumes to Contractor, except to the extent that provisions contained therein are by their terms or by law applicable only to the Awarding Authority.

2. The Contractor agrees to begin, prosecute and complete the entire work specified by the Awarding Authority in an orderly manner so that the Subcontractor will be able to begin, prosecute and complete the work described in this subcontract; and, in consideration thereof, upon notice from the Contractor, either oral or in writing, the Subcontractor agrees to begin, prosecute and complete the work described in this Subcontract in an orderly manner in accordance with completion schedules prescribed by the general contractor for each subcontract work item, based on consideration to the date or time specified by the Awarding Authority for the completion of the entire work.

3. The Subcontractor agrees to furnish to the Contractor, within a reasonable time after the execution of this subcontract, evidence of workers' compensation insurance as required by law and evidence of public liability and property damage insurance of the type and in limits required to be furnished to the Awarding Authority by the Contractor.

4. The Contractor agrees that no claim for services rendered or materials furnished by the Contractor to the Subcontractor shall be valid unless written notice thereof is given by the Contractor to the Subcontractor during the first forty (40) days following the calendar month in which the claim originated.

5. This agreement is contingent upon the execution of a general contract between the Contractor and the Awarding Authority for the complete work.

IN WITNESS WHEREOF, the parties hereto have executed this agreement the day and year first above-written.

SEAL

(Type in Name of Subcontractor here)

WITNESS: _____ By: _____ / /
Its _____, Duly Authorized Date

Print Name: _____ **Print Name:** _____

SEAL

(Type in Name of Contractor here)

WITNESS: _____ By: _____ / /
Its _____, Duly Authorized Date

Print Name: _____ **Print Name:** _____



November 1, 2013

Subject: Insurance Requirements

Evidence of the following minimum insurance coverage must be provided:

- a. General Liability limits of \$1 million per occurrence.
- b. Motor Vehicle Liability Insurance with limits of \$1 million, per occurrence.
- c. Worker's Compensation coverage to Connecticut statutory limits or documentation evidencing an approved self-insurance program.
- d. Umbrella Liability limits of \$10 million excess of \$1 million primary layer for airfield services, otherwise \$5 million.
- e. Errors and Omissions Coverage with minimum limits of \$1 million per occurrence.

Connecticut Airport Authority shall be named as additional insured on all policies of insurance with the exception of the Errors and Omission (Professional Liability) and Worker's Compensation insurance.

**General Conditions of the Contract for Construction
Military Department
State of Connecticut
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ARTICLE 1 DEFINITIONS

WHENEVER THE FOLLOWING TERMS, OR PRONOUNS IN PLACE OF THEM, ARE USED THE INTENT AND MEANING SHALL BE AS FOLLOWS:

- 1.1 ACCEPTANCE:** The Owner's acknowledgement of the Work from the Contractor upon certification by the Construction Administrator and Architect or Engineer that all Work has been completed.
- 1.2 ADDITIONAL OR DELETED WORK:** Work required by the Department that, in the judgment of the Commissioner, involves any addition to, deduction from, or modification of the Work required by the Contract Documents.
- 1.3 AGENCY:** The (User) Agency of the State of Connecticut having administrative authority of the facility in which the Work is being performed.
- 1.4 APPLICATION FOR PAYMENT, PARTIAL PAYMENT OR REQUISITION:** Contractor's certified request for payment for completed portions of the Work and, if the Contract so provides, for materials or equipment suitably stored pending their incorporation into the Work.
- 1.5 ARCHITECT OR ENGINEER:** A sole proprietor, partnership, firm, corporation or other business organization under Contract with the Owner, commissioned to prepare Contract Drawings and Specifications, to advise the Owner and in certain cases, to perform regular inspections during construction and when authorized to perform the duties of the Construction Administrator.
- 1.6 AS-BUILT DRAWINGS:** Construction Drawings revised by the Contractor to show all significant Modifications made during the construction process.
- 1.7 BASE BID:** Monetary value stated in the Bid Proposal Form as the sum for which the Bidder offers to perform the Work described in the Bidding Documents, exclusive of adjustments for Supplemental Bids.
- 1.8 BID BOND:** Form of Bid Security executed by the Bidder as Principal and by a Surety to guarantee that the Bidder will enter into a Contract within a specified time and furnish any required bond as mandated by Connecticut General Statute Section 4b-92.
- 1.9 BIDDER:** A sole proprietor, partnership, firm, corporation or other business organization submitting a Bid on the Bid Proposal Form for the Work contemplated.
- 1.10 BIDDING DOCUMENTS:** Collectively, the Bidding Requirements and the proposed Contract Documents, including any addenda issued prior to receipt of Bids.
- 1.11 BID OR BID PROPOSAL FORM:** A complete and duly signed proposal to perform Work (or a designated portion thereof) for a stipulated sum submitted in accordance with the Bidding Documents.
- 1.12 BID SECURITY:** Certified check or Bid Bond submitted with Bid Proposal Form, which provides that the Bidder, if awarded the Contract, will execute such Contract in accordance with the requirements of the Bidding Documents.
- 1.13 BUILDER'S RISK INSURANCE:** A specialized form of property insurance which provides coverage for loss or damage to the Work pursuant to the Contract Documents.
- 1.14 CASH ALLOWANCE:** An amount established in the Contract Documents for inclusion in the Contract Sum to cover the cost of prescribed items not specified in detail, and as shown in the Allowance Schedule.
- 1.15 CERTIFICATE OF ACCEPTANCE:** A document issued by the Owner to the Contractor stating that all Work specified in the Certificate of Acceptance has been completed and accepted by the Owner.
- 1.16 CERTIFICATE OF COMPLIANCE:** A document stating that for the portion of the Project completed, either the design portion or the construction portion, has been performed in substantial compliance with all applicable building codes.
- 1.17 CERTIFICATE OF OCCUPANCY:** Document is-sued by the authority having jurisdiction certifying that all or a designated portion of a building is approved for its designated use.
- 1.18 CERTIFICATE OF SUBSTANTIAL COMPLETION:** A document prepared by the Architect or Engineer and approved by the Owner on the basis of an inspection stating:
- 1.18.1** that the Work, or a designated portion thereof, is determined to be Substantially Complete;
 - 1.18.2** the date of Substantial Completion;
 - 1.18.3** the responsibilities of the Owner and the Contractor for security maintenance, heat, utilities, damage to the Work and insurance; and
 - 1.18.4** The time within which the Contractor shall complete the remaining Work.

1.19 CHANGE ORDER: Written authorization signed by the Owner, authorizing a modification in the Work, an adjustment in the Contract Sum, or an adjustment in the Contract Time.

1.20 COMMISSIONER: The State of Connecticut, Military Department (CT MIL) Commissioner acting directly or through specifically authorized CT MIL personnel or agent(s) having authority to perform duties defined in Article 25.

1.21 COMMISSIONING AGENT (CxA): An independent entity under contract directly with the Owner or Owner's Representative responsible for performing the specified commissioning procedures.

1.22 CONSTRUCTION ADMINISTRATOR: A sole proprietor, partnership, firm, corporation or other business organization, under Contract or employed by the Owner commissioned and/or authorized to oversee the fulfillment of all requirements of the Contract Documents. The authorized Construction Administrator may be a Military Department Assistant Project Manager, Military Department Project Manager, a Clerk of the Works, an Architect, a Consulting Architect, a Consulting Construction Administrator, a Consulting Engineer etc. or any other designee as authorized and identified by the Owner.

1.23 CONSTRUCTION CHANGE DIRECTIVE: A written authorization signed by the Owner, directing a modification in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum, Contract Time or both. Any Construction Change Directive effecting an adjustment to the Contract Sum or Contract Time shall result in a Change Order.

1.24 CONTRACT DOCUMENTS OR CONTRACT: The Agreement between Owner and Contractor, Conditions of the Contract (General Conditions, Supplementary Conditions, General Requirements and other Conditions), Drawings, Specifications, and Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract, all of which shall constitute the Contract.

1.25 CONTRACTOR OR GENERAL CONTRACTOR: A sole proprietor, partnership, firm or Corporation, under direct Contract with the Military Department, responsible for performing the Work under the Contract Documents. Whenever the words "Contractor" or "General Contractor" are used it shall be understood to mean Contractor.

1.26 CONTRACTOR'S LIABILITY INSURANCE: Insurance purchased and maintained by the Contractor that insures the Contractor for claims for property damage, bodily injury or death.

1.27 CONTRACT START DATE OR DATE OF COMMENCEMENT OF THE WORK: The date, specified by the Owner in the Notice to Proceed, on which the Contractor is required to start the Work.

1.28 CONTRACT SUM: The sum stated in the Contract, which is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

1.29 CONTRACT TIME: The period of time allotted in the Contract Documents for Substantial Completion of the Work, including authorized adjustments thereto. The Contract Time is the sum of all Working Days and Non-Working Days as further defined herein and specified in the Contract Documents.

1.30 DAY: Whenever the word Day is used it shall be understood to mean calendar day stated on the Bidding Documents, unless stated otherwise.

1.31 Military Department (CT MIL) PROJECT MANAGER: The individual employed by the Owner, designated and authorized by the Commissioner, to be responsible for the overall management and oversight of the Project, and to represent the (User) Agency.

1.32 DIESEL VEHICLE EMISSIONS CONTROL: The reduction of air pollution emissions from diesel powered vehicles through the use of diesel engine emission control technologies.

1.33 EQUAL(S): Any deviation from the Specification which is defined as follows: A replacement for the specified material, device, procedure, equipment, etc., which is recognized and accepted as substantially equal to the first listed manufacturer or first listed procedure specified after review by the Architect/Engineer, and may be rejected or approved at the sole discretion of the Owner. All equals must be substantially equivalent to the first manufacturer or first procedure listed in the Specifications with reference to all of the following areas: the substance and function considering quality, workmanship, economy of operation, durability, and suitability for purposes intended; size, rating, and cost. The equal does not constitute a modification in the scope of Work, the Schedule, or Architect/Engineer's design intent of the specified material, device, procedure, equipment, etc.

1.34 FINAL INSPECTION: Review of the Work by the Architect or Engineer and Owner to determine whether Acceptance has been achieved.

1.35 FINAL PAYMENT: The last payment made by the Owner to the Contractor, made after notice of the Acceptance. Payment shall include the entire unpaid balance of the Contract Sum as adjusted by modifications.

1.36 GENERAL CONDITIONS: The General Conditions of the Contract for Construction, part of Division 00 of the Specifications.

1.37 GENERAL REQUIREMENTS: That part of the Contract Documents entitled General Requirements, which is Division 01 of the

Specifications.

1.38 GUARANTEE: See Warranty.

1.39 LIQUIDATED DAMAGES: A sum established in a Contract, usually as a fixed sum per Day, as the predetermined measure of damages to be paid to the Owner due to the Contractor's failure to complete the Work within the Contract Time.

1.40 LUMP SUM: An item or category priced as a whole rather than broken down into its elements.

1.41 MOBILE SOURCE: A source designed or constructed to move from one location to another during normal operation except portable equipment and includes, but is not limited to, automobiles, buses, trucks, tractors, earth moving equipment, hoists, cranes, aircraft, locomotives operating on rails, vessels for transportation on water, lawnmowers, and other small home appliances.

1.42 NON-WORKING DAYS: All Saturdays, Sundays, Legal State Holidays (12), and any other Days identified in the Contract Documents that the Contractor is not permitted to execute the Work. The restriction of Non-Working Days may be suspended upon the approval or direction of the Commissioner.

1.43 NOTICE TO BIDDER: A notice contained in the Bidding Document informing prospective Bidders of the opportunity to submit Bids on a Project.

1.44 NOTICE TO PROCEED: Written notice, issued by the Commissioner or the Commissioner's authorized representative, to the Contractor authorizing the Contractor to proceed with the Work and establishing the date for commencement of the Contract Time.

1.45 OWNER OR DEPARTMENT: The State of Connecticut, Military Department acting through its Commissioner or specifically authorized Department personnel or agent.

1.46 OVERHEAD: Indirect costs including: supervision (any position over the foreman), field and home office expense, insurance, and small tools and consumables.

1.47 PAYMENT, BOND, LABOR BOND OR MATERIAL BOND: A bond in which the Contractor and the Contractor's surety guarantee to the Owner that the Contractor will pay for labor and materials furnished for use in the performance of the Contract, as required by Connecticut General Statutes Section 49-41.

1.48 PERFORMANCE BOND OR SURETY BOND: A bond in which the Contractor and the Contractor's surety guarantee to the Owner that the Work will be performed in accordance with the Contract Documents, as required by Connecticut General Statutes Section 49-41.

1.49 PERFORMANCE SPECIFICATION: A description of the desired results or performance of a product, material, assembly, procedure, or a piece of equipment with criteria for identifying the standard.

1.50 PLANS OR DRAWINGS: All Drawings or reproductions of Drawings pertaining to the construction of the Work contemplated and its appurtenances.

1.51 PROJECT: The total construction of which the Work performed under the Contract Documents may be the whole or a part.

1.52 PROJECT MANUAL: The set of documents assembled for the Work which includes, but is not limited to, Contract Documents, Bidding Requirements, Sample Forms, and General Conditions of the Contract for Construction, General Requirements, and the Specifications.

1.53 PROPRIETARY SPECIFICATION: A specification that describes a product, procedure, function, material, assembly, or piece of equipment by trade name and/or by naming the manufacturer(s) or manufacturer's procedure, exact model number, item, etc., of those products acceptable to the Owner.

1.54 RETAINAGE: A percentage of each Application for Payment and a percentage of the total Contract Sum retained by the Owner.

1.55 SCHEDULE: A Critical Path Method (CPM) or Construction Schedule as required by the Contract Documents which shall be a diagram, graph or other pictorial or written Schedule showing all events expected to occur and operations to be performed and indicating the Contract Time, start dates, durations and finish dates as well as Substantial Completion and Acceptance of the Work, rendered in a form permitting determination of the optimum sequence and duration of each operation.

1.56 SCHEDULE OF VALUES: A document furnished by the Contractor to the Architect or Engineer and Owner stating the portions of the Contract Sum allocated to the various portions of the Work, which is to be used for reviewing the Contractor's Applications for Payment.

1.57 SECONDARY SUBCONTRACTOR: A sole proprietor, partnership, firm or Corporation under direct Contract with the Subcontractor to the General Contractor.

1.58 SENSITIVE RECEPTOR SITES: Areas where concentrations of diesel emissions may be harmful to sensitive populations, including, but not limited to, hospitals, school and university buildings being occupied during a student semester, residential structures, daycare facilities, elderly housing, and convalescent facilities.

1.59 SHOP DRAWINGS: Drawings provided to Architect or Engineer and Owner by a Contractor that illustrate construction, materials, dimensions, installation, and other pertinent information for the incorporation of an element or item into the construction as detailed Contract Documents.

1.60 SPECIFICATIONS: The description, provisions and other requirements pertaining to the method and manner of performing the Work and/or to the quantities and quality of materials to be furnished under the Contract.

1.61 SUBCONTRACTOR: A sole proprietor, partnership, corporation or other business organization under direct Contract with the Contractor supplying labor and/or materials for the Work at the site of the Project.

1.62 SUBMITTALS: Documents including, but not limited to, samples, manufacturer's data, Shop Drawing, or other such items submitted to the Owner and Architect or Engineer by the Contractor for the purpose of approval or other action, as required by the Contract Documents.

1.63 SUBSTANTIAL COMPLETION: The stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents.

1.64 SUBSTITUTION: Any deviation from the specified requirements, which is defined as follows: A replacement for the specified material, device, procedure, equipment, etc., which is not recognized or accepted as equal to the first manufacturer or procedure listed in the Specification after review by the Architect/Engineer, and may be rejected or approved by the Owner. The Substitution is not equal to the specified requirement in comparison to the first manufacturer or first procedure listed in the Specifications in one or more of the following areas: the substance and function considering quality, workmanship, economy of operation, durability, and suitability for purposes intended; size, cost, and rating. The Substitution constitutes a modification in the scope of Work, the Schedule, or the Architect/Engineer's design intent of the specified material, device, procedure, equipment, etc.

1.65 SUPERINTENDENT: The Contractor's representative at the site who is responsible for continuous field supervision, coordination, in, completion of the Work, and, unless another person is designated in writing by the Contractor to the Owner and the Construction Administrator, for the prevention of accidents.

1.66 SUPPLEMENTAL BID: The monetary value stated in the Bid to be added to the amount of the Base Bid if the corresponding Work, as described in the Bidding Documents, is accepted.

1.67 SUPPLEMENTARY CONDITIONS: An extension in the Bid to be added to the amount of the Base Bid if the corresponding Work, as described in the Bidding Documents, is accepted.

1.68 THRESHOLD LIMIT BUILDING: Any proposed (new) structures or additions as defined by the Connecticut General Statutes Section 29-276b.

1.69 UNIT PRICE: The monetary value stated by the Owner or the Contractor, as a price per unit of measurement for materials or services as described in the Contract Documents and/or Bidding Documents.

1.70 WARRANTY: A written, legally enforceable assurance of specified quality or performance of a product or Work or of the duration of satisfactory performance.

1.71 WORK: The construction and services required by the Contract Documents, and including all labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project and "Work Phase".

1.72 WORK PHASE: Construction of the Project by sequence or time intervals, which may include but not be limited to separate Construction Start Dates, Substantial Completion Dates, Application for Payments, Change Orders, Liquidated Damages, Retainage, and Subcontractors for each Work Phase.

ARTICLE 2 CONDITIONS OF WORK

2.1 The Contractor shall carefully examine and study the conditions under which the Work is to be performed and the site of the Work, and compare the Contract Documents with each other and to information furnished by the Owner including but not limited to the Plans and Specifications, the form of the Contract, General Conditions, Supplementary Conditions, General Requirements, Bonds and all other Contract Documents associated with the Work.

2.2 The Contractor shall report to the Construction Administrator all errors, inconsistencies or omissions discovered. The Contractor shall not be liable to the Owner for damage resulting from errors, inconsistencies or omissions in the Contract Documents unless the Contractor recognized such errors, inconsistencies or omission and failed to report it to the Construction Administrator. If the Contractor performs any actions or construction activity knowing it involves an error, inconsistency or omission in the Contract Documents without notice to the Construction Administrator, the Contractor shall assume responsibility for such performance and related costs for the correction and shall not be allowed to submit any claim related to error, inconsistencies or omission.

2.3 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or

omissions discovered shall be reported to the Construction Administrator at once; and it will be assumed that the Contractor has been satisfied as to all requirements of the Contract Documents. Any deterrent conditions at the site of the Work which are obvious and apparent upon examination of the site but are not indicated on the Plans shall be corrected by the Contractor without additional compensation.

2.4 In performing the Work, the Contractor must employ such methods or means as will not cause any interruption of or interference with the Work of any other Contractor, nor any inordinate disruption with the normal routine of the Owner, institution or Agency operating at the site.

2.5 No claims for additional compensation will be considered when additional costs result from conditions made known to, discovered by, or which should have been discovered by, the Contractor prior to Contract signing.

2.6 All Communications from the Contractor concerning proposed changes to the Contract Sum, Contract Time, or Work shall be in writing.

2.7 The Contractor shall perform the Work in accordance with the Contract Documents and approved Submittals pursuant to Article 5.

ARTICLE 3 CORRELATION OF CONTRACT DOCUMENTS

3.1 The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. Where discrepancies or conflict occur in the Contract Documents the following order of precedence shall be utilized:

3.1.1 Amendments and addenda shall take precedence over previously issued Contract Documents.

3.1.2 The Supplementary Conditions take precedence over the General Conditions.

3.1.3 The General Conditions take precedence over the General Requirements.

3.1.4 The Specifications shall take precedence over the Plans.

3.1.5 Stated dimensions shall take precedence over scaled dimensions.

3.1.6 Large-scale detail Drawings shall take precedence over small-scale Drawings.

3.1.7 The Schedules contained in the Contract Documents shall take precedence over other data on the Plans.

3.2 Neither party to the Contract shall take advantage of any obvious error or apparent discrepancy in the Contract Documents. The Contractor shall give immediate written notification of any error or discrepancy discovered to the Construction Administrator, who shall take the necessary actions to obtain such corrections and interpretations as may be deemed necessary for the completion of the Work in a satisfactory and acceptable manner. The Contractor shall then promptly proceed under the direction of the Owner and the provisions of Article 13. The Contractor's failure to provide immediate notice shall mean the Contractor will not be entitled to any additional compensation, either monetary or Contract Time adjustment, with respect to any discrepancy.

3.3 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

3.4 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings, shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

3.5 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

3.6 In accordance with C.G.S. Section 4a-1, wherever the term "Commissioner of Construction Services" is used in the "Bidding Documents" or "Project Manual" the term "Commissioner of Administrative Services" shall be substituted in lieu thereof; and wherever the term "Department of Construction Services" is used in "Bidding Documents" or "Project Manual", the term "Department of Administrative Services" shall be substituted in lieu thereof.

ARTICLE 4 COMMENCEMENT AND PROGRESS OF WORK

4.1 The Work shall start upon the date given in the Notice to Proceed. The Contractor shall complete all the Work necessary for Final Payment, including but not limited to Substantial Completion, Contract close-out, testing and demonstration of all systems as required for Acceptance, punch list Work, training and submission of Record Documents, manuals, Guarantees and Warranties as stated in the Contract Document.

4.2 Time is of the essence with respect to the Contract Time. By executing the Contract, the Contractor confirms and agrees that the Contract Time is a reasonable period to perform the Work. The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. The Contractor may, at his discretion, plan to complete the Work and achieve Substantial Completion in less time than the Contract Time.

4.3 The Contractor's early completion Schedule notwithstanding, the Owner reserves the right to order Modifications to the Work in accordance with Article 13 at any time during the Contract Time.

4.4 The Contractor shall not be entitled to costs for delay due to Owner ordered Modifications or any other circumstances for the period of ~~time between the Contractor's elected early completion and the end of the Contract Time. Such costs include, but are not limited to,~~

extended home office costs, field office costs, or supervisory and management costs incurred in performance of the Work. Early completion of the Work shall not merit additional compensation.

4.5 If the Contractor is delayed at any time in the progress of Work by acts of God, such as fire or flood or any action, injunction or stop order issued by any court, judge or officer of the court or any other court action beyond the Owner's control, then the Contract Time may be extended by Change Order for such reasonable time as demonstrated by the Contractor's Schedule and as the Owner may determine that such event has delayed the Work. In any event, the granting of an extension of time shall be solely within the discretion of the Owner.

4.6 Except as otherwise may be provided herein, extensions of time shall be the Contractor's sole remedy for such delay. No payment or compensation of any kind shall be made to the Contractor for damages because of hindrance in the orderly progress of Work caused by the aforesaid causes.

4.7 The Contractor acknowledges that the Contract amount includes and anticipates any and all delays, whether avoidable or unavoidable, from said orders, which may issue from any court, judge, court officer, or act of God, and that such delays shall not, under any circumstances, be construed as compensable delays.

4.8 Any extension of the Contract Time shall be by Change Order pursuant to Article 13.

4.9 The Contractor shall employ a competent project manager who shall represent the Contractor. Communications given to the project manager shall be binding as if given to the Contractor. The project manager will be employed full time on the Project and be located and assigned to the Project site during and for the duration of the Work.

4.10 The Contractor shall employ a competent Superintendent and necessary assistants who will be in attendance at the project site during the performance of the Work.

4.11 Upon execution of the Contract, materials may be purchased. No material escalation costs will be valid or compensable unless the Owner directs, in writing, a delay in the procurement.

ARTICLE 5 SUBMITTALS, PRODUCT DATA, SHOP DRAWINGS AND SAMPLES

5.1 Contractor shall review, approve, and submit to the Construction Administrator all Submittals including but not limited to, product data, Shop Drawings, and samples, with such promptness as to cause no delay in the Work.

5.2 Correction or approval of such Submittals, Shop Drawings, product data and samples will be made with reasonable promptness by the Architect or Engineer. Approval will be general only and shall not relieve the Contractor from responsibility for errors in dimensions, for construction and field coordination of the Work or for any departure from the Contract Documents, unless such departure has received the Owner's written approval.

5.3 No Work governed by such Shop Drawings, Schedules or samples shall be fabricated, delivered or installed until approved by the Architect or Engineer.

5.4 No damages for delays or time extensions will be granted, even if approvals deviate from the approved Schedule.

ARTICLE 6 SEPARATE CONTRACTS

6.1 The Owner reserves the right to perform Work in connection with the Contract with the Owner's own forces, or to let separate contracts relating to the Contract (Project) site or in connection with Work on adjoining sites. In such cases, the Contractor shall afford such parties reasonable opportunity for storage of materials and equipment and coordinate and connect the Work with the work on adjoining sites or other Projects, and shall fully cooperate with such parties in the matter required under Article 7 herein.

6.2 Contractors working in the same vicinity shall cooperate with one another and, in case of dispute, decision of the Owner shall be final and binding to all Contractors involved, including Contractors under separate Contracts.

6.3 The Contractor shall assume all liability, financial or otherwise, in connection with this Contract and shall protect and hold harmless the Owner from any and all damages or claims that may arise because of inconvenience or delay which the Contractor may cause other Contractors. If the Contractor experiences a loss because of the presence and operations of other Contractors working adjacent to or within the limits of the same Project, then as between the Owner and the Contractor, the Contractor shall bear such loss.

6.4 Insofar as possible, the Contractor shall arrange the Work and shall place and dispose of the materials being used so as not to interfere with the operations of other Contractors adjacent to or within the limits of the same Project. The Contractor shall join its Work with that of others in an acceptable manner, and perform the Work in proper accordance with that of the others.

6.5 In no event shall the Owner be responsible for any claim or damages that are the result of the Contractor's failure to coordinate the Work with any other Contractor or Subcontractor.

ARTICLE 7 COOPERATION OF TRADES

7.1 The Contractor shall be responsible for and shall control all activities of their Subcontractors. The Subcontractors shall consult and cooperate with one another. Each Subcontractor shall furnish all necessary information to other Subcontractors and shall lay out and install their own Work so as to avoid any delays or interference with the Work of others.

7.2 Any cost or changes, cutting and/or repairing, made necessary by the failure to observe the above requirements shall be borne by the party or parties responsible for such failure or neglect or their faulty Work installed.

ARTICLE 8 DAMAGES

8.1 The Liquidated Damages, provided in the Bidding Documents, will be assessed at two distinct times, as follows:

8.1.1 Liquidated Damages – Substantial Completion:

If the Contractor fails to achieve Substantial Completion of the Work by the Substantial Completion Date, and such delay is not otherwise excused under this Contract, then the Contractor agrees to pay to the Owner Liquidated Damages for the dollar amount specified in the Bid Proposal Form for this Project, for each Day beyond Substantial Completion that the Contractor fails to achieve Substantial Completion. The parties to this Contract acknowledge and agree that the actual damages that are to be anticipated as a result of the neglect, failure, or refusal of the Contractor to substantially complete the Project by the established Substantial Completion Date are uncertain in amount or extremely difficult to determine. Accordingly, the parties to this Contract do intend and in fact now agree to liquidate damages in advance and stipulate that the amount set forth in this subparagraph is reasonable and an appropriate remedy and is intended to constitute compensatory damages and does not constitute a penalty of any kind. The parties understand and agree that, by including a provision for Liquidated Damages in this Contract, or in pursuing any relief pursuant to such provision:

.1 the parties do not intend to set a price for the privilege not to perform;

.2 the availability of Liquidated Damages may not be relied upon as a basis for argument that the Owner has an adequate remedy at law; and

.3 the remedies available to the Owner under this Agreement are cumulative and not exclusive.

8.1.2 Liquidated Damages – Acceptance:

If the Contractor fails to complete all of the Work required for Acceptance of the Work within ninety (90) Days of Substantial Completion then the Contractor agrees to pay to the Owner Liquidated Damages for the dollar amount specified in the Bid Proposal Form for each Day in excess of ninety (90) Days beyond the Substantial Completion Date that the Contractor fails achieve Acceptance. The parties to this Contract acknowledge and agree that the actual damages that are to be anticipated as a result of the failure of the Contractor to complete all of the Work required for Acceptance within ninety (90) Days of the established fWORK PHASES

Completion Date are uncertain in amount or extremely difficult to determine. Accordingly, the parties to this Contract do intend and in fact now agree to liquidate damages in advance and stipulate that the amount set forth in this subparagraph is reasonable and an appropriate remedy and is intended to constitute compensatory damages and does not constitute a penalty of any kind. The parties understand and agree that, by including a provision for Liquidated Damages in this Contract, or in pursuing any relief pursuant to such provision:

- .1 the parties do not intend to set a price for the privilege not to perform;
- .2 the availability of Liquidated Damages may not be relied upon as a basis for argument that the Owner has an adequate remedy at law; and
- .3 the remedies available to the Owner under this Agreement are cumulative and not exclusive.

8.2 The Liquidated Damages or any portion thereof may be waived at the sole discretion of the Commissioner.

8.3 No payment by the Owner, either partial or final, shall be construed to waive the Owner's right to seek Liquidated Damages.

8.4 In the event a court determines that the Contract herein is null and void for any reason, Contractor agrees that Contractor will not seek or pursue any lawsuit or claim for damages, including, but not limited to, claims for loss of Overhead or anticipated profits, against the Owner and the Owner shall not be liable for any damages which Contractor may incur as a result of such decision. In addition, if the court enjoins the Owner from entering into or proceeding with the Contract herein, the Owner shall not be liable for any damages arising out of or relating to the award of such Contract which Contractor may have incurred as a result of the injunction.

ARTICLE 9 MINIMUM WAGE RATES

9.1 In accordance with the provisions of the Connecticut General Statutes Section 31-53, the following applies:

"The wages paid on an hourly basis to any person performing the work of any mechanic, laborer, or worker on the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such person to any employee welfare fund, as defined in subsection (h) of this section, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such persons to any such employee welfare fund shall pay to each mechanic, laborer or worker as part of such person's wages the amount of payment or contribution for such person's classification on each payday."

9.2 Each Contractor who is awarded a Contract on or after October 1, 2002 shall be subject to provisions of the Connecticut General Statutes, Section 31-53 as amended by Public Act 02-69, "An Act Concerning Annual Adjustments to Prevailing Wages."

No wage adjustment will be made to the Contract for any wage increase under this Article.

ARTICLE 10 POSTING MINIMUM WAGE RATES

10.1 The Contractor shall post at conspicuous points on the site of the Contract a Schedule showing all determined wage rates for all trades and all authorized deductions, if any, from wages to be paid.

10.2 The Contractor shall provide weekly certified payrolls to the Owner for all persons working on the site.

ARTICLE 11 CONSTRUCTION SCHEDULES

11.1 Unless otherwise specified in the Contract Documents, within twenty-one (21) Days from the Contract Start Date, the Contractor shall submit the following to the Owner for approval:

- 11.1.1** A comprehensive Schedule of Submittals required by the Specifications. Said Schedule shall include Submittal dates, required approval dates and date material must be on site.
- 11.1.2** The Contractor shall allow a minimum of 14 Days for the Owner and its agents' review of Submittals. No extension of the Contract Time shall be granted for revisions and resubmission. Further, the Contractor shall allow a minimum of eight weeks for testing and Acceptance of the Work by the Owner.
- 11.1.3** When the Contract Documents specify a "CPM Schedule" a detailed Critical Path Method Schedule is required using software approved by the Owner and/or Construction Administrator with as many activities as necessary to make the Schedule an effective tool for planning and monitoring the progress of the Work. The Contractor shall show all pertinent activities requiring coordination between trades.
- 11.1.4** When the Contract Documents specify a "Construction Schedule" a detailed Construction Schedule is required using software approved by the Owner as a horizontal bar chart with a separate bar for each major portion of the Work or operation to make the Schedule an effective tool for planning and monitoring the progress of the Work.

11.2 Unless otherwise specified under the Contract Documents, the Contractor shall provide a monthly update of the CPM Schedule or Construction Schedule in the format required by the Owner as well as a disk of the updated Schedule and program. If, in the opinion of the Owner, the Work is falling behind Schedule, the Contractor shall submit a revised Schedule demonstrating a recovery plan to ensure Substantial Completion of the Work within the Contract Time.

11.3 Overtime, increased manpower, and additional shifts: If ordered by the Owner in writing, the Contractor shall work overtime, and/or add additional manpower and/or shifts:

11.3.1 If the Contractor is not behind Schedule, the Owner will pay the Contractor the actual additional premium portion of the wages for overtime or additional shift work not included in the Contract price, but the Contractor shall not be entitled to Overhead and Profit.

11.3.2 If the Contractor, through its sole or partial fault or neglect is behind Schedule, the Owner may order the Contractor, at the Contractor's expense, to increase its manpower or to work any overtime or additional shifts or take other action necessary to expedite the Work to meet the Project Schedule.

11.3.3 If the Schedule is shown to be more than 21 Days behind in any critical activity, overtime, increase manpower and/or additional shifts shall be implemented immediately regardless of who is at fault. A disagreement over the cause of the impact will not relieve the Contractor from the obligation of complying with this Article. Once liability for the impact is determined, compensation will be determined in accordance with 11.3.1 or 11.3.2.

11.3.4 The Owner reserves the right to suspend activity under Paragraph 11.3. Suspension shall be in writing and at the sole discretion of the Commissioner.

11.4 Requisitions for partial payment will not be processed until the Contractor has complied with this requirement.

ARTICLE 12 PREFERENCE IN EMPLOYMENT

12.1 Should this Contract be for the construction or repair of any building, then in the employment of labor to perform the Work specified herein, preference shall be given to citizens of the United States, who are, and continuously for at least three (3) months prior to the date hereof, have been residents of the labor market area, as established by the State of Connecticut Labor Commissioner, in which such Work is to be done, and if no such qualified person is available, then to citizens who have continuously resided in the county in which the Work is to be performed for at least three (3) months prior to the date hereof, and then to citizens of the state who have continuously resided in the State at least three months prior to the date hereof.

12.2 Should this Contract be for a Construction Services Project other than for the construction, remodeling or repairing of public buildings covered by Connecticut General Statutes 31-52, then in the employment of mechanics, laborers or workmen to perform the Work specified herein, preference will be given to residents of the state who are, and continuously for at least six (6) months prior to the date hereof have been residents of this State, and if no such person is available then to residents of other states.

12.3 The provisions of this Article shall not apply where the state or any subdivision thereof may suffer the loss of revenue granted or to be granted from any Agency or Department of the federal government as a result of this Article or regulations related thereto.

ARTICLE 13 COMPENSATION FOR CHANGES IN THE WORK

13.1 At any time, without invalidating the Contract and by a written order and without notice to the sureties, the Owner, through the Construction Administrator, may order modifications in the Work consisting of additions, deletions or other revisions. Upon request, the Contractor shall supply the Construction Administrator promptly with a detailed proposal for the same, showing quantities of and Unit Prices for the Work and that of any Subcontractor involved.

13.2 Modifications to the Work will be authorized by a written Change Order, or if necessary to expedite the Work, a written Construction Change Directive, issued by the Owner as provided for in Article 25. Change Orders and Construction Change Directives shall be processed in accordance with the terms of the Contract Documents. Upon receipt of the written Change Order, the Contractor shall proceed with the Work when and as directed.

13.3 If a Change Order makes the Work less expensive for the Contractor, the proper deductions shall be made from the Contract Sum, said deductions to be computed in accordance with the provisions listed in this Article 13.

13.4 The Contractor shall not be entitled to an extension of time if in the opinion of the Owner the Additional Work in conjunction with the Work can be performed without impact on the Contract Time.

13.5 The Contractor may request, and the Owner may grant additional Contract Time when, in the opinion of the Owner, the Contractor has demonstrated that the Additional Work cannot be performed in conjunction with the Work without impact on the original Substantial Completion and/or Acceptance (if applicable) date.

13.6 The amount of compensation to be paid to the Contractor for any Additional or Deleted Work that results in a Change Order shall be determined in one of the following manners:

13.6.1 AMOUNT OF COMPENSATION FOR CHANGE ORDER COSTS: LABOR, EQUIPMENT, BENEFITS AND MATERIAL:

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13.6.1.1 Unit Price: As stated in the Contract Documents.

13.6.1.2 Unit Price: As subsequently agreed upon by the Contractor and Owner

13.6.1.3 Lump Sum: Agreed upon sum by the Owner and the Contractor. The Owner may rely on costs, prices, and documentation provided by the Contractor or Subcontractor in agreeing to a Lump Sum. If the Owner believes that additional information is necessary to substantiate the accuracy of the cost, the Owner reserves the right to request and receive additional information from the Contractor. The Lump Sum must be based upon the following itemized costs:

13.6.1.3.1 Labor: (Contractor's or Subcontractor's own forces) No Change Order Proposal shall be negotiated if the request is solely for the increased labor rate over those originally carried by the Contractor in its original bid. Additional foreman hours shall not be included unless additional crews are added and/or a compensable time extension is granted. Project Executive time shall not be included as a direct cost as it is part of the overhead mark-up allowed. Project manager hours shall not be included unless a compensable time extension is granted.

13.6.1.3.2 Material: (Actual cost to the Contractor or Subcontractor) Cost shall not be based upon list pricing unless it reflects the actual prices being paid and no discounts or other offsets are being received by the Contractor or Subcontractor. No Change Order Proposal shall be negotiated if the request is solely for the escalation of material prices over those originally carried by the Contractor in its original bid.

13.6.1.3.3 Benefits: (The established rates of the following benefit costs inherent to the particular labor involved):

13.6.1.3.3.1 Workers Compensation. **13.6.1.3.3.2** Federal Social Security. **13.6.1.3.3.3** Connecticut Unemployment Compensation. **13.6.1.3.3.4** Fringe Benefits.

13.6.1.4 Rented Equipment: (Used directly on the Work and by the Contractor's or Subcontractor's own forces).

13.6.1.5 Owned Equipment: (Used directly on the Work and by the Contractor's or Subcontractor's own forces). Daily rate is not to exceed 3% of the monthly rental rate as identified by a nationally recognized construction cost estimating guide or service.

13.6.1.6 Small Tools:

Include items such as shovels, picks, rakes, ladders, and power tools which are expected to be utilized on a project. Trade related equipment, hand tools, and power tools normally supplied with the labor or are normally expected to be owned in the performance of the typical work for a trade are not compensable. These costs shall not be approved as part of the Direct Cost of a Change Order as they are included in the Contractor's overhead mark-up percentage.

13.6.2 OVERHEAD AND PROFIT PERCENTAGES: (Maximum allowable percentages applied to labor, equipment, and material)

13.6.2.1 Contractor's mark-up for Work performed by its own forces:

Change Order Amount	Overhead and Profit
\$0 to \$ 5,000	20%
\$5,001 to \$15,000	17%
\$15,001 to \$25,000	15%
\$25,000 and greater	12%

13.6.3 OVERHEAD AND PROFIT PERCENTAGES: (Maximum allowable percentages applied to labor, equipment, benefits and material)

13.6.3.1 Contractor's mark-up for Work performed by its Subcontractor's forces and not allowable for any subsidiary in which the Contractor has a majority ownership:

Change Order Amount	Overhead and Profit
\$0 and greater	6%

13.6.4 OVERHEAD AND PROFIT PERCENTAGES: (Maximum allowable percentages applied to labor, equipment, benefits and material) Subcontractor's mark-up for Work performed by its own forces:

Change Order Amount	Overhead and Profit
\$0 to \$ 5,000	20%
\$5,001 to \$15,000	17%
\$15,001 to \$25,000	15%
\$25,000 and greater	12%

13.6.5 OVERHEAD AND PROFIT PERCENTAGES: (Maximum allowable percentages applied to labor, equipment, benefits and material)

13.6.5.1 Subcontractor's mark-up for Work performed by its Secondary Subcontractor's forces. Limited to one level (tier) below the Subcontractor and not allowable for any subsidiary in which the Subcontractor has a majority ownership.

Change Order Amount	Overhead and Profit
\$0 and greater	6%

13.7 BOND COSTS

13.7.1 Actual additional bonding costs associated with the value of the Change Order will be compensable only when supported by written documentation by the bonding company that the Change Order requires an increase to the original Performance, Payment, Labor or Material Bond.

13.7.2 The Contractor shall notify the bonding company at each \$500,000 increase to the contract value as the cumulative result of change orders. A copy of the Consent of Surety must be provided to the Owner prior to the execution of any change order which exceeds each cumulative \$500,000.

13.8 Trade discounts, rebates, and amounts received from the sales by the Contractor of surplus materials and equipment shall accrue to the Owner.

13.9 If the parties cannot agree upon a Lump Sum, then the Commissioner, through the Project Manager, may at the option of the Commissioner take the following action(s):

13.9.1 Issue a Construction Change Directive for the Additional or Deleted Work. The amount of compensation shall be computed by the actual net costs to the Contractor determined by time and material or Unit Prices based upon the same information required in Subparagraphs 13.6.1.3.3.1 through 13.6.1.5:

13.9.1.1 Labor: (Contractor's or Subcontractor's own forces).

13.9.1.2 Material: (Used by Contractor's or Sub-contractor's own forces).

13.9.1.3 Benefits: (The established rates of the following benefit costs inherent to the particular labor involved):

13.9.1.3.1 Workers Compensation.

13.9.1.3.2 Federal Social Security.

13.9.1.3.3 Connecticut Unemployment Compensation.

13.9.1.3.4 Fringe Benefits.

13.9.1.4 Rented Equipment: (Used directly on the Work and by the Contractor's or Subcontractor's own forces).

13.9.1.5 Owned Equipment: (Used directly on the Work and by the Contractor's or Subcontractor's own forces). Daily rate is not to exceed 3% of the monthly rental rate that can be identified by a nationally recognized construction cost estimating guide or service.

13.9.2 Issue a Change Order adjusting the Contract Sum in the amount as determined by the Commissioner.

13.10 For any Change Order or Construction Change Directive the Contractor shall, when requested, promptly furnish in a form satisfactory to the Construction Administrator and the Owner a complete detailed accounting of all costs relating to the Additional Work, including but not limited to certified payrolls and copies of accounts, bills and vouchers to substantiate actual costs. Further, the Owner reserves the right to access and make copies of the Contractor's records at any time upon written request from the Commissioner.

13.11 Failure of the Contractor to negotiate in good faith issues of time and costs or failure to provide requested documentation within fourteen (14) Days, or a time period accepted by the Commissioner, shall constitute a waiver by the Contractor of any claim. In such cases the Owner may elect to issue a unilateral Change Order in an amount deemed to be fair and equitable by the Commissioner. The provisions hereof shall not affect the power of the Contractor to act in case of emergency, threatened injury to persons, or damage to Work on any adjoining property. In this case the Commissioner, through the Project Manager, shall issue a Change Order for such amount as the Commissioner finds to be reasonable cost of such Work.

ARTICLE 14 DELETED WORK

14.1 Without invalidating any of the terms of the Contract, the Commissioner may order deleted from the Contract any items or portions of the Work deemed necessary by the Commissioner.

14.2 The compensation to be deducted from the Contract Sum for such deletions shall be determined in the manner provided for under the provisions of Article 13 or in the event none of the provisions of Article 13 are applicable then by the value as estimated by the Owner.

ARTICLE 15 MATERIALS: STANDARDS

15.1 Unless otherwise specifically provided for in the Specifications, all equipment, materials and articles incorporated in the Work are to be new and of the best grade of their respective kinds for the purposes. Wherever in the Contract Documents a particular brand, make of material, device, or equipment is shown or specified, the first manufacturer listed in the specification section is to be regarded as the standard. When the specification is proprietary and only one manufacturer is listed, the Contractor shall use the named manufacturer and no Substitutions or Equals will be allowed.

15.2 Any other brand, make of material, device, equipment, procedure, etc. which is a deviation from the specified requirement is prohibited from use, but may be considered by the Owner for approval as an Equal or Substitution. The Contractor is to adhere to the specific requirements of the Contract Documents. Substitutions are discouraged and are only approved by the Commissioner as an exception.

15.3 Submittals – Equals and Substitution Requests:

15.3.1 Substitution of Materials and Equipment before Bid Opening. The Owner will consider requests for Equals or Substitutions, if made prior to the receipt of the Bid. The information on all materials shall be consistent with the information herein.

15.3.1.1 Statement of Variances – a statement of variances must list all features of the proposed Substitution which differ from the Drawings, Specifications and/or product(s) specified and must further certify that the Substitution has no other variant features. A request will be denied if submitted without sufficient evidence.

15.3.1.2 Substitution Denial – any Substitution request not complying with the above requirements will be denied. Substitution request sent after the deadline established in the Notice to Bidder will be denied.

15.3.1.3 An addendum shall be issued to inform all prospective Bidders of any accepted Substitution in accordance with Owner's addenda procedures.

15.3.2 Substitution of Materials and Equipment After Bid Opening: Subject to the Architect or Engineer's determination, if the material or equipment is Equal to the one specified or pre-qualified and the CT MIL Project Manager's approval of such determination, Substitution of Material or Equipment may be allowed after the Letter of Award is issued only:

15.3.2.1 If the specified or pre-qualified item is delayed by unforeseeable contingencies beyond the control of the Contractor which would cause a delay in the Project completion;

15.3.2.2 If any specified or pre-qualified item is found to be unusable or unavailable due to a change by the manufacturer or other circumstances; or

15.3.2.3 If the Contractor desires to provide a more recently developed material, equipment, or manufactured model from the same named manufacturer than the one specified or pre-qualified; or

15.3.2.4 If the specified material and/or equipment inadvertently lists only a single manufacturer.

15.4 Contractor shall submit each request for Equal or Substitution to the Architect or Engineer who shall review each request and make the following recommendations to the Owner:

15.4.1 Acceptance or non-acceptance of the adequacy of the submission and required back-up,

15.4.2 Determination of the category of the request for Substitution or Equal, and

15.4.3 Overall recommendation for approval or rejection of the Substitution or Equal. The determination of the category as a Substitution may be grounds for an immediate rejection by the Owner.

15.5 Approval of the Owner for each Equal or Substitution shall be obtained before the Contractor proceeds with the Work. The decision of the Commissioner, in this regard, shall be final and binding on the Contractor.

15.6 No extension of time will be allowed for the time period required for consideration of any Substitution or Equal. No extension of time will be allowed and no responsibility will be assumed by the Owner when a Contractor submits a request for Substitution or Equal, whether such request be approved or denied, and the Contractor shall not be entitled to any claim for damages for delay.

15.7 If the Contractor submits any request for an Equal or a Substitution, he shall bear the burden of proof that such requested Equal or Substitution meets the requirements of the Plans and Specifications.

15.8 The Contractor shall purchase no materials or supplies for the Work which is subject to any chattel mortgage or which are under a conditional sale or other agreement by which an interest is retained by the seller. The Contractor warrants that the Contractor has good title to all materials and supplies used by him in the Work.

15.9 All products and systems supplied to the State as a result of a purchase by a Contractor shall be certified that, to the best of the supplier's knowledge, there are no materials that are classified as hazardous materials being used within the assembly. Hazardous materials include, but are not limited to, products such as asbestos, lead, and other materials that have proven to cause a health risk by their presence.

ARTICLE 16 INSPECTION AND TESTS

16.1 The purpose of the inspections will be to assure that the Work is performed in accordance with the Contract Documents. These inspections shall include, but not be limited to, all inspections and testing as required by the Owner, and any authorities have jurisdiction.

16.2 All material and workmanship, if not otherwise designated by the Specifications, shall be subject to inspection, examination and test by the Commissioner at any and all times during manufacture and/or construction and at any and all places where such manufacture and/or construction is carried on. The Contract Documents additionally identify the parties responsible for performing and paying for the required testing and inspections. All required tests performed in a laboratory will be obtained and paid for by the Owner, except when the tests show the Work to be defective. The Contractor shall pay for all the costs associated with re-tests and re-inspections for all tests and inspections which fail. The Owner will issue a deduct Change Order to recover said retesting costs from the Contractor. All other tests, unless otherwise specified, shall be made at the Contractor's expense. Notice of the time of all tests to be made at the site shall be given to all interested parties, including the Owner.

16.3 Without additional cost to the Owner, the Contractor shall promptly furnish facilities, labor and materials necessary to coordinate and perform operational tests and checkout of the Work. The Contractor shall furnish promptly all reasonable facilities, labor, and materials necessary to make all such testing safe and convenient.

16.4 If, at any time before final payment and Acceptance of the Work, the Commissioner considers it necessary or advisable to examine of any portion of the Work already completed by removing or tearing out the same, the Contractor shall, upon request, furnish promptly all necessary facilities, labor, and materials. If such Work is found to be defective in any material respect, as determined by the Owner, because of a fault of the Contractor or any of the Contractor's Subcontractors, or if any Work shall have been covered without the approval or consent of the Commissioner (whether or not it is found to be defective), the Contractor shall be liable for testing costs and all costs of correction, including removal and/or demolition of the defective Work, including labor, material, and testing, including labor, material, re-testing or re-inspecting, services of required consultants, additional supervision, the Commissioner's and the Construction Administrator's administrative costs, and

other costs for services of other consultants.

16.5 Cost of Systems Commissioning Retesting: The cost to retest a pre-functional or functional test, if the Contractor is responsible for the deficiency, shall be the Contractor's. If the Contractor is not responsible, any cost recovery for retesting costs shall be negotiated with the Contractor.

16.5.1 For a deficiency identified, not related to any pre-functional checklist or start-up fault, the following shall apply: The Commissioning Agent (CxA) and Construction Administrator will direct the retesting of the equipment once at no "charge" to the Contractor for their time. However, the Commissioning Agent's and Construction Administrator's time for additional testing will be charged to the Contractor.

16.5.2 The time for the Systems Commissioning Agent and Construction Administrator to direct any retesting required because a specific pre-functional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back charged to the Contractor.

16.5.3 Any required retesting by any Subcontractor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.

ARTICLE 17 ROYALTIES AND PATENTS

17.1 If the Contractor desires to use any design, device, material or process covered by a patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the holder of said patent or copyright. The Contractor shall furnish a copy of this legal agreement to the Owner.

17.2 The Contractor shall indemnify and hold harmless the Owner and Construction Administrator for any costs, expenses and damage which it may be obliged to pay by reason of any infringement of a patent or a copyright, at any time during the prosecution or after the Final payment of the Work.

ARTICLE 18 SURVEYS, PERMITS AND REGULATIONS

18.1 Unless otherwise provided for, the Contractor shall furnish surveys necessary for the execution of the Work. The Owner will furnish the Contractor with two base lines and a benchmark.

18.2 The Contractor shall obtain and pay for permits and licenses necessary for the execution of the Work and the occupancy and use of the completed Work.

18.3 The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations including building and fire safety codes relating to the performance of the Work.

18.4 If underground utilities may be involved in part of the Work the Contractor is required to request "Call-Before-You-Dig" to verify the location of underground utilities at least (3) Working Days, as further defined under Paragraph 1.71 herein, prior to the start of any excavation. The Contractor shall also notify the Owner and Agency at least (3) Working Days prior to the start of any excavation. If "Call-Before-You-Dig" fails or refuses to respond to the Contractor's request, then the Contractor shall obtain the services of a qualified underground utility locating firm, at no additional cost to the Owner, to verify locations of underground utilities prior to the start of any excavation. The Contractor shall be held responsible for providing safety, protecting the Work and protecting workmen as necessary to perform the Work. The Contractor shall be responsible for maintaining and protecting all original utility mark-out at no additional cost to the Owner.

ARTICLE 19 PROTECTION OF THE WORK, PERSONS AND PROPERTY

19.1 The Contractor shall continuously and adequately protect the Work against damage from any cause, and shall protect materials and supplies furnished by the Contractor or Subcontractors, whether or not incorporated in the Work, and shall make good any damage unless it be due directly to errors in the Contract Documents or is caused by agents or employees of the Owner.

19.2 To the extent required by law, by public authority, or made necessary in order to safeguard the health and welfare of the personnel or occupants of any of the state institutions, the Contractor shall adequately protect adjacent property and persons, and provide and maintain all facilities, including but not limited, to passageways, guard fences, lights, and barricades necessary for such protection.

19.3 The Contractor shall take all necessary precautions for the safety of employees on the Work and shall comply with applicable provisions of federal and state safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed. The Contractor shall also comply with the applicable provisions of the Associated General Contractors' "Manual of Accident Prevention in Construction", the standards of the Connecticut Labor Department and Occupational Safety and Hazard Association (OSHA).

19.4 The Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of employees of the State and the public, and shall post danger signs warning against any dangerous condition or hazard created by such things as protruding nails, well holes, elevator hatchways, scaffolding, window openings, excavations, tripping hazards or slipping, stairways and falling materials.

19.5 The Contractor shall designate a qualified and responsible on-site staff person, whose duty shall be the prevention of accidents. The name and position of the designated person shall be reported to the Owner by the Contractor at the commencement of the Contract.

19.6 The Contractor shall at all times protect excavations, trenches, buildings, and all items of Work from damage by rain, water from melted snow or ice, surface water runoff and subsurface water usual for the vicinity at the time of operations; and provide all pumps and equipment and enclosures to insure such protection.

19.7 The Contractor shall construct and maintain all necessary temporary drainage and provide all pumping necessary to keep excavation, basements, footings and foundations free of water.

19.8 The Contractor shall remove all snow and ice as may be required for access to the site and proper protection and prosecution of the Work.

19.9 The Contractor shall install bracing, shoring, sheathing, sheet piling, caissons and any other underground facilities as required for safety and proper execution of the Work, and shall remove this portion of the Work when no longer necessary.

19.10 During cold weather the Contractor shall protect all Work from damage. If low temperature makes it impossible to continue operations safely in spite of cold weather precautions, the Contractor may cease Work upon the written approval of the Commissioner.

ARTICLE 20 TEMPORARY UTILITIES

20.1 Unless expressly provided for otherwise in the Contract Documents, the Contractor shall include in the proposed contract bid price as stated on the Bid Proposal Form, the costs of all temporary utilities required for Project completion and protection of the Work. Said temporary utilities include, but are not limited to, lighting, heating, cooling, electrical power, water, telephone, sanitary facilities, and potable water.

ARTICLE 21 CORRECTION OF WORK

21.1 The Contractor shall promptly and without expense to the Owner remove from the premises all materials rejected by or unacceptable to the Commissioner as failing to conform to the Contract Documents, whether incorporated in the Work or not.

21.2 The Contractor shall promptly and without expense to the Owner replace any such materials, which do not conform to the Contract Documents, and shall bear the expense of making good all Work of other Contractors or Subcontractors destroyed or damaged by such removal or replacement.

21.3 If the Contractor, after receipt of notice from the Owner, shall fail to remove such rejected or unacceptable materials within a reasonable time as fixed in said notice, the Owner may remove and store such materials at the expense of the Contractor.

21.4 Such action shall not affect the obligation of the Contractor to replace and complete assembly and installation of the Work and to bear the expenses referred to above. Prior to the correction of rejected or unacceptable Work or if the Commissioner deems it inexpedient or undesirable to correct any portion of the Work which was rejected, deemed unacceptable, or not done in accordance with the Contract Documents, the Contract Sum shall be reduced by such amount as, in the judgment of the Commissioner, shall be equitable.

21.5 No extension of time will be given to the Contractor for correction of rejected or unacceptable Work. All significant punch list Work shall be completed before Substantial Completion is determined. The remaining minor punch list Work, as determined by the Commissioner, shall be completed within ninety (90) Days of established Substantial Completion date.

21.6 Final Payment shall not relieve the Contractor of responsibility for the defects in material or workmanship.

21.7 Unless expressly provided for otherwise in the Contract Documents, the Contractor shall remedy any rejected or unacceptable Work, and any Work found to be not conforming to the Contract Documents which is discovered within 18 Months after the date of Substantial Completion. The Contractor shall pay for any damage to other Work caused by such nonconforming Work or any damage created in correcting the nonconforming Work.

ARTICLE 22 GUARANTEES and WARRANTIES

22.1 Unless expressly provided for otherwise in the Contract Documents, the Contractor shall provide a Warranty on the Work for an 18-Month period from the date of Substantial Completion. The Contractor shall warrant that the equipment, materials and workmanship are of good quality and new, unless permitted elsewhere by the Contract Documents, and that the Work shall be free from defects not inherent in the quality required or permitted and that the Work conforms to the Contract Documents.

22.2 Disclaimers and limitations from manufactures, Subcontractors, suppliers or installers to the Contractor shall not relieve the Contractor of the Warranty on the Work. The Contract Documents detail the related damages, reinstatement of Warranty, replacement cost and Owner's recourse.

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ARTICLE 23 CUTTING, FITTING, PATCHING, AND DIGGING

23.1 The Contractor will perform or will cause the Subcontractors to perform all cutting, fitting, or patching of the portion(s) of the Work that may be required to make the several parts thereof joined and coordinated in a manner satisfactory to the Commissioner and in accordance with the Plans and Specifications.

23.2 The responsibility for defective or ill-timed Work shall be with the Contractor, but such responsibility shall not in any way relieve the Subcontractor who performed such Work. Except with the consent of the Commissioner, neither the Contractor nor any of its Subcontractors shall cut or alter the Work of any other Contractor or Subcontractor.

ARTICLE 24 CLEANING UP

24.1 The Contractor shall, on a daily basis, keep the premises free from accumulations of waste material or rubbish.

24.2 Prior to Acceptance of the Work, the Contractor shall remove from and about the site of the Work, all rubbish, all temporary structures, tools, scaffolding, and surplus materials, supplies, and equipment which may have been used in the performance of the Work. If the Commissioner in his sole discretion determines that the Contractor has failed to clean the work site, the Owner may remove the rubbish and charge the cost of such removal to the Contractor. A deduct Change Order will be issued by the Owner to recover such cost.

ARTICLE 25 ALL WORK SUBJECT TO CONTROL OF THE COMMISSIONER

25.1 The Commissioner hereby declares that the CT MIL Project Manager is the Commissioner's only authorized representative to act in matters involving the Owner's, and/or Architect's or Engineer's, ability to revoke, alter, enlarge or relax any requirement of the Contract Documents; to settle disputes between the Contractor and the Construction Administrator; and act on behalf of the Commissioner. In all such matters, the provisions of Articles 13 and 14 herein shall guide the CT MIL Project Manager.

25.2 In no event may the Contractor act on any instruction of the Agency without written consent of the Owner. In the event the Contractor acts without such consent, he does so at his own risk and at his own expense, not only for the Work performed, but for the removal of such Work as determined necessary by the Commissioner.

25.3 In the performance of the Work, The Contractor shall abide by all orders, directions, and requirements of the Commissioner at such time and places and by such methods and in such manner and sequence as the Commissioner may require.

25.4 The Commissioner shall determine the amount, quality, acceptability and fitness of all parts of the Work, shall interpret the plans, Specifications, Contract Documents and extra work orders and shall decide all other questions in connection with the Work.

25.5 The Contractor shall employ no plant, equipment, materials, methods, or persons to which the Commissioner objects and shall remove no plant materials, equipment, or other facilities from the site of the Work without the permission of the Commissioner. Upon request, the Commissioner shall confirm in writing any oral order, direction, requirement or determination.

25.6 In accordance with Section 4b-24 of the Connecticut General Statutes, the public auditors of the State of Connecticut and the auditors or accountants of the Commissioner of Military Department shall have the right to audit and make copies of the books of any Contractor employed by the Commissioner.

ARTICLE 26 AUTHORITY OF THE CONSTRUCTION ADMINISTRATOR

26.1 The Construction Administrator employed by the Commissioner is authorized to inspect all Work for conformance to the Contract Documents. The Construction Administrator is authorized to reject all Work found to be defective, unacceptable and nonconforming to the Contract Documents. Such inspections and rejections may extend to all or any part of the Work, and to the preparation or manufacture of the material to be used.

26.2 The Construction Administrator is not empowered to revoke, alter, enlarge, or relax any requirements of the Contract Documents, or to issue instructions contrary to the Contract Documents. The Construction Administrator shall in no case act as foreman or perform other duties for the Contractor, nor shall the Construction Administrator interfere with the management of the Work by the Contractor. Any advice, which the Construction Administrator may give the Contractor, shall in no way be construed as binding the Commissioner or Owner in any way, nor releasing the Contractor from the fulfillment of the terms of the Contract.

26.3 In any dispute arising between the Contractor and the Construction Administrator with reference to inspection and rejection of the Work, the Construction Administrator may suspend Work on the non-compliant portion of the Work until the dispute can be referred to and decided by the Commissioner.

ARTICLE 27 SCHEDULE OF VALUES, APPLICATION FOR PAYMENT

- 27.1** Immediately after the signing of the Contract, the Contractor shall furnish for the use of the Commissioner, as a basis for estimating partial payments, a certified Schedule of Values, totaling the Contract Sum and broken down into quantities and unit costs, as outlined in the Contract Documents and as directed by the Owner. The Schedule of Values must reflect true costs and be in sufficient detail to be an effective tool for monitoring the progress of the Work Upon request of the Commissioner; the Contractor shall supply copies of signed Contracts, vendor quotations, etc. as back up to the Schedule of Values.
- 27.2** Approval of the Schedule of Values by the Commissioner is required prior to any payment by the Owner.
- 27.3** The Schedule of Values shall include a breakdown of the Contractor's general condition costs.
- 27.3.1** Non-recurring costs, (i.e. Mobilization costs, utility hook-ups, temporary heat) will be paid at the time of occurrence.
- 27.3.2** Reoccurring costs will be paid in proportion to the percent of completion of the Project.
- 27.3.3** Further detail can be found in the General Requirements 01.29.76; paragraphs 1.3.B.4 for this project.
- 27.4** The Schedule of Values shall include a breakdown of Contract closeout costs including systems certification testing and acceptance, training, Warranties, Guarantees, As-Built Drawings and attic stock.
- 27.5** The Contractor shall make periodic applications for payment, which shall be subdivided into categories corresponding with the approved Schedule of Values and shall be in such numbers of copies as may be designated by the Commissioner.

ARTICLE 28 PARTIAL PAYMENTS

- 28.1** Commissioner will examine the Contractor's Applications For Payments to determine, in the opinion of the Commissioner, the amounts that properly represent the value of the Work completed and the materials suitably stored on the site.
- 28.2** In making such Application For Payment for the Work, there shall be deducted seven and one-half percent (7.5%) of the amount of each Application for Payment to be retained by the Owner as Retainage until Final Completion.
- 28.2.1** The Commissioner has the sole discretion in the determination of reduction in Retainage. At fifty percent (50%) completion of the Work the Owner shall issue a "Contractor's Performance Evaluation". If the Contractor receives a performance evaluation score of "Good" or better, then the Retainage withheld may be reduced to five percent (5%). All subsequent Applications for Payment shall be subject to five percent (5%) Retainage. Upon Substantial Completion, the Retainage may be reduced at the request of the Contractor and recommendation of the CT MIL Project Manager. In the event of a reduction in Retainage to below five percent (5%), the minimum Retainage withheld shall not be less than the CT MIL Project Manager's estimate of the remaining Work or two and one-half percent (2.5%), whichever is greater. All requests for Retainage Reduction shall be done on CT MIL Form 7048 General Contractor Retainage Reduction Request, which can be found at the end of Substantial Completion, in limited circumstances, at the sole discretion of the Commissioner, a reduction of Retainage below Two and one-half percent (2.5%) may be considered.
- 28.2.2** Subsequent to Substantial Completion, in limited circumstances, at the sole discretion of the Commissioner and based upon factors set forth in Section 28.3, a reduction of Retainage below two and five-tenths percent (2.5%) may be considered.
- 28.2.3** A "Good" Contractor's Performance Evaluation score shall be defined as a minimum total score of sixty percent (60%).
- 28.3** The decision of the Commissioner to reduce the Retainage rate will be based upon the Contractor's Performance Evaluation score for completed portions of the Work as set out above and other factors that the Commissioner may find appropriate as follows:
- 28.3.1** The Contractor's timely submission of an appropriate and complete CPM Schedule or Construction Schedule and Schedule of Values, in compliance with the Contract requirements and the prompt resolution of the Owner's and/or Architect's or Engineer's comments on the submitted material resulting in an appropriate basis for progress of the Work.
- 28.3.2** The Contractor's timely and proper submission of all Contract Document required submissions: including, but not limited to, Shop Drawings, material certificates and material samples and the prompt resolution of the Owners and/or Architect's or Engineer's comments on the submitted material, resulting in an appropriate progress of the Work.
- 28.3.3** The Contractor's provision of proper and adequate supervision and home office support of the Project.
- 28.3.4** The Work completed to date has been installed or finished in a manner acceptable to the Owner.
- 28.3.5** The progress of the Work is consistent with the approved CPM Schedule or Construction Schedule.
- 28.3.6** All approved credit change orders have been invoiced.
- 28.3.7** All Change Order requests for pricing are current.
- 28.3.8** The Contractor has and is maintaining a clean worksite in accordance with the Contract Documents.
- 28.3.9** All Subcontractor payments are current at the time of reduction request.
- 28.3.10** Contractor is compliant with set-aside provisions of the contract.
- 28.3.2.11** Pursuant to C.G.S. Sec. 4a-101, the General Contractor shall compile evaluation information during the performance of the contract on each of its subcontractors who are performing work with a value in excess of five hundred thousand dollars (\$500,000.00). The General Contractor shall complete and submit to the State of Connecticut Military Department (CT MIL) evaluations of each such subcontractor upon fifty percent (50%) completion of the project and upon Substantial Completion of the project. The General Contractor acknowledges that its failure to complete and submit these evaluations in a timely manner may, by statute; result in a delay in project funding and, consequently, payment to the General Contractor.
- 28.4** No payments will be made for improperly stored or protected materials or unacceptable Work.
- 28.5** At his or her sole discretion, the Commissioner may allow to be included in the monthly requisitions payment requests for materials and equipment stored off the site.

~~**28.5.1** In the event the Commissioner allows the Contractor to include in its requisitions payment requests for materials and equipment~~

stored off the site, the Contractor shall also submit any additional bonds and/or insurance certificates relating to off-site stored materials and equipment, and follow such other procedures as may be required by the State to obtain the Commissioner's approval of such requests.

28.5.2 The Architect or Engineer, or Construction Administrator shall have inspected said materials and equipment and recommended payment therefore. The Contractor shall pay for the cost of the Architect's or Engineer's, or Construction Administrator's time and expense in performing these inspection services.

ARTICLE 29 DELIVERY OF STATEMENT SHOWING AMOUNTS DUE FOR WAGES, MATERIALS, AND SUPPLIES

29.1 For each Application for Payment under this Contract, the Owner reserves the right to require the Contractor and every Subcontractor to submit a written verified statement, in a form satisfactory to the Owner, showing in detail all amounts then due and unpaid by such Contractor or Subcontractor for daily or weekly wages to all laborers employed by it for the performance of the Work or to other persons for materials, equipment or supplies delivered at the site.

29.2 The term "laborers" as used herein shall include workmen, workwomen, and mechanics.

29.3 Failure to comply with this requirement may result in the Owner withholding the Application for Payment pursuant to Article 28.

ARTICLE 30 SUBSTANTIAL COMPLETION AND ACCEPTANCE

30.1 Substantial Completion:

30.1.1 When the Contractor considers that the Work or a portion thereof is Substantially Complete, the Contractor shall request an inspection of said Work in writing to the Construction Administrator. The request shall certify that the Contractor has completed its own inspection prior to the request and that the Contractor is compliant with all requirements of Section 01 77 00 of the General Requirements. The request must also include a statement that a principal or senior executive of the Contractor is ready, willing and able to attend a walk through inspection with the Architect or Engineer.

30.1.2 Upon receipt of the request, the Architect or Engineer, Construction Administrator and Owner, will make an inspection to determine if the Work or designated portion thereof is Substantially Complete. A principal or senior executive of the Contractor shall accompany the Architect or Engineer during each inspection/re-inspection. If the inspection discloses any item, whether or not included on the inspection list, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item.

30.1.3 The Contractor shall then submit a request for another inspection. The determination of Substantial Completion is solely within the discretion of the Owner. Any costs for re-inspection beyond one, shall be at the expense of the Contractor and such costs will be recovered by issuance of a credit Change Order. When the Work or designated portion thereof is determined to be Substantially Complete, the Contractor will be provided a Certificate of Substantial Completion from the Owner. The Certificate of Substantial Completion shall establish the date when the responsibilities of the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, are transferred to the Owner and shall fix the time within which the Contractor shall finish all items on the inspection list accompanying the Certificate. If the punch list is not complete in 90 Days, the Owner reserves the right to complete the outstanding punch list items with their own forces or by awarding separate contracts and to deduct the cost thereof from the amounts remaining due to the Contractor.

30.1.4 The Certificate of Substantial Completion shall be signed by the Construction Administrator, Owner, and Architect or Engineer. Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Construction Administrator and Architect or Engineer, the Owner shall make payment reflecting adjustment in Retainage, if any, for such Work or portion thereof as provided in the Contract Documents.

30.2 Acceptance:

30.2.1 Upon completion of the Work, the Contractor shall forward to the Construction Administrator a written notice that the Work is ready for inspection and Acceptance.

30.2.2 When the Work has been completed in accordance with terms and conditions of the Contract Document as determined by the Owner a Certificate of Acceptance shall be issued by the Owner.

ARTICLE 31 FINAL PAYMENT

31.1 The Owner reserves the right to retain for a period of thirty (30) Days after filing of the Certificate of Acceptance the amount therein stated less all prior payments and advances whatsoever to or for the account of the Contractor.

31.2 All prior estimates and payments, including those relating to extra or additional Work, shall be subject to correction by the Final Payment.

31.3 No Application for Payment, Final or Partial, shall act as a release to the Contractor or the Contractor's sureties from any obligations under this Contract.

31.4 The Architect or Engineer and Construction Administrator will promptly issue the Certificate for Payment, stating that to the best of their knowledge, information and belief, and on the basis of their observations and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in said Final Payment is due and payable.

- 31.5** Final Payment shall not be released until a Certificate of Acceptance and a Certificate of Compliance have been issued.
- 31.6** Neither Final Payment nor any Retainage shall become due until the Contractor submits to the Owner the following:
- 31.6.1** An affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied.
 - 31.6.2** A certificate evidencing that insurance required by the Contract Documents to remain in force after Final Payment is currently in effect and will not be canceled or allowed to expire without at least 30 Days prior written notice to the Owner.
 - 31.6.3** A written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents.
 - 31.6.4** Written consent of surety, if any, to Final Payment.
 - 31.6.5** If required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees.

ARTICLE 32 OWNER'S RIGHT TO WITHHOLD PAYMENTS

- 32.1** The Commissioner may withhold a portion of any Payment due the Contractor that may, in the judgment of the Commissioner, be necessary:
- 32.1.1** To assure the payment of just claims then due and unpaid to any persons supplying labor or materials for the Work.
 - 32.1.2** To protect Owner from loss due to defective, unacceptable or non-conforming Work not remedied by the Contractor.
 - 32.1** To protect the Owner from loss due to injury to persons or damage to the Work or property of other Contractors, Subcontractors, or others caused by the act or neglect of the Contractor or any of its Subcontractors.
- 32.2** The Owner shall have the right to apply any amount withheld under this Article as the Owner may deem proper to satisfy protection from claims. The amount withheld shall be considered a payment to the Contractor.
- 32.3** The Owner has the right to withhold payment if the Contractor fails to provide accurate submissions of Submittals, update the status including but not limited to the following: As- Built Drawings, request for information (RFI) log, Schedule, submittal log, Change Order log, certified payrolls and daily reports and all other requirement of the Contract Documents.
- 32.4** If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees.

ARTICLE 33 OWNER'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

- 33.1** The Commissioner shall have the authority to suspend the Work wholly or in part, for such period or periods as the Commissioner considers being in the best interests of the State, or in the interests of public necessity, convenience or safety. During such periods the Contractor shall store all materials and equipment, in such a manner to prevent the materials and equipment from being damaged in any way, and the Contractor shall take precautions to protect the Work from damage.
- 33.1.1** If the Commissioner, in writing, orders the performance of all or any portion of the Work to be suspended or delayed for an unreasonable period of time (i.e. not originally anticipated, customary, or inherent in the construction industry) and the Contractor believes that additional compensation and/or Contract Time is due as a result of such suspension or delay, the Contractor shall submit to the Commissioner in writing a request for a Contract adjustment within 7 Days of receipt of the notice to resume Work. The request shall set forth the specific reasons and support for said adjustment.
 - 33.1.2** The Commissioner shall evaluate any such requests received. If the Commissioner agrees that the cost and/or time required for the performance of the Contract has increased as a result of such suspension and that the suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or Subcontractors, and was not caused by weather, then the Commissioner will make a reasonable adjustment, excluding profit, of the Contract terms. The Commissioner will notify the Contractor of the determination as to what adjustments of the Contract, if any, that the Commissioner deems warranted.
 - 33.1.3** No Contract adjustment will be made unless the Contractor has submitted the request for adjustment within the time prescribed.
 - 33.1.4** No Contract adjustment will be made under this Article to the extent that performance would have been suspended or delayed by any other cause within the Contractor's control or by any factor for which the Contractor is responsible under the Contract; or that such an adjustment is provided for or excluded under other term or condition of this Contract.
- 33.2 Termination for Convenience:** Notwithstanding any provision or language in the Contract to the contrary, the State may terminate the Contract whenever the Commissioner determines at his sole discretion that such termination is in the best interests of the State. Any such termination shall be effected by delivery to the Contractor of a written Notice of Termination specifying the extent to which performance of Work under the Contract is terminated, and the date upon which such termination shall be effective.
- 33.2.1** In the event of such termination, the Contractor shall be entitled to reasonable compensation as determined by the Commissioner, however, no claim for lost Overhead or profits shall be allowed.
 - 33.2.2** All Work and materials obtained by the Contractor for the Work, that have been incorporated into the Work, inspected, tested as required, accepted by the Commissioner, and paid for by the State, shall become the property of the State.

33.2.3 Materials obtained by the Contractor for the Work that have been inspected, tested as required, and accepted by the Commissioner, and that are not incorporated into the Work, shall, at the option of the Commissioner, be purchased from the Contractor at actual cost as shown by receipted bills. To this cost shall be added all actual costs for delivery at such points of delivery as may be designated by the Commissioner, as shown by actual cost records.

33.2.4 Termination of the Contract shall not relieve the Contractor or its Surety of their responsibilities for the completed Work, nor shall it relieve the Contractor's Surety of its obligations to ensure completion of the Work and to pay legitimate claims arising out of Work.

33.3 Termination for Cause:

33.3.1 The Commissioner may give notice in writing to the Contractor and its surety of any particular delay, neglect, or default of the Contractor due to one or more of the following:

33.3.1.1 Failure to begin the Work within the time specified for same in the Contract Documents.

33.3.1.2 Failure to perform the Work with sufficient workmen, equipment or materials to ensure the prompt completion of the Work within the time specified in the Contract.

33.3.1.3 Unsuitable performance of the Work or failure to remedy or redo such work as DAS Project Manager shall reject as defective, unsuitable, or noncompliant with Contract requirements.

33.3.1.4 Failure or refusal to remove material rejected as defective, unsuitable, or noncompliant with Contract requirements.

33.3.1.5 Discontinuance of the suitable prosecution of the Work for a period of seventy-two (72) hours, excluding Saturdays, Sundays and holidays, without written authorization to do so from the DAS Project Manager.

33.3.1.6 Failure to recommence discontinued Work within forty-eight (48) hours (excluding Saturdays, Sundays and holidays) after being ordered to do so by the DAS Project Manager.

33.3.1.7 Insolvency, filing for bankruptcy or any act or occurrence that may render the Contractor financially incapable of completing the Work.

33.3.1.8 Failure to satisfy any final judgment against it for a period of thirty (30) days.

33.3.1.9 Making of any assignment for the benefit of creditors.

33.3.1.10 Violation of any provisions of the Contract Documents.

33.3.2 If the Contractor or its surety within a period of ten (10) days after the issuance of such notice does not proceed in conformance with the directions set forth therein, or fails to present a remedial plan of operation, satisfactory to the Commissioner, for remedying the acts or failures complained of in the notice, then the Commissioner may, at his discretion, order the surety to complete the Work or, without violating the Contract, take the right to control and prosecute the Work out of the hands of said Contractor and surety, terminating the Contract.

33.3.3 The Commissioner may appropriate or use any or all stockpiled materials and any and all equipment required by the Contract as may be suitable and necessary for completion of the Work and may enter into an agreement, either by negotiation or public letting, for the completion of said Contract by a party other than the Contractor, according to the terms and provisions thereof, or use such other methods or combinations thereof as in his or her opinion shall be required or desirable for the completion of the Work.

33.3.4 All costs and charges incurred by the Owner in connection with completing the Work, or as a result of the Contractor's default, shall be deducted from any monies due to or which may become due to the Contractor. In case such expense exceeds the sum that would have been payable under the Contract, then the Contractor and the surety shall be liable for, and shall pay to the State, the amount of the excess. Termination of the Contract shall not relieve the Contractor or its surety of their responsibilities for the completed Work, nor shall it relieve the Contractor's surety of its obligations to ensure completion of the Work and to pay legitimate claims arising out of the Work.

ARTICLE 34 SUBLETTING OR ASSIGNING OF CONTRACT

34.1 The Contract or any portion thereof, or the Work provided for therein, or the right, title, or interest of the Contractor therein may not be sublet, sold, transferred, assigned, or otherwise disposed of to any person, firm, or corporation without the written consent of the Commissioner.

34.2 No person, firm, or corporation other than the Contractor to whom the Contract was awarded shall be permitted to commence Work at the site of the Contract until such consent has been granted.

ARTICLE 35 CONTRACTOR'S INSURANCE

35.1 The Contractor shall not start Work under the Contract until they have obtained insurance as stated in SECTIONS 00 62 16 CERTIFICATE OF INSURANCE and 00 40 13 BID PROPOSAL FORM, subsections 4.4.2 and 4.4.3, of the Project Manual and until the insurance has been approved by the Owner. The Contractor shall not allow any Subcontractor to start Work until the same insurance has been obtained by the Subcontractor and approved by the Owner or the Contractor's insurance provides coverage on behalf of the Subcontractor. The Contractor shall send Certificates of Liability Insurance to the Bidding and Contracts Unit, Military Department, 360 Broad Street, Room #143, Hartford, CT 06105 unless otherwise directed in writing. Presented below is a narrative summary of the insurance required.

35.1.1 Commercial General Liability Insurance: Insurance including contractual liability, products/completed operations, broad form property damage and independent Contractors. The limits shall be no less than \$1,000,000 each occurrence and \$2,000,000 annual aggregate. Coverage for hazards of explosion, collapse and underground (X-C-U) and for asbestos abatement when applicable to this Contract, must also be included when applicable to the Work to be performed. The State of Connecticut, the Military Department, and their respective officers, agents, and employees shall be named as an Additional Insured. This coverage shall be provided on a primary basis.

35.1.2 Owner's and Contractor's Protective Liability Insurance: Insurance providing a total limit of \$1,000,000 for all damages arising out of bodily injury or death of persons in any one accident or occurrence and for all damages arising out of injury or destruction of property in any one accident or occurrence and subject to a total (aggregate) limit of \$2,000,000 for all damages arising out of bodily injury to or death of persons in all accidents or occurrences and out of injury to or destruction of property during the policy period. This coverage shall be for and in the name of the State of Connecticut.

35.1.3 Automobile Liability Insurance: The operation of all motor vehicles including those owned, non-owned and hired or used in connection with the Contract shall be covered by Automobile Liability Insurance providing for a total limit of \$1,000,000 for all damages arising out of bodily injuries to or death of all persons in any one accident or occurrence and for all damages arising out of injury to or destruction of property in any one accident or occurrence. In cases where an insurance policy shows an aggregate limit as part of the automobile liability coverage, the aggregate limit must be at least \$2,000,000. This coverage shall be provided on a primary basis. Should the Contractor not own any automobiles, the automobile & liability requirement shall be amended to allow the Contractor to maintain only hired and non-owned liability coverage.

35.1.4 Umbrella Liability Insurance: Umbrella Liability Insurance, including a drop down provision covering any exhausted underlying aggregate limits in the specified amount shown below of combined single limit each occurrence in excess of the coverages described in subsections 35.1.1 Commercial General Liability Insurance, 35.1.3 Automobile Liability, and 35.1.5 Workers' Compensation and Employer's Liability. The State of Connecticut shall be named as an additional insured. The Umbrella Liability Insurance Limits for the Contractor are based on the Contract Value as specified in the following table.

Umbrella Liability Insurance Table:			
Contract Value		Umbrella Limit	
From	To	From	To
\$1.00		\$500,000.00	\$1,000,000.00
\$500,000.01		\$1,000,000.00	\$2,000,000.00
\$1,000,000.01		\$10,000,000	\$5,000,000.00
\$10,000,000.01		\$30,000,000	\$10,000,000.00
\$30,000,000.01		\$80,000,000	\$15,000,000.00
\$80,000,000.01		\$150,000,000	\$20,000,000.00
\$150,000,000.01		\$300,000,000	\$25,000,000.00

35.1.5 Workers' Compensation and Employer's Liability: As required by Connecticut Law and Employers' Liability with a limit of not less than \$100,000 per occurrence, \$500,000 disease policy limit and \$100,000 disease each employee. When Work is on or contiguous to navigable bodies of waterways and ways adjoining, the Contractor shall include the Federal Act endorsement for the U.S. Longshoremen's and Harbor Workers Act.

35.1.6 Special Hazards Insurance: If required, will be stated in the BID PROPOSAL FORM of this Project Manual. This includes coverage for explosion, collapse or underground damage and for asbestos abatement when applicable to this Contract and shall be no less than \$1,000,000 each occurrence.

35.1.7 Builder's Risk Insurance: If required, will be stated in the BID PROPOSAL FORM of this Project Manual.

35.1.8 Inland Marine/Transit Insurance: With respect to property with values in excess of \$100,000 which is rigged, hauled or situated at the site pending installation, the Contractor shall maintain inland marine/transit insurance provided the coverage is not afforded by a Builder's Risk policy.

35.1.9 When required to be maintained, the Builder's Risk and/or Inland Marine/Transit Insurance policy shall endorse the State of Connecticut as a Loss Payee and the policy shall state it is for the benefit of and payable to the State of Connecticut.

35.2 Satisfying Limits Under an Umbrella Policy: If necessary, the Contractor may satisfy the minimum limits required above for either Commercial General Liability, Automobile Liability, and Employer's Liability coverage under an Umbrella or Excess Liability policy. The underlying limits may be set at the minimum amounts required by the Umbrella or Excess Liability policy provided the combined limits meet at least the minimum limit for each required policy. The Umbrella or Excess Liability policy shall have an Annual Aggregate at a limit not less than two (2) times the highest per occurrence minimum limit required above for any of the required coverages. The State of Connecticut shall be specifically endorsed as an Additional Insured on the Umbrella or Excess Liability policy, unless the Umbrella or Excess Liability policy provides continuous coverage to the underlying policies on a complete "Follow-Form" basis.

35.3 The Contractor shall, at its sole expense, maintain in full force and effect at all times during the life of the Contract or the performance of Work hereunder, insurance coverage as described herein. Certificates shall include a minimum thirty (30)-day endeavor to notify requirement to the Owner prior to any cancellation or non-renewal.

35.4 The Contractor shall be fully and solely responsible for any costs or expenses as a result of a coverage deductible, coinsurance penalty, or self-insured retention, including any loss not covered because of the operation of such deductible, coinsurance penalty, or self-insured retention.

35.5 The requirement contained herein as to types and limits of insurance coverage to be maintained by the Contractor are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor.

35.6 Indemnification and Hold Harmless Provisions:

35.6.1 The Contractor shall indemnify, defend and hold harmless the State and its officers, representatives, agents, servants, employees, successors and assigns from and against any and all (1) Claims arising, directly or indirectly, in connection with the Contract, including the acts of commission or omission (collectively, the "Acts") of the Contractor or Contractor Parties; and (2) liabilities, damages, losses, costs and expenses, including but not limited to, attorneys' and other professionals' fees, arising, directly or indirectly, in connection with Claims, Acts or the Contract. The Contractor shall use counsel reasonably acceptable to the State in carrying out its obligations under this section. The Contractor's obligations under this section to indemnify, defend and hold harmless against Claims includes Claims concerning confidentiality of any part of or all of the Contractor's bid, proposal or any Records, any intellectual property rights, other proprietary rights of any person or entity, copyrighted or uncopyrighted compositions, secret processes, patented or unpatented inventions, articles or appliances furnished or used in the Performance.

35.6.2 The Contractor shall not be responsible for indemnifying or holding the State harmless from any liability arising due to the negligence of the State or any third party acting under the direct control or supervision of the State.

35.6.3 The Contractor shall reimburse the State for any and all damages to the real or personal property of the State caused by the Acts of the

Contractor or any Contractor Parties. The State shall give the Contractor reasonable notice of any such Claims.

35.6.4 The Contractor's duties under this section shall remain fully in effect and binding in accordance with the terms and conditions of the Contract, without being lessened or compromised in any way, even where the Contractor is alleged or is found to have merely contributed in part to the Acts giving rise to the Claims and/or where the State is alleged or is found to have contributed to the Acts giving rise to the Claims.

35.6.5 The Contractor shall carry and maintain at all times during the term of the Contract, and during the time that any provisions survive the term of the Contract, sufficient general liability insurance to satisfy its obligations under this Contract. The Contractor shall name the State as an additional insured on the policy and shall provide a copy of the policy to the Agency prior to the effective date of the Contract. The Contractor shall not begin Performance until the delivery of the policy to the Agency. The Agency shall be entitled to recover under the insurance policy even if a body of competent jurisdiction determines that the Agency or the State is contributorily negligent.

35.6.6 Such obligations shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to any party or person described in General Conditions Article 35.

35.6.7 This section shall survive the Termination of the Contract and shall not be limited by reason of any insurance coverage.

ARTICLE 36 FOREIGN MATERIALS

36.1 Preference shall be given to articles or materials manufactured or produced in the United States, Canada, and Mexico, (the members of the North American Free Trade Agreement (NAFTA)); and the products shall meet all of the referenced standards and Specifications for conditions of performance, quality, and price with duty being equal.

36.2 Only articles or materials manufactured or produced in the United States, Canada, and Mexico, (the members of the North American Free Trade Agreement (NAFTA)), will be allowed. The foregoing provisions shall not apply to foreign articles or materials required by the Contract Documents.

36.3 Buy American Act (BAA): Any "public building" or "public work" project funded by the American Recovery and Reinvestment Act of 2009 ("ARRA") requires that "all of the iron, steel, and manufactured goods used in the project" must be "produced in the United States" in accordance with the requirements of the Buy American Act (BAA).

ARTICLE 37 HOURS OF WORK

37.1 No person shall be employed to work or be permitted to work more than eight (8) hours in any Day or more than forty (40) hours in any week for any Work provided in the Contract, in accordance with Connecticut General Statute Section 31-57.

37.2 The operation of such limitation of hours of work may be suspended during an emergency, upon the approval of the Commissioner, in accordance with Connecticut General Statute Section 31-57.

ARTICLE 38 CLAIMS

38.1 General: When filing a formal claim under Section 4-61 (referred to as "Section 4-61" below) of the Connecticut General Statutes (as revised), either as a lawsuit in the Superior Court or as a demand for arbitration, the Contractor must follow the procedures and comply with the requirements set forth in this Article. This Section does not, unless so specified, govern informal claims for additional compensation which the Contractor may bring before the Department. The Contractor should understand, however, that the Department may need, before the Department can resolve such a claim, the same kinds of documentation and other substantiation that it requires under this Article. It is the intent of the Department to compensate the Contractor for actual increased costs caused by or arising from acts or omissions on the part of the Department that violate legal or contractual duties owed to the Contractor by the Department.

38.2 Notice of Claim: Whenever the Contractor intends to file a formal claim against the Department under Section 4-61, seeking compensation for additional costs, the Contractor shall notify the Commissioner in writing (in strict compliance with Section 4-61) of the details of said claim. Such written notice shall contain all pertinent information described in Paragraph 38.5 below.

Once formal notice of a claim under Section 4-61(b) (as revised) has been given to the Commissioner, the claimant may not change the claim in any way, in either concept or monetary amount, (1) without filing a new notice of claim and demand for arbitration to reflect any such change, and (2) without the minimum period of six months after filing of the new demand commencing again and running before any hearing on the merits of the claim may be held. The only exception to this limitation will be for damages that continue to accrue after submission of the notice, in ways described and anticipated in the notice.

38.3 Record Keeping: The Contractor shall keep daily records of all costs incurred in connection with its Work on behalf of the Department. The daily records shall identify each aspect of the Project affected by matters related to any claim for additional compensation that the Contractor has filed, intends to file, or has reason to believe that it may file against the Department; the specific Project locations where Project work has been so affected; the number of people working on the affected aspects of the Project at the pertinent time(s); and the types and number of pieces of equipment on the Project site at the pertinent time(s). Any potential or anticipated effect on the Project's progress or Schedule which may result in a claim by the Contractor shall be noted contemporaneously with the cause of the effect, or as soon thereafter as possible.

38.4 Claim Compensation: The payment of any claim, or any portion thereof, that is deemed valid by the Department shall be made in accordance with the following provisions of this Article:

38.4.1.0 Compensable Items: The liability of the Department for claims will be limited to the following specifically identified items of cost, insofar as they have not otherwise been paid for by the Department, and insofar as they were caused solely by the actions or omissions

of the Department or its agents (except that with regard to payment for extra work, the Department will pay to the Contractor the Overhead and profit percentages provided for in Article 13.):Additional Project-site labor expenses.

38.4.1.1 Additional Project-site labor expenses.

38.4.1.2 Additional costs for materials.

38.4.1.3 Additional, unabsorbed Project-site Overhead (e.g., for mobilization and demobilization).

38.4.1.4 Additional costs for active equipment.

38.4.1.5 For each Day of Project delay or suspension caused solely by actions or omissions of the Department either:

38.4.1.5.1 an additional ten percent (10%) of the total amount of the costs identified in Subparagraphs 38.4.1.1 through 38.4.1.4 above; except that if the delay or suspension period prevented the Contractor from incurring enough Project costs under Subparagraphs 38.4.1.1 through 38.4.1.4 during that period to require a payment by the Department that would be greater than the payment described in Subparagraph 38.4.1.5.2 below, then the payment for affected home office Overhead and profit shall instead be made in the following *per diem* amount :

38.4.1.5.2 six percent (6%) of the original total Contract amount divided by the original number of Days of Contract Time. Payment under either 38.4.1.5.1 or 38.4.1.5.2 here of shall be deemed to be complete and mutually satisfactory compensation for any unabsorbed home office overhead and any profit related to the period of delay or suspension.

38.4.1.6 Additional equipment costs. Only actual equipment costs shall be used in the calculation of any compensation to be made in response to claims for additional Project compensation. Actual equipment costs shall be based upon records kept in the normal course of business and in accordance with generally accepted accounting principles. Under no circumstances shall Blue Book or other guide or rental rates be used for this purpose (unless the Contractor had to rent the equipment from an unrelated party, in which case the actual rental charges paid by the Contractor, so long as they are reasonable, shall be used). Idle equipment, for instance, shall be paid for based only on its actual cost to the Contractor.

38.4.1.7 Subcontractor costs limited to, and determined in accordance with, Subparagraphs 38.4.1.1 through 38.4.1.5 above and applicable statutory and case law. Such Subcontractor costs may be paid for by the Department only: (a) in the context of an informal claims settlement; or (b) if the Contractor has itself paid or legally assumed, present unconditional liability for those Subcontractor costs.

38.4.2 Excusable But Not Compensable Items: The Contractor may be allowed Days but the Department will have no liability for the following non-compensable items:

38.4.2.1 Abnormal or unusually severe weather

38.4.2.2 Acts of God

38.4.2.3 Force Majeure

38.4.2.4 Concurrent Delay

38.4.3 Non-Compensable Items: The Department will have no liability for the following specifically-identified non-compensable items:

38.4.3.1 Profit, in excess of that provided for herein.

38.4.3.2 Loss of anticipated profit.

38.4.3.3 Loss of bidding opportunities.

38.4.3.4 Reduction of bidding capacity.

38.4.3.5 Home office overhead in excess of that provided for in Subparagraph 38.4.1.5 hereof.

38.4.3.6 Attorney's fees, claims preparation expenses, or other costs of claims proceedings or resolution.

38.4.3.7 Subcontractor failure to perform

38.4.3.8 Any other consequential or indirect expenses or costs, such as tort damages, or any other form of expense or damages not provided for in these specifications or elsewhere in the Contract.

38.5 Required Claim Documentation: All claims shall be submitted in writing to the Commissioner, and shall be sufficient in detail to enable the Department to ascertain the basis and the amount of each claim, and to investigate and evaluate each claim in detail. As a minimum, the Contractor must provide the following information for each and every claim and sub-claim asserted:

38.5.1 Detailed factual statement of the claim, with all dates, locations and items of Work pertinent to the claim.

38.5.2 A statement of whether each requested additional amount of compensation or extension of time is based on provisions of the Contract or on an alleged breach of the Contract. Each supporting or breached Contract provision and a statement of the reasons why each such provision supports the claim must be specifically identified or explained.

38.5.3 Excerpts from manuals or other texts which are standard in the industry, if available, that support the Contractor's claim.

38.5.4 The details of the circumstances that gave rise to the claim.

38.5.5 The date(s) on which any and all events resulting in the claim occurred, and the date(s) on which conditions resulting in the claim first became evident to the Contractor.

38.5.6 Specific identification of any pertinent document, and detailed description of the substance of any material oral communication, relating to the substance of such claim.

38.5.7 If an extension of time is sought, the specific dates and number of Days for which it is sought, and the basis or bases for the extension sought. A critical path method, bar chart, or other type of graphical schedule that supports the extension must be submitted.

38.5.8 When submitting any claim over \$50,000, the Contractor shall certify in writing, under oath and in accordance with the formalities required by the contract, as to the following:

38.5.8.1 That supporting data is accurate and complete to the Contractor's best knowledge and belief;

38.5.8.2 That the amount of the dispute and the dispute itself accurately reflects what the Contractor in good faith believes to be the Department's liability;

38.5.8.3 The certification shall be executed by:

38.5.8.3.1 If the Contractor is an individual, the certification shall be executed by that individual.

38.5.8.3.2 If the Contractor is not an individual, the certification shall be executed by a senior company official in charge at the Contractor's plant or location involved or an officer or general partner of the Contractor having overall responsibility for the conduct of the Contractor's affairs.

38.6 Auditing of Claims: All claims filed against the Department shall be subject to audit by the Department or its agents at any time following the filing of such claim. The Contractor and its Subcontractors and suppliers shall cooperate fully with the Department's auditors. Failure of the Contractor, its Subcontractors, or its suppliers to maintain and retain sufficient records to allow the Department or its agents to fully evaluate the claim shall constitute a waiver of any portion of such claim that cannot be verified by specific, adequate, contemporaneous records, and shall bar recovery on any claim or any portion of a claim for which such verification is not produced. Without limiting the foregoing requirements, and as a minimum, the Contractor shall make available to the Department and its agents the following documents in connection with any claim that the Contractor submits:

38.6.1 Daily time sheets and foreman's daily reports.

38.6.2 Union agreements, if any.

38.6.3 Insurance, welfare, and benefits records.

38.6.4 Payroll register.

38.6.5 Earnings records.

38.6.6 Payroll tax returns.

38.6.7 Records of property tax payments.

38.6.8 Material invoices, purchase orders, and all material and supply acquisition contracts.

38.6.9 Materials cost distribution worksheets.

38.6.10 Equipment records (list of company equipment, rates, etc.).

38.6.11 Vendor rental agreements.

38.6.12 Subcontractor invoices to the Contractor, and the Contractor's certificates of payments to Subcontractors.

38.6.13 Subcontractor payment certificates.

- 38.6.14** Canceled checks (payroll and vendors).
- 38.6.15** Job cost reports.
- 38.6.16** Job payroll ledger.
- 38.6.17** General ledger, general journal (if used), and all subsidiary ledgers and journals, together with all supporting documentation pertinent to entries made in these ledgers and journals.
- 38.6.18** Cash disbursements journals.
- 38.6.19** Financial statements for all years reflecting the operations on the Project.
- 38.6.20** Income tax returns for all years reflecting the operations on the Project.
- 38.6.21** Depreciation records on all company equipment, whether such records are maintained by the company involved, its accountant, or others.
- 38.6.22** If a source other than depreciation records is used to develop costs for the Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents.
- 38.6.23** All documents which reflect the Contractor's actual profit and overhead during the years that the Project was being performed, and for each of the five years prior to the commencement of the Project.
- 38.6.24** All documents related to the preparation of the Contractor's bid, including the final calculations on which the total proposed Contract bid price as stated in the Bid Proposal Form was based.
- 38.6.25** All documents which relate to the claim or to any sub-claim, together with all documents that support the amount of damages as to each claim or sub-claim.
- 38.6.26** Worksheets used to prepare the claim, which indicate the cost components of each item of the claim, including but not limited to the pertinent costs of labor, benefits and insurance, materials, equipment, and Subcontractors' damages, as well as all documents which establish the relevant time periods, individuals involved, and the Project hours and the rates for the individuals.
- 38.6.27** The name, function, and pertinent activity of each Contractor's or Subcontractor's official, or employee, involved in or knowledgeable about events that give rise to, or facts that relate to, the claim.
- 38.6.28** The amount(s) of additional compensation sought and a break-down of the amount(s) into the categories specified as payable under Paragraph 38.4 above.
- 38.6.29** The name, function, and pertinent activity of each Department official, employee, or agent involved in or knowledgeable about events that give rise to, or facts that relate to, the claim.

ARTICLE 39 DIESEL VEHICLE EMISSIONS CONTROL

39.1 The Contractor shall be responsible for compliance with the following provisions:

39.1.1 All Contractor and Subcontractor diesel powered non-road construction equipment with engine horsepower (HP) ratings of 60 HP and above, that are on the Project or are assigned to the Contract for a period in excess of 30 consecutive Days, shall be retrofitted with emission control devices in order to reduce diesel emissions. In addition, all motor vehicles and/or construction equipment (both on-highway and non-road) shall comply with all pertinent State and Federal regulations relative to exhaust emission controls and safety.

39.1.2 Retrofit emission control devices shall consist of oxidation catalysts, or similar retrofit equipment control technology that is:

39.1.2.1 Included on the U.S. Environmental Protection Agency (EPA) "Verified Technology List," as may be amended from time to time <http://www.epa.gov/otaq/retrofit/retroverifiedlist.htm> and

39.1.2. Verified by EPA to provide a minimum emissions reduction of 20% particulate matter (PM₁₀), 40% carbon monoxide (CO), and 50% hydrocarbons (HC).

39.1.3 Construction shall not proceed until all diesel powered non-road construction equipment meeting the criteria in provision 39.1.1 have been retrofitted, unless the Commissioner grants a waiver under provision 39.2.

39.1.4 The Contractor shall at least monthly, assess which diesel powered non-road construction equipment are subject to these provisions. The Contractor shall notify the CT MIL Project Manager of any violations of these provisions.

39.1.5 Idling of delivery and/or dump trucks, or other diesel powered equipment shall be limited to three (3) minutes during non-active use in accordance with the Regulations of Connecticut State Agencies Section 22a-74-18(b)(3)(C), which states, in part:

"[N]o person shall cause or allow a Mobile Source to operate for more than three (3) consecutive minutes when such Mobile Source is not in motion, except as follows:

When a Mobile Source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control,

When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers,

When it is necessary to operate auxiliary equipment that is located in or on the Mobile Source to accomplish the intended use of the Mobile Source,(To bring the Mobile Source to the manufacturer's recommended)

When a Mobile Source is in queue to be inspected by

U.S. military personnel prior to gaining access to a U.S. military installation."

39.1.6 All Work shall be conducted to ensure that no harmful effects are caused to adjacent Sensitive Receptor Sites. Diesel-powered

engines shall be located away from fresh air intakes, air conditioners, and windows.

39.1.7 If any diesel powered non-road construction equipment is found to be in non-compliance with these provisions by the CT MIL Project Manager, the Contractor will be issued a Non-Conformance Notice and given a 24 hour period in which to bring the equipment into compliance or remove it from the Project. The Contractor's failure to comply with these provisions shall be reason to withhold payment as described in Article 33.

39.1.8 Any costs associated with these provisions shall be included in the general cost of the contract. In addition, there shall be no time granted to the Contractor for compliance with these provisions. The Contractor's compliance with these provisions and any associated regulations shall not be grounds for a Change Order.

39.2 The Commissioner reserves the right to waive all or portions of these provisions at his/her discretion. The Contractor may request a waiver to all or portions of these provisions with written justification to the Commissioner as to why the Contractor cannot comply with these provisions. A waiver, to be effective, must be granted in writing by the Commissioner.

ARTICLE 40 DISCLOSURE OF RECORDS

40.1 Contractor acknowledges that the Agency must comply with the Freedom of Information Act, C.G.S. §§ 1-200 et seq. ("FOIA") which requires the disclosure of documents in the possession of the State upon request of any citizen, unless the content of the document falls within certain categories of exemption, as defined by C.G.S. § 1-210(b).

40.2 Governmental Function. In accordance with C.G.S. § 1-218, if the amount of this Contract exceeds two million five hundred thousand dollars (\$2,500,000), and the Contractor is a "person" performing a "governmental function", as those terms are defined in C.G.S. § 1-200(4) and (11), the Agency is entitled to receive a copy of the Records and files related to the Contractor's performance of the governmental function, which may be disclosed by the Agency pursuant to the FOIA.

ARTICLE 41 AUDIT AND INSPECTION OF PLANTS, PLACES OF BUSINESS, AND RECORDS

41.1 The State and its agents, including, but not limited to, the Connecticut Auditors of Public Accounts, Attorney General and State's Attorney and their respective agents, may, at reasonable hours, inspect and examine all of the parts of the Contractor's and Contractor Parties' plants and places of business which, in any way, are related to, or involved in, the performance of this Contract.

41.2 The Contractor shall maintain, and shall require each of the Contractor Parties to maintain, accurate and complete Records. The Contractor shall make all of its and the Contractor Parties' Records available at all reasonable hours for audit and inspection by the State and its agents.

41.3 The State shall make all requests for any audit or inspection in writing and shall provide the Contractor with at least twenty-four (24) hours' notice prior to the requested audit and inspection date. If the State suspects fraud or other abuse, or in the event of an emergency, the State is not obligated to provide any prior notice.

41.4 All audits and inspections shall be at the State's expense.

41.5 The Contractor shall keep and preserve or cause to be kept and preserved all of its and Contractor Parties' Records until three (3) years after the latter of (i) final payment under this Agreement, or (ii) the expiration or earlier termination of this Agreement, as the same may be modified for any reason. The State may request an audit or inspection at any time during this period. If any Claim or audit is started before the expiration of this period, the Contractor shall retain or cause to be retained all Records until all Claims or audit findings have been resolved.

41.6 The Contractor shall cooperate fully with the State and its agents in connection with an audit or inspection. Following any audit or inspection, the State may conduct and the Contractor shall cooperate with an exit conference.

41.7 The Contractor shall incorporate this entire Section verbatim into any contract or other agreement that it enters into with any Contractor Party.

END OF SECTION

The State Military Department is required to insert the substance of Article VIII of each Master Cooperative Agreement (MCA), MCCA or Appendix in all contracts utilizing federal funds issued under the CA, unless State/Territory laws or regulations offer more protection. The following sections are made a part of this bid/contract/purchase order:

ARTICLE VIII - APPLICABLE LAWS AND REGULATIONS

Section 801. Applicable Law.

This MCA is incidental to the implementation of a Federal program. Accordingly, this MCA and associated appendices shall be governed by and construed according to federal law as it may affect the rights, remedies, and obligations of the United States.

Section 802. Governing Regulations.

Title 2 Code of Federal Regulations (CFR) Part 200, current PARC policy, NGR 5-1 or successor CNGB I & M, are hereby incorporated into this MCA by reference as if fully set forth herein and shall govern this Agreement. Attachment A consists of those provisions of part 200 which are terms & conditions commonly applicable to NGB assistance instruments.

Section 803. Nondiscrimination.

The Grantee covenants and agrees that no person shall be subject to discrimination or denied benefits in connection with the State's performance under the MCA. Accordingly, and to the extent applicable, the Grantee covenants and agrees to comply with the following national policies prohibiting discrimination:

- a. On the basis of race, color or national origin, in Title VI of the Civil Rights Act of 1964 (42 U.S.C. Section 2000d et seq.), as implemented by DoD regulations at 32 CFR Part 195.
- b. On the basis of race, color or national origin, in Executive Order 11246 as implemented by Department of Labor regulations at 41 CFR Chapter 60.
- c. On the basis of sex or blindness, in Title IX of the Education Amendments of 1972 (20 U.S.C. Section 1681, et seq.), as implemented by DoD regulations at 32 CFR Part 196.
- d. On the basis of age, in The Age Discrimination Act of 1975 (42 U.S.C. Section 6101, et seq.), as implemented by Department of Health and Human Services regulations at 45 CFR Part 90.
- e. On the basis of handicap, in Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794), as implemented by Department of Justice regulations at 28 CFR part 41 and DoD regulations at 32 CFR Part 56.

Section 804. Lobbying.

- a. The state covenants and agrees that it will not expend any funds appropriated by Congress to pay any person for influencing or attempting to influence an officer or employee of any agency, or a Member of Congress in connection with any of the following covered federal actions. The awarding of any federal contract; the making of any federal grant; the making of any federal loan; the entering into of any CA; and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or Cooperative Agreement.
- b. The Final Rule, New Restrictions on Lobbying, issued by the Office of Management and Budget and the Department of Defense (32 CFR Part 28) to implement the provisions of Section 319 of Public Law 101-121 (31 U.S.C. Section 1352) is incorporated by reference and the state agrees to comply with all the provisions thereof, including any amendments to the Interim Final Rule that may hereafter be issued.

Section 805. Drug-Free Work Place.

The Grantee covenants and agrees to comply with the requirements regarding drug-free workplace requirements

in of 32 CFR Part 26, which implements Section 5151-5160 of the Drug-Free Workplace act of 1988 (Public Law 100-690, Title V, Subtitle D; 41 U.S.C. 701, et seq.).

Section 806. Environmental Protection.

- a. The Grantee covenants and agrees that its performance under this Agreement shall comply with:
1. The requirements of Section 114 of the Clean Air Act (42 U.S.C. Section 7414);
 2. Section 308 of the Federal Water Pollution Control Act (33 U.S.C. Section 1318), that relates generally to inspection, monitoring, entry reports, and information, and with all regulations and guidelines issued thereunder;
 3. The Resources Conservation and Recovery Act (RCRA);
 4. The Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA);
 5. The National Environmental Policy Act (NEPA);
 6. The Solid Waste Disposal Act (SWDA));
 7. The applicable provisions of the Clean Air Act (42 U.S.C. 7401, et seq.) and Clean Water Act (33 U.S.C. 1251, et seq.), as implemented by Executive Order 11738 and Environmental Protection Agency (EPA) rules at 40 CFR Part 31;
 8. To identify any impact this award may have on the quality of the human environment and provide help as needed to comply with the National Environmental Policy Act (NEPA, at 42 U.S.C. 4321, et seq.) and any applicable federal, state or local environmental regulation.
- b. In accordance with the EPA rules, the parties further agree that the Grantee shall also identify to the awarding agency (NGB) any impact this award may have on:
1. The quality of the human environment, and provide help the agency may need to comply with the National Environmental Policy Act (NEPA, at 42 U.S.C 4321, et seq.) and to prepare Environment Impact Statements or other required environmental documentation. In such cases, the recipient agrees to take no action that will have an adverse environmental impact (e.g., physical disturbance of a site such as breaking of ground) until the agency provides written notification of compliance with the environmental impact analysis process.
 2. Flood-prone areas, and provide help the agency may need to comply with the National Flood Insurance Act of 1968 and Flood Disaster Protection Act of 1973 (42 U.S.C. 4001, et seq.), which require flood insurance, when available, for federally assisted construction or acquisition in flood-prone areas.
 3. Coastal zones, and provide help the agency may need to comply with the Coastal Zone Management Act of 1972 (16 U.S.C. 1451, et seq.), concerning protection of U.S. coastal resources.
 4. Coastal barriers, and provide help the agency may need to comply with the Coastal Barriers Resource Act (16 U.S.C. 3501 et seq.), concerning preservation of barrier resources.
 5. Any existing or proposed component of the National Wild and Scenic Rivers System, and provide help the agency may need to comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271 et seq.).
 6. Underground sources of drinking water in areas that have an aquifer that is the sole or principal drinking water source, and provide help the agency may need to comply with the Safe Drinking Water Act (42 U.S.C 300H-3).

Section 807. Use of United States Flag Carriers.

- a. The state covenants and agrees that travel supported by U.S. Government funds under this agreement shall use U.S.-flag air carriers (air carriers holding certificates under 49 U.S.C. 41102) for international air transportation of people and property to the extent that such service is available, in accordance with the International Air Transportation Fair Competitive Practices Act of 1974 (49 U.S.C. 40118) and the inter-operative guidelines issued by the Comptroller General of the United States in the March 31, 1981, amendment to Comptroller General Decision B138942.
- b. The state agrees that it will comply with the Cargo Preference Act of 1954 (46 U.S.C. Chapter 553), as implemented by Department of Transportation regulation at 46 CFR 381.7, and 46 CFR 381.7(b).

Section 808. Debarment and Suspension.

Non-federal entities and contractors are subject to the non-procurement debarment and suspension regulations implementing Executive Orders 12549 and 12689, 2 CFR part 180. These regulations restrict awards, subawards, and contracts with certain parties that are debarred, suspended, or otherwise excluded from or ineligible for

participation in Federal assistance programs or activities. The grantee agrees to comply with the DOD implementation of 2 CFR Part 180 (at 2 CFR Part 1125) by checking the Excluded Parties List System (EPLS) at the current OMB website to verify contractor eligibility to receive contracts and subcontracts resulting from this Agreement. The grantee and subrecipients shall not solicit offers from, nor award contracts to contractors listed in EPLS. This verification shall be documented in the grantee and subrecipient contract files, and shall be subject to audit by the grantor and Federal/State audit agencies

Section 809. Buy American Act.

The state covenants and agrees that it will not expend any funds appropriated by Congress without complying with The Buy American Act (41 U.S.C.10a et seq.). The Buy American Act gives preference to domestic end products and domestic construction material. In addition, the Memorandum of Understanding between the United States of America and the European Economic Community (EEC) on Government Procurement, and the North American Free Trade Agreement (NAFTA), provide that EEC and NAFTA end products and construction materials are exempted from application of the Buy American Act.

Section 810. Uniform Relocation Assistance and real Property Acquisition Policies

The state covenants and agrees that it will comply with CFR 49 part 24, which implements the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. Section 4601 et seq.) and provides for fair and equitable treatment of persons displaced by federally assisted programs or persons whose property is acquired as a result of such programs.

Section 811. Copeland “Anti-Kickback” Act.

The state covenants and agrees that it will comply with the Copeland “Anti-Kickback” Act (18 U.S.C. Section 874) as supplemented in Department of Labor regulations (29 CFR Part 3). As applied to this agreement, the Copeland “Anti-Kickback” Act makes it unlawful to induce, by force, intimidation, threat of procuring dismissal from employment, or otherwise, any person employed in the construction or repair of public buildings or public works, financed in whole or in part by the United States, to give up any part of the compensation to which that person is entitled under a contract of employment.

Section 812. Contract Work Hours and Safety Standards Act.

The state covenants and agrees that it will comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. Sections 3701-3708) as supplemented by Department of Labor regulations (29 CFR Part 5). As applied to this agreement, the Contract Work Hours and Safety Standards Act specifies that no laborer or mechanic doing any part of the work contemplated by this agreement shall be required or permitted to work more than 40 hours in any workweek unless paid for all additional hours at not less than 1.5 times the basic rate of pay.

Section 813. System for Award Management and Data Universal Numbering Requirements

System for Award Management and Data Universal Numbering Requirements (DUNS) as indicated below:

- a. Requirement for SAM. You as the recipient must maintain the currency of your information in SAM until you submit the final financial report required under this Agreement or receive the final payment, whichever is later. This requires that you review and update the information at least annually after the initial registration, and more frequently if required by changes in your information or another award term.
- b. Requirement for DUNS Numbers. If you are authorized to make subawards under this Agreement, you:
 1. Must notify potential subrecipients that no entity (see definition in paragraph (c) of this Agreement term) may receive a subaward from you unless the entity has provided its DUNS number to you; and
 2. May not make a subaward to an entity unless the entity has provided its DUNS number to you.
 3. Definitions. For purposes of this Agreement:
 - a. SAM means the official U.S. Government system that consolidated the capabilities of CCR and EPLS. There is NO fee to register in SAM. Entities may register at no cost at the current OMB website. Additional information about registration procedures, updating your recipient account, searching records, as well as user guides and helpful hints may be found at the SAM website.
 1. If you had an active record in CCR, you have an active record in SAM. You do not need to do anything in SAM at this time, unless a change in your business circumstances requires updates to your Entity record(s) in order for you to be paid or to receive an award or you need to renew

your Entity(s) prior to its expiration. SAM will send notifications to the registered user via email 60, 30, and 15 days prior to expiration of the Entity. To update or renew your Entity records(s) in SAM you will need to create a SAM User Account and link it to your migrated Entity records. You do not need a user account to search for registered entities in SAM by typing the DUNS number or business name into the search box.

- b. Data Universal Numbering System (DUNS) number means the nine-digit number established and assigned by Dun and Bradstreet, Inc. (D&B) to uniquely identify business entities. A DUNS number may be obtained from D&B by telephone (currently 866-705-5711) or the internet (currently at <http://fedgov.dnb.com/webform>).
- c. Entity, as it is used in this award term, means all of the following, as defined at 2 CFR Part 25, Subpart C:
 - 1. A Governmental organization, which is a State, local Government, or Indian Tribe;
 - 2. A foreign public entity;
 - 3. A domestic or foreign nonprofit organization;
 - 4. A domestic or foreign for-profit organization; and
 - 5. A Federal Agency, but only as a subrecipient under an award or subaward to a non- Federal entity.
- 4. Subaward:
 - a. This term means a legal instrument to provide support for the performance of any portion of the substantive project or Program for which you received this Agreement and that you as the recipient award to an eligible subrecipient.
 - b. The term does not include your procurement of property and services needed to carry out the project or Program.
 - c. A subaward may be provided through any legal Agreement, including an Agreement that you consider a contract.
- 5. Subrecipient means an entity that:
 - a. Receives a subaward from you under this Agreement; and is accountable to you for the use of the Federal funds provided by the subawards

Section 814. Reporting Subawards and Executive Compensation

The Grantee covenants and agrees to comply with the Reporting Subawards and Executive Compensation requirements indicated below:

- a. Reporting of first-tier subawards.
 - 1. Applicability. Unless you are exempt as provided in paragraph d. of this award term, you must report each action that obligates \$25,000 or more in Federal funds that does not include Recovery funds (as defined in section 1512(a)(2) of the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5) for a subaward to an entity (see definitions in paragraph e. of this award term).
 - 2. Where and when to report.
 - i. You must report each obligating action described in paragraph a.1. of this award term to <http://www.fsr.gov>.
 - ii. For subaward information, report no later than the end of the month following the month in which the obligation was made. (For example, if the obligation was made on November 7, 2010, the obligation must be reported by no later than December 31, 2010.)
 - 3. What to report. You must report the information about each obligating action that the submission instructions posted at <http://www.fsr.gov> specify.
- b. Reporting Total Compensation of Recipient Executives.
 - 1. Applicability and what to report. You must report total compensation for each of your five most highly compensated executives for the preceding completed fiscal year, if—
 - i. the total Federal funding authorized to date under this award is \$25,000 or more;
 - ii. in the preceding fiscal year, you received—
 - A. 80 percent or more of your annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and
 - B. \$25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and
 - iii. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or

section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/execomp.htm>)

2. Where and when to report. You must report executive total compensation described in paragraph b.1. of this award term:
 - i. As part of your registration profile at <http://www.ccr.gov>.
 - ii. By the end of the month following the month in which this award is made, and annually thereafter.

c. Reporting of Total Compensation of Subrecipient Executives.

1. Applicability and what to report. Unless you are exempt as provided in paragraph d. of this award term, for each first-tier subrecipient under this award, you shall report the names and total compensation of each of the subrecipient's five most highly compensated executives for the subrecipient's preceding completed fiscal year, if—

- i. in the subrecipient's preceding fiscal year, the subrecipient received—
 - A. 80 percent or more of its annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and
 - B. \$25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts), and Federal financial assistance subject to the Transparency Act (and subawards); and
- ii. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/execomp.htm>)

2. Where and when to report. You must report subrecipient executive total compensation described in paragraph c.1. of this award term:

- i. To the recipient.
- ii. By the end of the month following the month during which you make the subaward. For example, if a subaward is obligated on any date during the month of October of a given year (i.e., between October 1 and 31), you must report any required compensation information of the subrecipient by November 30 of that year.

d. Exemptions

If, in the previous tax year, you had gross income, from all sources, under \$300,000, you are exempt from the requirements to report:

- i. Subawards, and
- ii. The total compensation of the five most highly compensated executives of any subrecipient.

e. Definitions. For purposes of this award term:

1. Entity means all of the following, as defined in 2 CFR Part 200:

- i. A Governmental organization, which is a State, local government, or Indian tribe;
- ii. A foreign public entity;
- iii. A domestic or foreign nonprofit organization;
- iv. A domestic or foreign for-profit organization;
- v. A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

2. Executive means officers, managing partners, or any other employees in management positions.

3. Subaward:

- i. This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.
- ii. The term does not include your procurement of property and services needed to carry out the project or program.
- iii. A subaward may be provided through any legal agreement, including an agreement that you or a subrecipient considers a contract.

4. Subrecipient means an entity that:

- i. Receives a subaward from you (the recipient) under this award; and
- ii. Is accountable to you for the use of the Federal funds provided by the subaward.

5. Total compensation means the cash and noncash dollar value earned by the executive during the

recipient's or subrecipient's preceding fiscal year and includes the following (for more information see 17 CFR 229.402(c)(2)):

- i. Salary and bonus.
- ii. Awards of stock, stock options, and stock appreciation rights. Use the dollar amount recognized for financial statement reporting purposes with respect to the fiscal year in accordance with the Statement of Financial Accounting Standards No. 123 (Revised 2004) (FAS 123R), Shared Based Payments.
- iii. Earnings for services under non-equity incentive plans. This does not include group life, health, hospitalization or medical reimbursement plans that do not discriminate in favor of executives, and are available generally to all salaried employees.
- iv. Change in pension value. This is the change in present value of defined benefit and actuarial pension plans.
- v. Above-market earnings on deferred compensation which is not tax-qualified.
- vi. Other compensation, if the aggregate value of all such other compensation (e.g. severance, termination payments, value of life insurance paid on behalf of the employee, perquisites or property) for the executive exceeds \$10,000.

~END OF SECTION ~

To: James Cavanna, RA, DBIA, CBO
 CFMO, Construction Department
 Room 225, 360 Broad Street, Hartford, CT 06105

From: (Insert GC's Name), General Contractor

Subject: Project No. (Insert CT MIL Project No.) Reduction of Retainage at (insert numerical percent)% project completion

Date: Insert Date

In accordance with the General Conditions, Article 28 Progress Payments, (insert GC's name) hereby requests a reduction of retainage to an amount of insert written percent Percent (insert numerical percent%). The following list of items required under the General Conditions is in compliance with the terms of the contract and has been verified by the General Contractor.

- Military Department Contractor Performance Evaluation Score is a minimum of **Ninety (90%) Percent**.
- Timely submission of an appropriate and complete CPM Schedule and Schedule of Values, in compliance with the Contract requirements and the prompt resolution of the Owner's and/or A/E's comments on the submitted material resulting in an appropriate basis for progress of the Work.
- Timely and proper submission of all Contract Document required submissions: including but not limited to Shop Drawings, material certificates and material samples and the prompt resolution of the Owner's and/or Architect's or Engineer's comments on the submitted material resulting in an appropriate progress of the Work.
- Proper and adequate supervision and home office support of the Project.
- The Work completed to date has been installed or finished in a manner acceptable to the Owner.
- The progress of the Work is consistent with the approved CPM Schedule.
- All approved credit Change Orders have been invoiced.
- All Change Order requests for pricing are current.
- The General Contractor has and is maintaining a clean worksite in accordance with the Contract Documents.
- All Subcontractor payments are current at the time of reduction request.
- General Contractor is compliant with set-aside provisions of the contract.

General Contractor Certification:	_____	_____	_____
	<i>(Written Name)</i>	<i>(Signature)</i>	<i>(Date)</i>
Project Manager Recommendation:	_____	_____	_____
	<i>(Written Name)</i>	<i>(Signature)</i>	<i>(Date)</i>
Approved: CT CFMO Construction Dept.:	James A. Cavanna, Mgr	_____	_____
	<i>(Written Name)</i>	<i>(Signature)</i>	<i>(Date)</i>

END

SET-ASIDE CONTRACTOR SCHEDULE

SENT VIA CERTIFIED MAIL OR EMAIL

Contractor:

Attention:

BID OPENING DATE:

Re:

Date:

Dear:

Your bid on referenced project is one of the three (3) apparent lowest bids received.

Named Subcontractor Bidders Qualification Statement(s) is/(are) required for this project, only for your Named Subcontractors listed in Schedule 7.5.1 of your Bid Proposal. Please submit at this time.

In accordance with Section 4.6.1 of your Bid proposal Form, you are required to list below the names of each currently certified set aside contractor to be used for this project, along with the dollar amount to be paid each set-aside contractor.

The responsibility for listing a qualified and certified set aside contractor rests solely with the bidder and not the State. Listing a set-aside contractor who does not qualify may be considered the same as not listing one at all and the bid may be considered non-responsive and subject to rejection.

NAME	ADDRESS	AMOUNT

- This amount must be not less than 25% of the total contract cost as stated on the Bid Proposal Form, Section 7.3.1. (Including 6.25% Minority Business Enterprises.)

**CERTIFICATE OF ELIGIBILITY FOR EACH OF THE NAMED
SET-ASIDE CONTRACTORS MUST BE SUBMITTED WITH THIS FORM.**

Authorized Signature & Title

Date

**THIS FORM MUST BE SUBMITTED NO LATER THAN 10 DAYS TO: STATE OF
CONNECTICUT, MILITARY DEPARTMENT, 360 BROAD STREET, HARTFORD, CT 06105 RM#143**

END OF SECTION

STATE OF CONNECTICUT

Military Department

October 1, 2019

All Military Department Contractors SUBJECT:

Set-Aside Contract Laws

Dear Sir/Madam:

The administration of Governor Ned Lamont is committed to supporting the subject programs by encouraging all contractors on State projects to improve their efforts in these areas.

State law requires contractors doing business with the State to demonstrate non-discrimination by making “good faith efforts” in both hiring and in sub-contracting practices (Connecticut General Statutes Section [C.G.S. §] 4a-60).

What does “good faith efforts” mean? It means that you, as contractors, must act affirmatively. It is not good enough to say you can’t find minorities and women. You must seek them out. That is the law, and the Military Department (CT MIL) is committed to enforcing the law. At the same time, we are ready to assist you in making “good faith efforts.”

The Military Department is required by C.G.S. § 4a-60g (b) and (c) to set aside projects (amounting to twenty-five percent (25%) of its annual contract awards) for small business and twenty-five percent (25%) of that amount for minority business enterprises. CT MIL may require any general contractor to set aside a portion of the contract for subcontractors who are small businesses or minority business enterprises in lieu of setting aside a project or in addition to setting aside a project.

Therefore, unless otherwise specified in the Bid Proposal Form, CT MIL will require contractors to subcontract twenty-five percent (25%) of the total contract value to small businesses certified by DAS and further will require contractors to subcontract 25% of that 25% to minority and women small contractors certified as minority business enterprises by CT DAS. These statutory goals represent the minimum values expected to be achieved by this program.

Together, we can meet the challenge of providing equal opportunity for minority and women-owned businesses and workers in our State. We expect superior results in the areas of affirmative action, equal employment opportunity, and set-aside contracts. The CT MIL standard in these areas is not just minimal effort. Our goal is to uphold the letter and the spirit of the law.

For more information on Non-Discrimination and Affirmative Action Provisions for State Contracts please visit the Commission on Human Rights and Opportunities (CHRO) Website at www.ct.gov/chro.

Sincerely yours,

MG Francis J. Evon, Jr
The Adjutant General/Commissioner

/mt

Non-Discrimination and Affirmative Action Provisions for State Contracts

Section 1) CHRO – Contract Compliance Regulations Notification to Bidders (Revised 09/3/15)

https://www.ct.gov/chro/lib/chro/Notification_to_Bidders.pdf

The contract to be awarded is subject to contract compliance requirements mandated by Sections 4a-60 and 4a-60a of the Connecticut General Statutes; and, when the awarding agency is the State, Sections 46a-71(d) and 46a-81i(d) of the Connecticut General Statutes. There are Contract Compliance Regulations codified at Section 46a-68j-21 through 43 of the Regulations of Connecticut State Agencies, which establish a procedure for awarding all contracts covered by Sections 4a-60 and 46a-71(d) of the Connecticut General Statutes.

According to Section 46a-68j-30(9) of the Contract Compliance Regulations, every agency awarding a contract subject to the contract compliance requirements has an obligation to “aggressively solicit the participation of legitimate minority business enterprises as bidders, contractors, subcontractors and suppliers of materials.” “Minority business enterprise” is defined in Section 4a-60 of the Connecticut General Statutes as a business wherein fifty-one percent or more of the capital stock, or assets belong to a person or persons: “(1) Who are active in daily affairs of the enterprise; (2) who have the power to direct the management and policies of the enterprise; and (3) who are members of a minority, as such term is defined in subsection (a) of Section 32-9n.” “Minority” groups are defined in Section 32-9n of the Connecticut General Statutes as “(1) Black Americans . . . (2) Hispanic Americans . . . (3) persons who have origins in the Iberian Peninsula . . . (4) Women . . . (5) Asian Pacific Americans and Pacific Islanders; (6) American Indians . . .” An individual with a disability is also a minority business enterprise as provided by Section 4a-60g of the Connecticut General Statutes. The above definitions apply to the contract compliance requirements by virtue of Section 46a-68j-21(11) of the Contract Compliance Regulations.

The awarding agency will consider the following factors when reviewing the bidder’s qualifications under the contract compliance requirements:

(a) the bidder’s success in implementing an affirmative action plan; (b) the bidder’s success in developing an apprenticeship program complying with Sections 46a-68-1 to 46a-68-17 of the Administrative Regulations of Connecticut State Agencies, inclusive; (c) the bidder’s promise to develop and implement a successful affirmative action plan; (d) the bidder’s submission of employment statistics contained in the “Employment Information Form”, indicating that the composition of its workforce is at or near parity when compared to the racial and sexual composition of the workforce in the relevant labor market area; and (e) the bidder’s promise to set aside a portion of the contract for legitimate minority business enterprises. See Section 46a-68j-30(10)(E) of the Contract Compliance Regulations.

* The Commission on Human Rights and Opportunities (CHRO) “Employment Information Form” shall be submitted to CT DAS Procurement Services on behalf of the awarding agency, the Military Department (CT MIL).

Section 2) Non-Discrimination and other Contract Compliance Requirements

For purposes of this Section, the following terms are defined as follows:

(1) “Commission” means the Commission on Human Rights and Opportunities; (2) “Contract” and “contract” include any extension or modification of the Contract or contract; (3) “Contractor” and “contractor” include any successors or assigns of the Contractor or contractor; (4) “Gender identity or expression” means a person’s gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person’s physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person’s core identity or not being asserted for an improper purpose. (5) “good faith” means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations; (6) “good faith efforts” shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements; (7) “marital status” means being single, married as recognized by the State of Connecticut, widowed, separated or divorced; (8) “mental disability” means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association’s “Diagnostic and Statistical Manual of Mental Disorders”, or a record of or regarding a person as having one or more such disorders;

(9) "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of C.G.S. § 32-9n; (10) "public works contract" means any agreement between any individual, firm or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees; and (11) "Small Contractor" Section 4a-60g CONN. GEN. STAT. defines a small contractor as a company that has been doing business under the same management and control and has maintained its principal place of business in Connecticut for a one year period immediately prior to its application for certification under this section, had gross revenues not exceeding fifteen million dollars in the most recently completed fiscal year, and at least fifty-one percent of the ownership of which is held by a person or persons who are active in the daily affairs of the company, and have the power to direct the management and policies of the company, except that a nonprofit corporation shall be construed to be a small contractor if such nonprofit corporation meets the requirements of subparagraphs (A) and (B) of subdivision 4a-60g CONN. GEN. STAT.

For purposes of this Section, the terms "Contract" and "contract" do not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, unless the contract is a municipal public works contract or quasi-public agency project contract, (2) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in C.G.S. § 1-267, (3) the federal government, (4) a foreign government, or (5) an agency of a subdivision, state or government described in the immediately preceding enumerated items (1), (2), (3), or (4).

- (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Contractor further agrees to take affirmative action to ensure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved; (2) the Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission; (3) the Contractor agrees to provide each labor union or representative of workers with which the Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which the Contractor has a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the Contractor's commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Contractor agrees to comply with each provision of this Section and C.G.S. §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to C.G.S. §§ 46a-56, 46a-68e, 46a-68f and 46a-86; and (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this Section and C.G.S. § 46a-56. If the contract is a public works contract, municipal public works contract or contract for a quasi-public agency project, the Contractor agrees and warrants that he or she will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works or quasi-public agency projects.

Americans with Disabilities Act. The Contractor shall be and remain in compliance with the Americans with Disabilities Act of 1990 (<http://www.ada.gov/>) as amended from time to time ("ADA") to the extent applicable, during the term of the Contract. The Agency may cancel or terminate this Contract if the Contractor fails to comply with the ADA. The Contractor represents that it is familiar with the terms of this Act and that it is in compliance with the law. The Contractor warrants that it shall hold the State harmless from any liability which may be imposed upon the state as a result of any failure of the Contractor to be in compliance with this ADA. As applicable, the Contractor shall comply with § 504 of the Federal Rehabilitation Act of 1973, as amended from time to time, 29 U.S.C. § 794 (Supp. 1993), regarding access to programs and facilities by people with disabilities.

Section 3) Affirmative Action Requirements for Certain Public Works Contracts for Construction

Pursuant to CONN.GEN. STAT. § 46a-68c and §46a-68d and, the Regulations of Connecticut State Agencies Sections 46a-68j-21 to 46a-68j-29, the following must file an affirmative action plan with the Commission:

- 1) A successful bidder on a public works contract with a value of \$500,000 or more. The plan must be filed within thirty (30) days after a bid has been accepted by an awarding agency but before a contract is awarded. A plan may be filed in advance of or, at the same time as a bid is submitted.
- 2) A contractor with fifty (50) or more employees who has been awarded a public works contract in excess of \$50,000 in any fiscal year. A plan must be filed within thirty (30) days of the date a contract is awarded. The Commission must review a plan within sixty (60) days of receipt and must either approve or reject a plan. Should the Commission approve an affirmative action plan, the Commission will issue a certificate of compliance. This certificate of compliance shall be proof of a successful bidder's or a contractor's eligibility to bid or be awarded contracts for a period of two (2) years from the date of the certificate. This certificate does not excuse a successful bidder or contractor from being monitored by the Commission for implementation of its affirmative action plan or, from its reporting requirements under C.G.S. § 46a-68e and § 46a-68f. (Refer to Section 6) Also, the Commission may revoke the certificate if a successful bidder or contractor does not implement its affirmative action plan.

Should the Commission opt to disapprove an affirmative action plan, the Commission must notify the successful bidder or contractor in writing within ten (10) days of the disapproval. The notice will state the reason for disapproval and may provide necessary proposals to bring the plan into compliance. The successful bidder or contractor must then submit a new or amended plan, within thirty (30) days of the date the notice of disapproval is mailed by the Commission.

In addition, the Commission may conditionally approve an affirmative action plan for a successful bidder on a public works contract valued at \$500,000 or more. The Commission must notify the successful bidder in writing within ten (10) days of the conditional disapproval and state the reason for conditional approval and, may provide necessary proposals to bring the plan into compliance. The successful bidder must then submit a new or amended plan or, provide written assurances that it will amend its plan to conform to affirmative action requirements, within thirty (30) days of the date the notice is mailed by the Commission.

The awarding agency (CT MIL) will provide a successful bidder or contractor with a copy of the Commission's Affirmative Action Plan format. All sections of this Affirmative Action Plan format must be completed by the successful bidder or contractor and forwarded to the Commission. Also, the awarding agency (CT MIL) shall withhold 2% of the total contract price per month from any payment made to a contractor until such time as the contractor has developed an affirmative action plan, which has been approved by the Commission.

¹According to CONN. GEN. STAT. § 46a-68b, a "public works contract" means any agreement between any individual, firm or corporation and the state or any political subdivision of the state other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the state, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.

Section 4) "Good Faith Efforts" to Include Minority Business Enterprises as Subcontractors

Utilization of Minority Business Enterprises. The Contractor shall perform under this Contract in accordance with 45 C.F.R. Part 74; and, as applicable, C.G.S. §§ 4a-60 to 4a-60a and 4a-60g to carry out this policy in the award of any subcontracts.

In addition to, or in the absence of, any other subcontractor requirements included in this project, contractors are required to make "good faith efforts" to include minority business enterprises in the work of this project as subcontractors (for services and/or material suppliers). For purpose of identifying minority business enterprises, a minority business enterprise shall be a subcontractor which has a valid certification as such from the Department of Administrative Services (DAS) and/or a subcontractor for which an affidavit has been submitted by the contractor attesting that the subcontractor named as a minority business enterprise meets the minority business enterprise criteria set out in C. G. S. § 4a-60(b).

For purposes of identifying a minority business enterprise who is not certified by DAS, and in order to recognize the contractor's "good faith efforts" to include minority business enterprises in the work of the project, a contractor who becomes the apparent low bidder will be requested by the awarding agency (CT MIL) to submit an Affidavit for Certification of Subcontractors as Minority Business Enterprises (MBE), prior to the

award of a contract. For purposes of identifying any small contractor and/or minority business enterprise which will participate on the project as a “set-aside” subcontractor, only a subcontractor which has a valid certification issued by DAS shall be acceptable.

- a. Determination of the Contractor's good faith efforts shall include, but shall not be limited to, the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.
- b. The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.
- c. The Contractor shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and in every subcontract entered into in order to fulfill any obligation of a municipal public works contract for a quasi-public agency project, and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with C.G.S. § 46a-56, as amended; provided if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission regarding a State contract, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.
- d. The Contractor agrees to comply with the regulations referred to in this Section as they exist on the date of this Contract and as they may be adopted or amended from time to time during the term of this Contract and any amendments thereto.

Priority Hiring. Subject to the Contractor's exclusive right to determine the qualifications for all employment positions, the Contractor shall give priority to hiring welfare recipients who are subject to time-limited welfare and must find employment. The Contractor and the Agency shall work cooperatively to determine the number and types of positions to which this Section shall apply.

Section 5) Set-Aside Program

This contract may be subject to the provisions the Set-Aside Program for Small Contractors and may be awarded only to a contractor certified as a small and/or minority business enterprise by DAS. The notification as to this special provision will be found in the Invitation to Bid for this contract. To search eligible “Set-Aside” contractors on DAS' web site <https://biznet.ct.gov/SDSearch/SDSearch.aspx> In the event that the Set-Aside Program for Small Contractors applies to this contract, the following special provisions will also apply:

5.1 Amount of Work Required to Be Done by “Set-Aside” Contractors

A contractor awarded a contract on a project pursuant to the provisions of C.G.S. §4a-60g, as amended, shall be required to perform not less than thirty (30) per cent of the work with his/her own forces and shall ensure that not less than fifty (50) per cent of the work be performed by contractors or subcontractors who are certified as small contractors or minority business enterprises pursuant to C.G.S. §4a-60g.

The primary product/service performed by contractors working on a contract awarded under C.G.S. §4a-60g must be the same as the primary product/service described for the contractors on their “Certificate of Eligibility” which is provided to them by DAS.

5.2 Alternate Bonding Available to “Set Aside” Contractors

In lieu of a performance, bid, labor and materials or other required bond, a contractor or subcontractor awarded a contract under C.G.S. §4a-60g may provide to the awarding authority (CT MIL) and the awarding authority shall accept a “Letter of Credit”. Any such “Letter of Credit” shall be in an amount equal to ten per cent (10%) of the contract for any contract that is less than one hundred thousand (\$100,000) dollars, and in the amount of twenty-five per cent (25%) for any contract that is one hundred thousand (\$100,000) dollars or more.

5.3 Procedures to Follow Regarding Substitution of Named Project “Set-Aside” Subcontractors.

The awarding authority (CT MIL) may also require the contractor to set aside a portion of the contract for subcontractors who are eligible for set aside contracts. The awarding authority shall not permit substitution of a subcontractor for one named in accordance with the provisions of C.G.S. § 4b-95 or substitution of a subcontractor for any designated sub-trade work bid to be performed by the contractor's own forces, except for good cause.

Pursuant to C.G.S. § 4b-95, the term “good cause” includes but is not limited to a subcontractor's or, where appropriate, a general contractor's:

- 1) Death or physical disability, if the listed subcontractor is an individual;
- 2) Dissolution, if a corporation or partnership;
- 3) Bankruptcy;
- 4) Inability to furnish any performance and payment bond shown on the bid form;
- 5) Inability to obtain, or loss of, a license necessary for the performance of the particular category of work;
- 6) Failure or inability to comply with a requirement of law applicable to contractors and subcontractors, or to subcontracts for construction, alteration, or repair projects;
- 7) Failure to perform his/her agreement to execute a subcontract under C.G.S. § 4b-96.

Any general contractor who violates any provision of C.G.S. § 4b-95 shall be disqualified from bidding on other contracts that are subject to the provisions of Chapter 60 - Construction and Alterations of State Buildings of the C.G.S., for a period not to exceed twenty-four (24) months, commencing from the date on which the violation is discovered, for each violation.

Section 6) Contract Monitoring and Reporting

The Commission has the authority to monitor state contractor pursuant to C.G.S. § 46a-68e and 46a-68f and Section 46a-68j-23(3) of the Administrative Regulations of Connecticut State Agencies. In addition, under Sections 46a-68j-25(e) and 46a-68j-26 (g) of the Administrative Regulations of Connecticut State Agencies, the Commission has the authority to monitor the implementation of an affirmative action plan regarding: a) a successful bidder who has been awarded a public works contract valued at \$500,000 or more and, b) a contractor with fifty (50) or more employees who has been awarded a public works contract in excess of \$50,000 in any fiscal year.

In order to monitor the implementation of these plans, the Commission requires that the following contract monitoring reports be compiled and submitted:

- 1) Monthly Employment Utilization Report (form CHRO: cc-257). A contractor, on behalf of itself and all subcontractors who perform work on the project during a given month, is required to report on the work hour participation of minority male and female workers in each trade category on the project. The report must be submitted to the contract awarding agency (CT MIL) and to the Commission by the 15th day following the end of each calendar month during the term of the on-site construction work of the project.
- 2) Quarterly Small Contractor and Minority Business Enterprise Payment Status Report (form CHRO: cc-258). A contractor is required to report on the participation of small contractors or minority business enterprises identified to participate on the project. The report must be submitted to the contract awarding agency (CT MIL) and to the Commission by the 15th day following the end of each calendar quarter during the term of the on-site construction work of the project.

Website page: <http://www.ct.gov/chro>, then click on Forms, then click on Contract Compliance Forms and Reports.

In addition, the Commission expects that a contractor will designate an Equal Opportunity/Contract Compliance Officer for its public works project who will compile the above quarterly and monthly reports, as well as, undertake the following responsibilities for implementation of its project Affirmative Action Plan (AAP):

- 1) Maintain a project Equal Employment Opportunity (EEO) file to include all records, correspondence and other documentation relate to the project AAP.
- 2) Communicate to and inform all project subcontractors, regardless of tier, and labor referral organizations (if applicable) about project equal employment and AAP commitments and performance requirements.
- 3) Participate in project job meetings to inform project subcontractors about project equal employment and AAP performance requirements.
- 4) Track the use of employment recruitment sources identified in the project AAP regarding all employment opportunities with all subcontractors on the project. Also, maintain documentation of all contacts with these recruitment sources and their responses.

The Commission will forward a copy of the quarterly and monthly report to each contractor on a public works project.

NOTE: Bidders and state contractors may review the full text of the before referenced Connecticut General Statutes by accessing either the State Law Library's web site <https://ctstatelibrary.org/> or the State Legislatures' web site <http://www.cga.ct.gov>.

The full text of the Regulations of Connecticut State Agencies (RSCA) Sections 46a-68j-21 through 46a-68j-43 may be reviewed by accessing the Commission's web site:

<http://www.ct.gov/chro/cwp/view.asp?a=2525&Q=315900&chroPNavCtr=#45679>

In the alternative, bidders or state contractors may request a copy of these state statutes and regulations by contacting the Commission at (860) 541-3400 (in Hartford) or 1 (800) 477-5737.

Section 7) CHRO Contract Compliance Forms:

The following CHRO Contract Compliance Forms are available on the CHRO Website:

1. Monthly Employment Utilization Report (Form CHRO-257 and CHRO-257a):

<http://www.ct.gov/chro/lib/chro/257s.pdf>

2. Cumulative Utilization Report (Form CHRO-257b):

<http://www.ct.gov/chro/lib/chro/257b.pdf>

3. Monthly Small Contractor & MBE Payment Status Report (Form CHRO-258a) and Quarterly Small Contractor & MBE Payment Status Report (Form CHRO-258):

<http://www.ct.gov/chro/lib/chro/258s.pdf>

**Minimum Rates and Classifications for
Heavy/Highway Construction**

ID#: 20-14117

**Connecticut Department of Labor
Wage and Workplace Standards Division**

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: #20MIL-21201

Project Town: Windsor Locks

State#: #20MIL-21201

FAP#: Windsor Locks

Project: AASF Aircraft Apron Repairs (Windsor Locks)

CLASSIFICATION	Hourly Rate	Benefits
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	35.72	33.16
2) Carpenters, Piledrivermen	34.53	25.64
2a) Diver Tenders	34.53	25.64
3) Divers	42.99	25.64
03a) Millwrights	34.94	26.19
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	52.25	22.55
4a) Painters: Brush and Roller	35.62	22.55
4b) Painters: Spray Only	38.62	22.55
4c) Painters: Steel Only	37.62	22.55
4d) Painters: Blast and Spray	38.62	22.55
4e) Painters: Tanks, Tower and Swing	37.62	22.55

Project: AASF Aircraft Apron Repairs (Windsor Locks)

5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	40.25	29.17+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	36.67	37.62 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	44.63	32.95
----LABORERS-----		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	31.0	22.15
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	31.25	22.15
10) Group 3: Pipelayers	31.5	22.15
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	31.5	22.15
12) Group 5: Toxic waste removal (non-mechanical systems)	33.0	22.15
13) Group 6: Blasters	32.75	22.15
Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	32.0	22.15
Group 8: Traffic control signalmen	18.0	22.15
Group 9: Hydraulic Drills	29.3	18.90
----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----		
13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	33.23	22.15 + a
13b) Brakemen, Trackmen	32.26	22.15 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		

As of: July 21, 2020

Project: AASF Aircraft Apron Repairs (Windsor Locks)

14) Concrete Workers, Form Movers, and Strippers	32.26	22.15 + a
15) Form Erectors	32.59	22.15 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	32.26	22.15 + a
17) Laborers Topside, Cage Tenders, Bellman	32.15	22.15 + a
18) Miners	33.23	22.15 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	39.72	22.15 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	39.52	22.15 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	37.54	22.15 + a
21) Mucking Machine Operator	40.31	22.15 + a
----TRUCK DRIVERS----(*see note below)		
Two axle trucks	29.86	25.79 + a
Three axle trucks; two axle ready mix	29.97	25.79 + a
Three axle ready mix	30.03	25.79 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	30.08	25.79 + a
Four axle ready-mix	30.13	25.79 + a
Heavy duty trailer (40 tons and over)	30.35	25.79 + a

As of: July 21, 2020

Project: AASF Aircraft Apron Repairs (Windsor Locks)

Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	30.13	25.79 + a
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----POWER EQUIPMENT OPERATORS----

Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over, Tunnel Boring Machines. (Trade License Required)	42.45	25.30 + a
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Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	42.11	25.30 + a
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Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	41.32	25.30 + a
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Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	40.91	25.30 + a
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Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24	40.28	25.30 + a
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Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	40.28	25.30 + a
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Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	39.95	25.30 + a
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Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24	39.59	25.30 + a
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Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	39.17	25.30 + a
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Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	38.71	25.30 + a
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Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	36.54	25.30 + a
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Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	36.54	25.30 + a
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Group 12: Wellpoint Operator.	36.48	25.30 + a
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Project: AASF Aircraft Apron Repairs (Windsor Locks)

Group 13: Compressor Battery Operator. 35.86 25.30 + a

Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain). 34.66 25.30 + a

Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator. 34.23 25.30 + a

Group 16: Maintenance Engineer/Oiler 33.54 25.30 + a

Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator. 38.11 25.30 + a

Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license). 35.53 25.30 + a

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)---

20) Lineman, Cable Splicer, Technician 48.19 6.5% + 22.00

21) Heavy Equipment Operator 42.26 6.5% + 19.88

22) Equipment Operator, Tractor Trailer Driver, Material Men 40.96 6.5% + 19.21

23) Driver Groundmen 26.5 6.5% + 9.00

23a) Truck Driver 40.96 6.5% + 17.76

----LINE CONSTRUCTION----

24) Driver Groundmen 30.92 6.5% + 9.70

25) Groundmen 22.67 6.5% + 6.20

26) Heavy Equipment Operators 37.1 6.5% + 10.70

27) Linemen, Cable Splicers, Dynamite Men 41.22 6.5% + 12.20

As of: July 21, 2020

Project: AASF Aircraft Apron Repairs (Windsor Locks)

28) Material Men, Tractor Trailer Drivers, Equipment Operators

35.04

6.5% + 10.45

Project: AASF Aircraft Apron Repairs (Windsor Locks)

Welders: Rate for craft to which welding is incidental.

*Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.

**Note: Hazardous waste premium \$3.00 per hour over classified rate

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)**
- 2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson**
- 3) Cranes (under 100 ton rated capacity)**

Crane with 150 ft. boom (including jib) - \$1.50 extra

Crane with 200 ft. boom (including jib) - \$2.50 extra

Crane with 250 ft. boom (including jib) - \$5.00 extra

Crane with 300 ft. boom (including jib) - \$7.00 extra

Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyman instructing and supervising the work of each apprentice in a specific trade.

--Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

As of: July 21, 2020

Project: AASF Aircraft Apron Repairs (Windsor Locks)

~~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 clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: July 21, 2020

SECURITY REGULATIONS FOR CONTRACT FORCES ON MILITARY DEPARTMENT FACILITIES

Facility Admittance

Identification Badges for Contractor's Personnel, Visitors & Parking Stickers:

1. The Contractor will provide each person working or visiting at the site with an identification badge, bearing the name of the Contractor and a number. As badges are assigned, a record shall be kept by the Contractor and given to the Construction Administrator and Agency Administrator. Update and correct the records of all badges issued on a semi-monthly basis.

2. Badges are to be worn on outer garment where visible at all times while at the construction site, return them to the Contractor's field office at the end of each day and pick them up there each morning.

3. All vehicles parking in the Contractor's parking lot and those used around the site require an ID sticker. They will be issued by the Agency. Each contractor shall apply for parking stickers through the Construction Administrator no more than semi-monthly and shall keep record of all stickers issued.

NOTICE: Violence in the Workplace Prevention Policy per Executive Order #16 dated August 1999:

<https://www.ct.gov/opm/lib/opm/olr/wpv/exc16.pdf>

That all state agency personnel, contractors, subcontractors, and vendors comply with the following Violence in the Workplace Prevention Policy:

The State of Connecticut adopts a statewide zero tolerance policy for workplace violence. Therefore, except as may be required as a condition of employment -

1. No employee shall bring into any state worksite any weapon or dangerous instrument as defined herein.
2. No employee shall use, attempt to use, or threaten to use any such weapon or dangerous instrument in a state worksite.
3. No employee shall cause or threaten to cause death or physical injury to any individual in a state worksite.

Weapon means any firearm, including a BB gun, whether loaded or unloaded, any knife (excluding a small pen or pocket knife), including a switchblade or other knife having an automatic spring release device, a stiletto, any police baton or nightstick or any martial arts weapon or electronic defense weapon.

Dangerous instrument means any instrument, article, or substance that, under the circumstances, is capable of causing death or serious physical injury.

Violation of the above reasonable work rules shall subject the employee to disciplinary action up to and including discharge.

PERFORMANCE BOND

Know all men by these presents

THAT _____ of the
Town of _____, County _____ and
State of _____, as Principal (hereinafter called the Principal), and _____

(a surety company authorized to transact business in the State Of Connecticut) as Surety (hereinafter called the Surety) are held and firmly bound unto the State of Connecticut (hereinafter called the Obligee) in the full penal sum of _____ (\$ _____) Dollars, lawful money of the United States, to be paid to said State of Connecticut, to the which payment well and truly to be made and done, the said Principal binds himself, his heirs, executors, administrators and assigns (or itself, its successors and assigns), and the said Surety binds itself, its successors and assigns jointly and severally firmly by these presents.

Signed, sealed and delivered this _____ day of _____ A. D. 20_____.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT

WHEREAS said Principal will enter into a certain written contract with said Obligee, to be dated the _____ day of _____ A. D. 20_____, which written contract shall provide for the following:

which contract, including any hereafter made extension, modification or alteration thereof, is hereby referred to, incorporated in and made a part of this bond as though herein fully set forth.

NOW, THEREFORE, if the said Principal shall well and truly keep, perform and execute all the terms, conditions and stipulations of said contract, as it may be extended, modified or altered, according to its provisions on his or its part to be kept and performed or shall indemnify and reimburse the Obligee for any loss that it may suffer through the failure of the Principal to faithfully observe and perform each and every obligation and duty imposed upon the Principal by the said contract, as it may be extended, modified or altered, at the time and in the manner therein specified, then this obligation shall be null and void, otherwise it shall remain and be in full force and effect.

Any such extension, modification or alteration or any forbearance on the part of either the Obligee or the Principal, one to the other, shall not in any way release the Principal and/or the Surety, their heirs, executors, administrators, successors or assigns from liability hereunder, notice to the Surety of any such extension, modification, alteration or forbearance being hereby specifically and absolutely waived.

IN TESTIMONY WHEREOF, the said Principal has hereunto set his / its hand and seal, and the said Surety has caused this instrument to be signed by its attorney in fact and its corporate seal to be hereunto affixed, the day and year first written.

SEAL

Witnesses as to Principal

_____, Its _____, Its Duly Authorized

(Print Name)

(Print Name)

SEAL

Witnesses as to Surety

by _____

Its attorney in fact

(Print Name)

(Print Name)

**END
PERFORMANCE BOND**

LABOR AND MATERIAL BOND

Know all men by these presents

THAT _____ of the
Town of _____, County _____ and
State of _____, as Principal (hereinafter called the Principal), and _____

(a surety company authorized to transact business in the State Of Connecticut) as Surety (hereinafter called the Surety) are held and firmly bound unto the State of Connecticut (hereinafter called the Obligee) in the full penal sum of _____ (\$ _____) Dollars, lawful money of the United States, to be paid to said State of Connecticut, to the which payment well and truly to be made and done, the said Principal binds himself, his heirs, executors, administrators and assigns (or itself, its successors and assigns), and the said Surety binds itself, its successors and assigns jointly and severally firmly by these presents.

Signed, sealed and delivered this _____ day of _____ A. D. 20_____.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT

WHEREAS said Principal will enter into a certain written contract with said Obligee, to be dated the _____ day of _____ A. D. 20_____, which written contract shall provide for the following:

which contract, including any hereafter made extension, modification or alteration thereof, is hereby referred to, incorporated in and made a part of this bond as though herein fully set forth.

NOW, THEREFORE, if the said Principal shall well and truly keep, perform and execute all the terms, conditions and stipulations of said contract, as it may be extended, modified or altered, according to its provisions on his or its part to be kept and performed or shall indemnify and reimburse the Obligee for any loss that it may suffer through the failure of the Principal to faithfully observe and perform each and every obligation and duty imposed upon the Principal by the said contract, as it may be extended, modified or altered, at the time and in the manner therein specified, then this obligation shall be null and void, otherwise it shall remain and be in full force and effect.

Any such extension, modification or alteration or any forbearance on the part of either the Obligee or the Principal, one to the other, shall not in any way release the Principal and/or the Surety, their heirs, executors, administrators, successors or assigns from liability hereunder, notice to the Surety of any such extension, modification, alteration or forbearance being hereby specifically and absolutely waived.

IN TESTIMONY WHEREOF, the said Principal has hereunto set his / its hand and seal, and the said Surety has caused this instrument to be signed by its attorney in fact and its corporate seal to be hereunto affixed, the day and year first written.

SEAL

Witnesses as to Principal

_____, Its _____, Its Duly Authorized

(Print Name)

(Print Name)

SEAL

Witnesses as to Surety

by _____

Its attorney in fact

(Print Name)

(Print Name)

**END
LABOR AND MATERIAL BOND**

State Of Connecticut
Department Of Administrative Services
on Behalf of
Department Of Construction Services
Procurement – Room G-35
State Office Building
165 Capitol Avenue
Hartford, Ct 06106

Surety Sheet

1. SURETY COMPANY

Name of Surety Co.: _____

Address of Home Office: _____

Telephone Number: _____

2. AGENT

Name of Surety Co.: _____

Address of Agency: _____

Telephone Number: _____

Attorney-In-Fact: _____

Telephone Number: _____

Project Number: _____

Contractor's Name: _____

End
Surety Sheet

**Bidder's Certification:
Financial Position and Corporate Structure**

I, _____ of _____
(Your Name) (Name Of Company)

the bidder for this contract (hereinafter "bidder"), certify under penalty of false statement that the information in the bid is true, that there has been no substantial change in the bidder's financial position or corporate structure since its most recent prequalification certificate was issued or renewed pursuant to CGS § 4b-91, as amended, other than those changes noted in the update statement, and that the bid was made without fraud or collusion with any person.

(Signature)

(Print Name)

(Date)

(DPW Project Number)

**END
Bidder's Certification:
Financial Position and Corporate Structure**

Download Form file:

<https://portal.ct.gov/-/media/DRS/Forms/1-2017/BondForms/AU960pdf.pdf?la=en>

Connecticut Army National Guard

Project No. 20MIL21201

AASF Aircraft Apron Repairs – Phase 1
Bradley Army National Guard Base

Windsor Locks, CT

Project Specifications
Volume 1

June 2020

100% Submittal – Issued for Bid

Proposer's Name and Address

AASF AIRCRAFT APRON REPAIRS
PROJECT NUMBER: 20MIL21201
CONNECTICUT ARMY NATIONAL GUARD
BRADLEY ARMY NATIONAL GUARD BASE
WINDSOR LOCKS, CT

INDEX AND CERTIFICATION PAGE

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SECTION 01 11 00

SUMMARY OF WORK
08/15

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00
SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Utility Outage Requests

Utility Connection Requests

Borrow Permits

Excavation Permits

Welding Permits

Burning Permits

Salvage Plan; G

1.2 WORK COVERED BY CONTRACT DOCUMENTS

1.2.1 Project Description

Reconfigure, re-grade and pave (concrete and asphalt) the existing AASF Aircraft ramp. Provide new access road and associated storm water management upgrades. Reconfigure and re-size helicopter parking pads for both rotary wing air-craft. Provide required tie-downs and grounding point.

The work will be compatible with applicable DOD, Air Force, and Base standards.

This Project also includes modifications to the site surrounding the rotary wing aircraft apron inclusive of, but not limited to, pavement removal and stormwater management upgrades.

The Contractor shall refer to the Contract Documents (both plans and Specifications) for the complete scope of the Project.

The following bid options have been identified:

- a. Base Bid: Access road as defined in drawings.
- b. Supplemental Bid #1: Reconfigure, Re-grade and pave AASF Aircraft ramp and helicopter parking pads.

1.2.2 Location

The work is located at the Bradley Army National Guard Base in Windsor Locks, Connecticut, as indicated. The exact location will be shown by the

Construction Administrator.

1.3 CONTRACT DRAWINGS

The following Drawings accompany this Specification and are a part thereof.

Contract Drawings, maps, and Specifications will be available digitally through CT DAS Website only. Reference publications will not be furnished. Immediately check furnished Drawings and notify the Government of any discrepancies.

1.4 WORK RESCHEDULING

Contractor shall allow time in their anticipated schedule to submit and procure all required permits for the renovation/construction and site work for the Project. The schedule shall be submitted to the Government for approval prior to the start of construction activities.

Normal duty hours for work are from 7 a.m. to 4 p.m., Monday through Friday. Requests for additional work requires written approval from the Construction Administrator 7 days in advance of the proposed work period.

1.5 OCCUPANCY OF PREMISES

Before work is started, arrange with the Construction Administrator a sequence of procedure, means of Base access and space for storage of materials and equipment.

1.6 EXISTING WORK

Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements":

- a. Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain.
- b. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Construction Administrator. At the completion of operations, existing work must be in a condition equal to or better than that which existed before new work started.

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 Construction Administrator. 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 Construction Administrator 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

<u>ACTIVITY</u>	<u>SUBMISSION DATE</u>	<u>SUBMISSION FORM</u>
Excavation Permits	14 calendar days prior to work	Base Safety and Environmental Office

Post permits at a conspicuous location in the construction area.

Burning of trash or rubbish is not permitted 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. Contact local utility locating service a minimum of 72 hours prior to excavating, to mark utilities, and within sufficient time required if work occurs on a Monday or after a Holiday. 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 or encased 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 Construction Administrator at least 48 hours prior to starting excavation work.

1.9 GOVERNMENT-INSTALLED WORK

Materials and equipment that is Government-installed shall be coordinated with the Contractor in alignment with their Construction Schedule.

1.10 SALVAGE MATERIAL AND EQUIPMENT

Items designated by the Construction Administrator to be salvaged remain the property of the Government. Segregate, itemize, deliver and off-load the salvaged property at the Government designated storage area located within 2 miles of the Construction Site.

Provide a salvage plan, listing material and equipment to be salvaged, and their storage location. Maintain property control records for material or equipment designated as salvage. Use a system of property control that is approved by the Construction Administrator. Store and protect salvaged materials and equipment until disposition by the Construction Administrator.

20MIL21201 AASF Aircraft Apron Repair
Bradley ARNGB Windsor Locks, Connecticut
PART 2 PRODUCTS

102422

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 01 14 00

WORK RESTRICTIONS

11/11

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 State

"State" when used in reference to states of the United States.

1.2 SUBMITTALS

Government approval 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. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

A list of items shall be provided to the Contractor by the Construction Administrator at the preconstruction meeting. The Construction Administrator shall identify items, which shall be submitted prior to construction activity at said meeting.

1.3 SPECIAL SCHEDULING REQUIREMENTS

- a. Have materials, equipment, and personnel required to perform the work at the site prior to the commencement of the work. Specific items of work to which this requirement applies include:
 - (1) Site clearing and site demolition.
- b. The Contractor must conduct his operations so as to cause the least possible interference with normal operations of other facilities on-base.
- c. Permission to interrupt any activity roads or utility service must be requested in writing a minimum of 30 calendar days prior to the desired date of interruption.
- d. The work under this Contract requires special attention to the scheduling and conduct of the work in connection with existing operations. Identify on the Construction Schedule each factor which constitutes a potential interruption to operations.

The following conditions apply:

- (1) Temporary Power.

1.4 CONTRACTOR ACCESS AND USE OF PREMISES

1.4.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations including safety, fire, traffic and security regulations. Keep within the limits of the work and avenues of ingress and egress. Ingress and egress of Contractor vehicles at the Activity is limited to the main Base entry gate. Wear hard hats in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Mark Contractor equipment for identification.

1.4.1.1 Subcontractors and Personnel Contacts

Provide a list of contact personnel of the Contractor and Subcontractors including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

1.4.1.2 Identification Badges and Installation Access

Application for and use of badges will be as directed. Obtain access to the installation by inspection of vehicle and gate passes issued by the security officer or by obtaining passes each day from the Base Pass and Identification Office. One-day passes, issued through the Base Pass and Identification Office, will be furnished without charge. Furnish a completed application form for all personnel requesting badges. Immediately report instances of lost or stolen badges to the Construction Administrator.

- a. NCACS Program: NCACS is a voluntary program in which Contractor personnel who enroll, and are approved, are subsequently granted access to the installation for a period up to one year, or the length of the Contract, whichever is less, and are not required to obtain a new pass from the Base Pass and Identification Office for each visit. The Government performs background screening and credentialing. Throughout the year the Contractor employee must continue to meet background screening standards. Periodic background screenings are conducted to verify continued NCACS participation and installation access privileges. Under the NCACS program, no commercial vehicle inspection is required, other than for Random Anti-Terrorism Measures (RAM) or in the case of an elevation of Force Protection Conditions (FPCON). Information on costs and requirements to participate and enroll in NCACS is available at <http://www.rapidgate.com> or by calling 1-877-727-4342. Contractors should be aware that the costs incurred to obtain NCACS credentials are not reimbursable. Any time invested, or price(s) paid, for obtaining NCACS credentials will not be compensated in any way or approved as a direct cost of any Contract.

- (1) Delivery companies submitting NCACS applications must only be granted access if the Prime Contractor has included the company on a participant's spreadsheet provided in advance to the Construction Administrator. This form must be provided by the Government upon request.
- (2) Delivery companies NOT participating in NCACS must have documentation identifying the destination location (building no., street, etc.), Project Title, Contract No., Prime Contractor

organization, Bill of Lading & Proof of Citizenship. Otherwise, no access will be allowed.

(3) For those companies that do not have a bill of lading or proof of citizenship the Prime Contractor must fill out the Short Term Visitor Request form and provide to the Construction Administrator no less than 5 workdays prior to the delivery date.

b. One-Day Passes: Participation in the NCACS is not mandatory, and if the Contractor chooses to not participate, the Contractor's personnel will have to obtain daily passes, be subject to daily mandatory vehicle inspection, and will have limited access to the installation. The Government will not be responsible for any cost or lost time associated with obtaining daily passes or added vehicle inspections incurred by non-participants in the NCACS.

1.4.1.3 Employee List

The Contractor must provide to the Construction Administrator, in writing, the names of two designated representatives authorized to request personnel and vehicle passes for employees and Subcontractor's employees prior to commencement of work under this Contract.

1.4.1.4 Personnel Entry Approval

Failure to obtain entry approval will not affect the Contract price or time of completion.

1.4.1.5 No Smoking Policy

Smoking is prohibited within and outside of all buildings on installation, except in designated smoking areas. This applies to existing buildings, buildings under construction and buildings under renovation. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines. The Construction Administrator will identify designated smoking areas.

1.4.2 Working Hours

Regular working hours must consist of an 9 hour period established by the Contractor Officer, between 7 a.m. and 4 p.m., Monday through Friday, excluding Government holidays.

1.4.3 Work Outside Regular Hours

Work outside regular working hours requires Construction Administrator approval. Make application 7 calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress, giving the specific dates, hours, location, type of work to be performed, Contract Number and Project Title. Based on the justification provided, the Construction Administrator may approve work outside regular hours. During periods of darkness, the different parts of the work must be lighted in a manner approved by the Construction Administrator. Make utility cutovers after normal working hours or on Saturdays, unless directed otherwise.

1.4.4 Exclusionary Period

No work must be performed during the period 5 p.m. to 7 a.m., inclusive,

without prior written approval of the Construction Administrator. This period has not been considered in computing the time allowed for the performance of this Contract.

1.4.5 Occupied and Existing Buildings

The Contractor shall be working around existing buildings which are occupied. Do not enter the buildings without prior approval of the Construction Administrator.

The existing buildings and their contents must be kept secure at all times. Provide temporary closures as required to maintain security as directed by the Construction Administrator.

Provide dust covers or protective enclosures to protect existing work that remains and Government material during the construction period.

Government shall relocate movable items away from the Contractor's working area as required to perform the work. Leave attached equipment in place, and protect against damage, or temporarily disconnect, relocate, protect, and reinstall at the completion of the work. Contractor to coordinate this effort with Construction Administrator.

The Government will remove other Government property in the area of the work.

1.4.6 Utility Cutovers and Interruptions

- a. Make utility cutovers and interruptions after normal working hours or on Saturdays. Conform to procedures required Paragraph "Work Outside Regular Hours".
- b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.
- c. Interruption to water, sanitary sewer, storm sewer, and electric service are considered utility cutovers pursuant to the Paragraph "Work Outside Regular Hours".

1.5 SECURITY REQUIREMENTS

1.5.1 Personnel List

Submit for approval, at least 15 days prior to the desired date of entry, an original alphabetical list of personnel who require entry into Government property to perform work on the Project. Furnish for each person:

- a. Name;
- b. Date and place of birth;
- c. Citizenship;
- d. Home address;
- e. Social security number;
- f. Current pass expiration date;

- g. Naturalization or Alien Registration number;
- h. Passport number, place of issue, and expiration date.

The request for personnel passes must be accompanied with the following certification:

"I hereby certify that all personnel on this list are either born U.S. citizens, naturalized U.S. citizens with the naturalization number shown, or legal aliens with the alien registration number indicated."

1.5.2 Vehicle List

Submit an original list of vehicles to be utilized at the work site with the following information for each vehicle:

- a. Make;
- b. Year;
- c. Model;
- d. License number;
- e. Registered owner.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

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SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

08/15

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)

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

1.2 SUBMITTALS

Government approval 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.

1.3 VIEW LOCATION MAP

Submit, prior to or with the first digital photograph submittals, a sketch or drawing indicating the required photographic locations. Update as required if the locations are moved.

1.4 PROGRESS AND COMPLETION PICTURES

Photographically document site conditions prior to start of construction operations. Provide monthly, and within one month of the completion of work, digital photographs, 1600 by 1200 by 24 bit true color in JPEG file format showing the sequence and progress of work. Take a minimum of 20 digital photographs each week throughout the entire Project from a minimum of ten views from points located by the Construction Administrator. Submit with the monthly invoice two sets of digital photographs, each set on a separate compact disc (CD) or data versatile disc (DVD), cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Provide photographs for each month in a separate monthly directory and name each file to indicate its location on the view location sketch. Also provide the view location sketch on the CD or DVD as a digital file. Include a date designator in file names. Cross reference submittals in the appropriate daily report. Photographs provided are for unrestricted use by the Government.

1.5 MINIMUM INSURANCE REQUIREMENTS

Provide the minimum insurance coverage required by the Connecticut Airport Authority (CAA) during the entire period of performance under this Contract. Provide other insurance coverage as required by the state of Connecticut law.

1.6 SUPERVISION

1.6.1 Minimum Communication Requirements

Have at least one qualified superintendent, or competent alternate, capable of reading, writing, and conversing fluently in the English language, on the job-site at all times during the performance of Contract work. In addition, if a Quality Control (QC) representative is required on the Contract, then that individual must also have fluent English communication skills.

1.6.2 Superintendent Qualifications

The Project Superintendent must have a minimum of 10 years experience in construction with at least 5 of those years as a superintendent on projects similar in size and complexity. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance. The individual must be capable of interpreting a critical path schedule and Construction Drawings. The qualification requirements for the alternate superintendent are the same as for the Project Superintendent. The Construction Administrator may request proof of the Superintendent's qualifications at any point in the Project if the performance of the Superintendent is in question.

For routine projects where the Superintendent is permitted to also serve as the Quality Control (QC) Manager as established in Section 01 45 00.00 10 QUALITY CONTROL, the Superintendent must have qualifications in accordance with that Section.

1.6.2.1 Duties

The Project Superintendent is primarily responsible for managing and coordinating day-to-day production and schedule adherence on the Project. The Superintendent is required to attend meetings, partnering meetings, and quality control meetings. The Superintendent or qualified alternative must be on-site at all times during the performance of this Contract until the work is completed and accepted.

1.6.3 Project Manager

Assign a Project Manager with the responsibility for the overall management of the Project. The Construction Administrator may request proof of the Project Manager's qualifications at any point in the Project if the performance of the Project Manager is in question.

1.6.3.1 Project Manager Qualifications

The Project Manager must have a minimum 10 years experience as a Project Manager or Superintendent on projects of similar size and complexity.

1.6.4 Non-Compliance Actions

The Project Superintendent is subject to removal by the Construction Administrator for non-compliance with requirements specified in the Contract and for failure to manage the Project to insure timely completion. Furthermore, the Construction Administrator 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 is acceptable as the subject of claim for extension of time for excess

costs or damages by the Contractor.

1.7 PRECONSTRUCTION MEETING/CONFERENCE

After award of the Contract but prior to commencement of any work at the site, meet with the Construction Administrator to discuss and develop a mutual understanding relative to the administration of the value engineering and safety program, preparation of the schedule of prices or earned value report, shop drawings, and other submittals, scheduling programming, prosecution of the work, and clear expectations of the "Interim DD Form 1354" Submittal. Major Subcontractors who will engage in the work must also attend.

1.8 ELECTRONIC MAIL (E-MAIL) ADDRESS

Establish and maintain electronic mail (e-mail) capability along with the capability to open various electronic attachments as text files, pdf files, and other similar formats. Within 10 days after Contract Award, provide the Construction Administrator a single (only one) e-mail address for electronic communications from the Construction Administrator related to this Contract including, but not limited to Contract Documents, invoice information, request for proposals, and other correspondence. The Construction Administrator may also use email to notify the Contractor of base access conditions when emergency conditions warrant, such as hurricanes or terrorist threats. Multiple email addresses are not allowed.

It is the Contractor's responsibility to make timely distribution of all Construction Administrator initiated e-mail with its own organization including field office(s). Promptly notify the Construction Administrator, in writing, of any changes to this email address.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

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SECTION 01 32 01.00 10

PROJECT SCHEDULE
02/15

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.

AACE INTERNATIONAL (AACE)

AACE 29R-03	(2011) Forensic Schedule Analysis
AACE 52R-06	(2006) Time Impact Analysis - As Applied in Construction

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval or 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 Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Project Scheduler Qualifications; G

Preliminary Project Schedule; G

Initial Project Schedule; G

Periodic Schedule Update; G

1.3 PROJECT SCHEDULER QUALIFICATIONS

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating and production of reports. The authorized representative must have a minimum of 2-years experience scheduling construction projects similar in size and nature to this Project with scheduling software that meets the requirements of this Specification. Representative must have a comprehensive knowledge of CPM scheduling principles and application.

PART 2 PRODUCTS

2.1 SOFTWARE

The scheduling software utilized to produce and update the schedules required herein must be capable of meeting all requirements of this Specification.

2.1.1 Government Default Software

The Government intends to use Primavera P6.

2.1.2 Contractor Software

Scheduling software used by the Contractor must be commercially available from the software vendor for purchase with vendor software support agreements available. The software routine used to create the required sdef file must be created and supported by the software manufacturer.

2.1.2.1 Primavera

If Primavera P6 is selected for use, provide the "xer" export file in a version of P6 importable by the Government system.

2.1.2.2 Other Than Primavera

If the Contractor chooses software other than Primavera P6, that is compliant with this Specification, provide for the Government's use two licenses, two computers, and training for two Government employees in the use of the software. These computers will be stand-alone and not connected to Government network. Computers and licenses will be returned at Project completion.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire Project is required. The scheduling of construction design and construction is the responsibility of the Contractor. Contractor management personnel must actively participate in its development. Subcontractors and suppliers Designers, Subcontractors and suppliers working on the Project must 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. Use the Critical Path Method (CPM) of network calculation to generate all Project Schedules. Prepare each Project Schedule using the Precedence Diagram Method (PDM).

3.2 BASIS FOR PAYMENT AND COST LOADING

The schedule is the basis for determining Contract earnings during each update period and therefore the amount of each progress payment. The aggregate value of all activities coded to a Contract CLIN must equal the value of the CLIN.

3.2.1 Activity Cost Loading

Activity cost loading must be reasonable and without front-end loading. Provide additional documentation to demonstrate reasonableness if requested by the Construction Administrator.

3.2.2 Withholdings / Payment Rejection

Failure to meet the requirements of this Specification may result in the disapproval of the preliminary, initial or periodic schedule updates and

subsequent rejection of payment requests until compliance is met.

In the event that the Construction Administrator directs schedule revisions and those revisions have not been included in subsequent Project Schedule revisions or updates, the Construction Administrator may withhold 10 percent of pay request amount from each payment period until such revisions to the Project Schedule have been made.

3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS

3.3.1 Level of Detail Required

Develop the Project Schedule to the appropriate level of detail to address major milestones and to allow for satisfactory Project planning and execution. Failure to develop the Project Schedule to an appropriate level of detail will result in its disapproval. The Construction Administrator will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.3.2 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 may have Original Durations (OD) greater than 20 work days or 30 calendar days.

3.3.3 Design and Permit Activities

Include design and permit activities with the necessary conferences and follow-up actions and design package submission dates. Include the design schedule in the Project Schedule, showing the sequence of events involved in carrying out the Project design tasks within the specific Contract period. Provide at a detailed level of scheduling sufficient to identify all major design tasks, including those that control the flow of work. Also include review and correction periods associated with each item.

3.3.4 Procurement Activities

Include activities associated with the critical submittals and their approvals, 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.

3.3.5 Mandatory Tasks

Include the following activities/tasks in the initial Project Schedule and all updates.

- a. Submission, review and acceptance of SD-01 Preconstruction Submittals (individual activity for each).
- b. Submission, review and acceptance of features require design completion
Submission, review and acceptance of design packages.
- c. Submission of electrical systems layout drawings.
- d. Long procurement activities.

- e. Submission and approval of as-built drawings.
- f. Submission and approval of DD1354 data and installed equipment lists.
- g. Other systems testing, if required.
- h. Contractor's pre-final inspection.
- i. Correction of punch list from Contractor's pre-final inspection.
- j. Government's pre-final inspection.
- k. Correction of punch list from Government's pre-final inspection.
- l. Final inspection.

3.3.6 Government Activities

Show Government and other agency activities that could impact progress. These activities include, but are not limited to: Approvals, acceptance, design reviews, environmental permit approvals by State regulators, inspections, utility tie-in, Government Furnished Equipment (GFE), and Notice to Proceed (NTP) for phasing requirements.

3.3.7 Contract Milestones and Constraints

Milestone activities are to be used for significant Project events including, but not limited to, Project Phasing, Project Start and end activities, or interim completion dates. The use of artificial float constraints such as "zero free float" or "zero total float" are prohibited.

Mandatory constraints that ignore or effect network logic are prohibited. No constrained dates are allowed in the schedule other than those specified herein. Submit additional constraints to the Construction Administrator for approval on a case by case basis.

3.3.7.1 Project Start Date Milestone and Constraint

The first activity in the Project Schedule must be a start milestone titled "NTP Acknowledged," which must have a "Start On" constraint date equal to the date that the NTP is acknowledged.

3.3.7.2 End Project Finish Milestone and Constraint

The last activity in the schedule must be a finish milestone titled "End Project."

Constrain the Project Schedule to the Contract Completion Date in such a way that if the schedule calculates an early finish, then the float calculation for "End Project" milestone reflects positive float on the longest path. If the project schedule calculates a late finish, then the "End Project" milestone float calculation reflects negative float on the longest path. The Government is under no obligation to accelerate Government activities to support a Contractor's early completion.

3.3.7.3 Interim Completion Dates and Constraints

Constrain contractually specified interim completion dates to show

negative float when the calculated late finish date of the last activity in that phase is later than the specified interim completion date.

3.3.7.3.1 Start Phase

Use a start milestone as the first activity for a project phase. Call the start milestone "Start Phase X" where "X" refers to the phase of work.

3.3.7.3.2 End Phase

Use a finish milestone as the last activity for a project phase. Call the finish milestone "End Phase X" where "X" refers to the phase of work.

3.3.8 Calendars

Schedule activities on a Calendar to which the activity logically belongs. Develop calendars to accommodate any contract defined work period such as a 7-day calendar for Government Acceptance activities, concrete cure times, etc. Develop the default Calendar to match the physical work plan with non-work periods identified including weekends and holidays. Develop Seasonal Calendar(s) and assign to seasonally affected activities as applicable.

If an activity is weather sensitive it should be assigned to a calendar showing non-work days on a monthly basis, with the non-work days selected at random across the weeks of the calendar, using the anticipated days provided in the Contract Clause "Time Extensions For Unusually Severe Weather". Assign non-work days over a seven-day week as weather records are compiled on seven-day weeks, which may cause some of the weather related non-work days to fall on weekends.

3.3.9 Open Ended Logic

Only two open ended activities are allowed: The first activity "NTP Acknowledged" may have no predecessor logic, and the last activity -"End Project" may have no successor logic.

Predecessor open ended logic may be allowed in a time impact analyses upon the Construction Administrator's approval.

3.3.10 Default Progress Data Disallowed

Actual Start and Finish dates must not automatically update with default mechanisms included in the scheduling software. Updating of the percent complete and the remaining duration of any activity must be independent functions. Disable program features that calculate one of these parameters from the other. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process must match those dates provided in the Contractor Quality Control Reports. Failure to document the AS and AF dates in the Daily Quality Control report will result in disapproval of the Contractor's schedule.

3.3.11 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 Construction Administrator. Propose logic corrections to eliminate out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated

Project Schedule. Address out of sequence progress or logic changes in the Narrative Report and in the periodic schedule update meetings.

3.3.12 Added and Deleted Activities

Do not delete activities from the project schedule or add new activities to the schedule without approval from the Construction Administrator. Activity ID and description changes are considered new activities and cannot be changed without Construction Administrator approval.

3.3.13 Original Durations

Activity Original Durations (OD) must be reasonable to perform the work item. OD changes are prohibited unless justification is provided and approved by the Construction Administrator.

3.3.14 Leads, Lags, and Start to Finish Relationships

Lags must be reasonable as determined by the Government and not used in place of realistic original durations, must not be in place to artificially absorb float, or to replace proper schedule logic.

- a. Leads (negative lags) are prohibited.
- b. Start to Finish (SF) relationships are prohibited.

3.3.15 Retained Logic

Schedule calculations must retain the logic between predecessors and successors ("retained logic" mode) even when the successor activity(s) starts and the predecessor activity(s) has not finished (out-of-sequence progress). 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") are not be allowed.

3.3.16 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.

3.3.17 Remaining Duration

Update the remaining duration for each activity based on the number of estimated work days it will take to complete the activity. Remaining duration may not mathematically correlate with percentage found under Paragraph entitled "Percent Complete".

3.3.18 Cost Loading of Closeout Activities

Cost load the "Correction of punch list from Government pre-final inspection" activity(ies) not less than 1 percent of the present Contract Value. Activity(ies) may be declared 100 percent complete upon the Government's verification of completion and correction of all punch list work identified during Government pre-final inspection(s).

3.3.18.1 As-Built Drawings

If there is no separate Contract line item (CLIN) for as-built drawings, cost load the "Submission and approval of as-built drawings" activity not less than \$35,000 or 1 percent of the present Contract Value, which ever is greater, up to \$200,000. Activity will be declared 100 percent complete upon the Government's approval.

3.3.19 Anticipated Adverse Weather

Paragraph applicable to Contracts with Clause entitled "Time Extensions For Unusually Severe Weather". Reflect the number of anticipated adverse weather delays allocated to a weather sensitive activity in the activity's calendar.

3.3.20 Early Completion Schedule and the Right to Finish Early

An Early Completion Schedule is an Initial Project Schedule (IPS) that indicates all scope of the required Contract Work will be completed before the contractually required completion date.

- a. No IPS indicating an Early Completion will be accepted without being fully resource-loaded (including crew sizes and manhours) and the Government agreeing that the schedule is reasonable and achievable.
- b. The Government is under no obligation to accelerate work items it is responsible for to ensure that the early completion is met nor is it responsible to modify incremental funding (if applicable) for the Project to meet the Contractor's accelerated work.

3.4 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data CD/DVD, reports, and network diagrams required for each submission are contained in Paragraph "Submission Requirements". If the Contractor fails or refuses to furnish the information and schedule updates as set forth herein, then the Contractor will be deemed not to have provided an estimate upon which a progress payment can be made.

Review comments made by the Government on the schedule(s) do not relieve the Contractor from compliance with requirements of the Contract Documents.

3.4.1 Preliminary Project Schedule Submission

Within 15 calendar days after the NTP is acknowledged submit the Preliminary Project Schedule defining the planned operations detailed for the first 90 calendar days for approval. 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. The Preliminary Project Schedule may be summary in nature for the remaining performance period. It must be early start and late finish constrained and logically tied as 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, 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. Government acceptance of the associated design package(s) and all other specified Program and Plan approvals must occur prior to any planned construction activities. Activity code any activities that are summary in nature after the first 90 calendar days with Bid Item (CLIN) code (BIDI), Responsibility Code (RESP) and Feature of Work code (FOW).

3.4.2 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 42 calendar days after notice to proceed is issued. The schedule must demonstrate a reasonable and realistic sequence of activities which represent all work through the entire Contract Performance period. Include in the design-build schedule detailed design and permitting activities, including but not limited to identification of individual design packages, design submission, reviews and conferences; permit submissions and any required Government actions; and long lead item acquisition prior to design completion. Also cover in the preliminary design-build schedule the entire construction effort with as much detail as is known at the time but, as a minimum, include all construction start and completion milestones, and detailed construction activities through the dry-in milestone, including all activity coding and cost loading. Include the remaining construction, including cost loading, but it may be scheduled summary in nature. As the design proceeds and design packages are developed, fully detail the remaining construction activities concurrent with the monthly schedule updating process. Constrain construction activities by Government acceptance of associated designs. When the design is complete, incorporate into the then approved schedule update all remaining detailed construction activities that are planned to occur after the dry-in milestone. If applicable, include in the design-build schedule detailed design and permitting activities, including but not limited to identification of individual design packages, design submission, reviews and conferences, permit submissions and any required Government actions, and long lead item acquisition prior to design completion. Also cover in the preliminary design-build schedule the entire construction effort with as much detail as is known at the time but, as a minimum, include all construction start and completion milestones, and detailed construction activities through the dry-in milestone, including all activity coding and cost loading. Include the remaining construction, including cost loading, but it may be scheduled summary in nature. As the design proceeds and design packages are developed, fully detail the remaining construction activities. No payment will be made for work items not fully detailed in the Project Schedule.

3.4.3 Periodic Schedule Updates

Update the Project Schedule on a regular basis, monthly at a minimum. Provide a draft Periodic Schedule Update for review at the schedule update meetings as prescribed in the Paragraph "Periodic Schedule Update Meetings". These updates will enable the Government to assess Contractor's progress. Update the schedule to include detailed 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 Construction Administrator 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.

- a. Update information including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete is subject

to the approval of the Government at the meeting.

- b. AS and AF dates must match the date(s) reported on the Contractor's Quality Control Report for an activity start or finish.

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:

3.5.1 Data CD/DVDs

Provide two sets of data CD/DVDs containing the current project schedule and all previously submitted schedules in the format of the scheduling software (e.g., .xer). Also include on the data CD/DVDs the Narrative Report and all required Schedule Reports. Label each CD/DVD indicating the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and file name. Each schedule must have a unique file name and use Project specific settings.

3.5.2 Narrative Report

Provide a Narrative Report with each schedule submission. The Narrative Report is expected to communicate to the Government the thorough analysis of the schedule output and the plans to compensate for any problems, either current or potential, which are revealed through that analysis. Include the following information as minimum in the Narrative Report:

- a. Identify and discuss the work scheduled to start in the next update period.
- b. A description of activities along the two most critical paths where the total float is less than or equal to 20 work days.
- c. 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.
- d. Identify and explain why activities based on their calculated late dates should have either started or finished during the update period but did not.
- e. Identify and discuss all schedule changes by activity ID and activity name including what specifically was changed and why the change was needed. Include at a minimum new and deleted activities, logic changes, duration changes, calendar changes, lag changes, resource changes, and actual start and finish date changes.
- f. Identify and discuss out-of-sequence work.

3.5.3 Schedule Reports

The format, filtering, organizing and sorting for each schedule report will be as directed by the Construction Administrator. Typically, reports contain Activity Numbers, Activity Description, Original 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. Provide the reports electronically in .pdf format. The following lists typical reports that will be requested:

3.5.3.1 Activity Report

List of all activities sorted according to activity number.

3.5.3.2 Logic Report

List of detailed predecessor and successor activities for every activity in ascending order by activity number.

3.5.3.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.5.3.4 Earnings Report by CLIN

A compilation of the Total Earnings on the project from the NTP to the data date, which reflects the earnings of activities based on the agreements made in the schedule update meeting defined herein. Provided a complete schedule update has been furnished, this report serves as the basis of determining progress payments. Group activities by CLIN number and sort by activity number. Provide a total CLIN percent earned value, CLIN percent complete, and Project percent complete. The printed report must contain the following for each activity: The Activity Number, Activity Description, Original Budgeted Amount, Earnings to Date, Earnings this period, Total Quantity, Quantity to Date, and Percent Complete (based on cost).

3.5.3.5 Schedule Log

Provide a Scheduling/Leveling Report generated from the current Project Schedule being submitted.

3.5.4 Network Diagram

The Network Diagram is required for the Preliminary, Initial, and Periodic Updates. Depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Construction Administrator will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.4.1 Continuous Flow

Show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, duration, and estimated earned value on the diagram.

3.5.4.2 Project Milestone Dates

Show dates on the diagram for start of project, any Contract required interim completion dates, and Contract completion dates.

3.5.4.3 Critical Path

Show all activities on the critical path. The critical path is defined as the longest path.

3.5.4.4 Banding

Organize activities using the WBS or as otherwise directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by major elements of work, category of work, work area and/or responsibility.

3.5.4.5 Cash Flow / Schedule Variance Control (SVC) Diagram

With each schedule submission, provide a SVC diagram showing 1) Cash Flow S-Curves indicating planned Project Cost based on projected early and late activity finish dates, and 2) Earned Value to-date.

3.6 PERIODIC SCHEDULE UPDATE

3.6.1 Periodic Schedule Update Meetings

Conduct periodic schedule update meetings for the purpose of reviewing the proposed Periodic Schedule Update, Narrative Report, Schedule Reports, and progress payment. Conduct meetings at least monthly within five days of the proposed schedule data date. Provide a computer with the scheduling software loaded and a projector which allows all meeting participants to view the proposed schedule during the meeting. The Contractor's authorized scheduler must organize, group, sort, filter, perform schedule revisions as needed and review functions as requested by the Contractor and/or Government. The meeting is a working interactive exchange which allows the Government and Contractor the opportunity to review the updated schedule on a real time and interactive basis. The meeting will last no longer than 8 hours. Provide a draft of the proposed narrative report and schedule data file to the Government a minimum of two workdays in advance of the meeting. The Contractor's Project Manager and scheduler must attend the meeting with the authorized representative of the Construction Administrator. Superintendents, foremen and major Subcontractors must attend the meeting as required to discuss the Project schedule and work. Following the periodic schedule update meeting, make corrections to the draft submission. Include only those changes approved by the Government in the submission and invoice for payment.

3.6.2 Update Submission Following Progress Meeting

Submit the complete Periodic Schedule Update of the Project Schedule containing all approved progress, revisions, and adjustments, pursuant to Paragraph "Submission Requirements" not later than 4 work days after the periodic schedule update meeting.

3.7 WEEKLY PROGRESS MEETINGS

Conduct a weekly meeting with the Government (or as otherwise mutually agreed to) between the meetings described in Paragraph entitled "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 two weeks. Use the current approved schedule update for the purposes of this meeting and for the production and review of reports. At the weekly progress meeting, address the status of RFIs, RFPs, and Submittals.

3.8 REQUESTS FOR TIME EXTENSIONS

Provide a justification of delay to the Construction Administrator in accordance with the Contract Provisions and clauses for approval within 10 days of a delay occurring. Also prepare a time impact analysis for each Government request for proposal (RFP) to justify time extensions.

3.8.1 Justification of Delay

Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify all schedule activities impacted. Show that the event that caused the delay/impact was the responsibility of the Government. Provide a time impact analysis that demonstrates the effects of the delay or impact on the Project completion date or interim completion date(s). Evaluate multiple impacts chronologically; each with its own justification of delay. With multiple impacts consider any concurrency of delay. A time extension and the schedule fragnet becomes part of the Project Schedule and all future schedule updates upon approval by the Construction Administrator.

3.8.2 Time Impact Analysis (Prospective Analysis)

Prepare a time impact analysis for approval by the Construction Administrator based on industry standard ACEC 52R-06. Utilize a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis. If Construction Administrator determines the time frame between the last approved schedule and the first day of impact is too great, prepare an interim updated schedule to perform the time impact analysis. Unless approved by the Construction Administrator, no other changes may be incorporated into the schedule being used to justify the time impact.

3.8.3 Forensic Schedule Analysis (Retrospective Analysis)

Prepare an analysis for approval by the Construction Administrator based on industry standard ACEC 29R-03.

3.8.4 Fragmentary Network (Fragnet)

Prepare a proposed fragnet for time impact analysis consisting of a sequence of new activities that are proposed to be added to the Project Schedule to demonstrate the influence of the delay or impact to the Project's contractual dates. Clearly show how the proposed fragnet is to be tied into the project schedule including all predecessors and successors to the fragnet activities. The proposed fragnet must be approved by the Construction Administrator prior to incorporation into the Project Schedule.

3.8.5 Time Extension

The Construction Administrator must approve the Justification of Delay including the time impact analysis before a time extension will be granted. No time extension will be granted unless the delay consumes all available Project Float and extends the projected finish date ("End Project" milestone) beyond the Contract Completion Date. The time extension will be in calendar days.

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.

3.8.6 Impact to Early Completion Schedule

No extended overhead will be paid for delay prior to the original Contract Completion Date for an Early Completion IPS unless the Contractor actually performed work in accordance with that Early Completion Schedule. The Contractor must show that an early completion was achievable had it not been for the impact.

3.9 FAILURE TO ACHIEVE PROGRESS

Should the progress fall behind the approved Project Schedule for reasons other than those that are excusable within the terms of the Contract, the Construction Administrator may require provision of a written recovery plan for approval. The plan must detail how progress will be made-up to include which activities will be accelerated by adding additional crews, longer work hours, extra work days, etc.

3.9.1 Artificially Improving Progress

Artificially improving progress by means such as, but not limited to, revising the schedule logic, modifying or adding constraints, shortening activity durations, or changing calendars in the Project Schedule is prohibited. Indicate assumptions made and the basis for any logic, constraint, duration and calendar changes used in the creation of the recovery plan. Any additional resources, manpower, or daily and weekly work hour changes proposed in the recovery plan must be evident at the work site and documented in the daily report along with the Schedule Narrative Report.

3.9.2 Failure to Perform

Failure to perform work and maintain progress in accordance with the supplemental recovery plan may result in an interim and final unsatisfactory performance rating and/or may result in corrective action directed by the Construction Administrator.

3.10 OWNERSHIP OF FLOAT

Except for the provision given in the Paragraph "Impact To Early Completion Schedule", float available in the schedule, at any time, may not be considered for the exclusive use of either the Government or the Contractor including activity and/or Project float. Activity float is the number of work days that an activity can be delayed without causing a delay to the "End Project" finish milestone. Project float (if applicable) is the number of work days between the projected early finish and the Contract completion date milestone.

3.11 REVISIONS TO SCHEDULES

Submit revised Construction Schedules each Application for payment. Provide Narravtive report to define problem areas, anticpated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect to the Construction Admiistrator.

3.12 PRIMAVERA P6 MANDATORY REQUIREMENTS

If Primavera P6 is being used, request a backup file template (.xer) from the Government, if one is available, prior to building the schedule. The following settings are mandatory and required in all schedule submissions to the Government:

- a. Activity Codes must be Project Level, not Global or EPS level.
- b. Calendars must be Project Level, not Global or Resource level.
- c. Activity Duration Types must be set to "Fixed Duration & Units".
- d. Percent Complete Types must be set to "Physical".
- e. Time Period Admin Preferences must remain the default "8.0 hr/day, 40 hr/week, 172 hr/month, 2000 hr/year". Set Calendar Work Hours/Day to 8.0 Hour days.
- f. Set Schedule Option for defining Critical Activities to "Longest Path".
- g. Set Schedule Option for defining progressed activities to "Retained Logic".
- h. Set up cost loading using a single lump sum labor resource. The Price/Unit must be \$1/hr, Default Units/Time must be "8h/d", and settings "Auto Compute Actuals" and "Calculate costs from units" selected.
- i. Activity IDs must not exceed 10 characters.
- j. Activity Names must have the most defining and detailed description within the first 30 characters.

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES

05/11

PART 1 GENERAL

1.1 SUMMARY

The Construction Administrator may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections.

Units of weights and measures used on all submittals are to be the same as those used in the Contract Drawings.

Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with Contract Requirements.

Contractor's Quality Control (CQC) System Manager and the Designer of Record, if applicable, to check and approve all items prior to 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.

Submittals requiring Government approval are to be scheduled and made prior to the acquisition of the material or equipment covered thereby. Pick up and dispose of samples not incorporated into the work in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

A submittal register showing items of equipment and materials for when submittals are required by the specifications is provided as "Appendix A - Submittal Register".

1.2 DEFINITIONS

1.2.1 Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

SD-01 Preconstruction Submittals

Submittals which are required prior to start of construction (work), issuance of Contract Notice To Proceed, or commencing work on site, or the start of the next major phase of the construction on a multi-phase Contract, includes schedules, tabular list of data, or tabular list including location, features, or 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

Construction progress schedule

Network Analysis Schedule (NAS)

Submittal register

Schedule of prices or Earned Value Report

Health and safety 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 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 by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the Project and those which 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.

Design submittals, design substantiation submittals and extensions of design submittals.

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 which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the Project before shipment to job site.

Report which 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 (MSDS) concerning impedances, hazards and safety precautions.

SD-10 Operation and Maintenance Data

Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel, including

manufacturer's help and product line documentation necessary to maintain and install equipment. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

This data is intended to be 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 submittal.

1.2.3 Work

As used in this Section, on- and off-site construction required by Contract Documents, including labor necessary to produce submittals, except those SD-01 Pre-Construction Submittals noted above, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor QC approval or 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 this Section.

SD-01 Preconstruction Submittals

Submittal Register; G

1.4 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.4.1 Designer of Record Approved (DA)

Designer of Record (DOR) approval is required for extensions of design, critical materials, any deviations from the solicitation, the accepted proposal, or the completed design, equipment whose compatibility with the entire system must be checked, and other items as designated by the Construction Administrator. Within the terms of the Contract Clause "Specifications And Drawings For Construction", they are considered to be "shop drawings." Contractor to provide the Government with the number of copies designated hereinafter of all DOR approved submittals. The

Government may review any or all Designer of Record approved submittals for conformance to the Solicitation, Accepted Proposal and the completed design. The Government will review all submittals designated as deviating from the Solicitation or Accepted Proposal, as described below. Design submittals to be in accordance with Section 01 33 16 DESIGN AFTER AWARD. Generally, design submittals should be identified as SD-05 Design Data submittals.

1.4.2 Government Approved (G)

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Construction Administrator. Government approval is required for any deviations from the Solicitation or Accepted Proposal and other items as designated by the Construction Administrator. Within the terms of the Contract Clause "Specifications And Drawings For Construction", they are considered to be "shop drawings."

1.4.3 Designer of Record Approved/Government Conformance Review (DA/CR)

1.4.3.1 Deviations to the Accepted Design

Designer of Record approval and the Government's concurrence are required for any proposed deviation from the accepted design which still complies with the contract before the Contractor is authorized to proceed with material acquisition or installation. Within the terms of the Contract Clause "Specifications And Drawings For Construction", they are considered to be "shop drawings." If necessary to facilitate the Project Schedule, the Contractor and the DOR may discuss a submittal proposing a deviation with the Construction Administrator's Representative prior to officially submitting it to the Government. However, the Government reserves the right to review the submittal before providing an opinion, if deemed necessary. In any case, the Government will not formally agree to or provide a preliminary opinion on any deviation without the DOR's approval or recommended approval. The Government reserves the right to non-concur with any deviation from the design, which may impact furniture, furnishings, equipment selections or operations decisions that were made, based on the reviewed and concurred design.

1.4.3.2 Substitutions

Unless prohibited or provided for otherwise elsewhere in the Contract, where the accepted Contract proposal named products, systems, materials or equipment by manufacturer, brand name and/or by model number or other specific identification, and the Contractor desires to substitute manufacturer or model after award, submit a requested substitution for Government concurrence. Include substantiation, identifying information and the DOR's approval, as meeting the Contract Requirements and that it is equal in function, performance, quality and salient features to that in the accepted Contract Proposal. If the Contract otherwise prohibits substitutions of equal named products, systems, materials or equipment by manufacturer, brand name and/or by model number or other specific identification, the request is considered a "variation" to the Contract. Variations are discussed below in Paragraphs "Designer of Record Approved/Government Approved" and "Variations."

1.4.4 Designer of Record Approved/Government Approved (DA/GA)

In addition to the above stated requirements for proposed deviations to the accepted design, both Designer of Record and Government Approval and, where applicable, a Contract modification are required before the Contractor is authorized to proceed with material acquisition or installation for any proposed variation to the Contract (the solicitation and/or the accepted proposal), which constitutes a change to the Contract Terms. Within the terms of the Contract Clause "Specifications And Drawings For Construction", they are considered to be "shop drawings." The Government reserves the right to accept or reject any such proposed deviation at its discretion.

1.4.5 For Information Only

Submittals not requiring Government approval will be for information only.

For Design-build construction all submittals not requiring Designer of Record or Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.5 FORWARDING SUBMITTALS REQUIRING GOVERNMENT APPROVAL

1.5.1 Submittals Required from the Contractor

As soon as practicable after award of Contract, and before procurement of fabrication, forward to the Construction Administrator submittals required in the technical sections of this Specification, including shop drawings, product data and samples. Forward one copy of the transmittal form for all submittals to the Resident Officer in Charge of Construction.

The Architect-Engineer for this Project will review and approve for the Construction Administrator those submittals reserved for Construction Administrator approval to verify submittals comply with the Contract Requirements.

1.6 PREPARATION

1.6.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels to office of Construction Administrator and Architect/Engineer. Transmit submittals with transmittal form prescribed by Construction Administrator and standard for Project. All submittals shall be accomplished by a separately signed form AF3000 cover sheet, which will be provided to the Contractor by the Construction Administrator. On the transmittal form identify Contractor, indicate date of submittal, and include information prescribed by transmittal form and required in Paragraph "Identifying Submittals". Process transmittal forms to record actions regarding samples and installations.

1.6.2 Identifying Submittals

When submittals are provided by a Subcontractor, the Prime Contractor is to prepare, review and stamp with Contractor's approval all specified submittals prior to submitting for Government approval.

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. Date 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 Section by which submittal is required.
- f. Submittal description (SD) number of each component of submittal.
- g. When 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 Format for SD-02 Shop Drawings

Shop Drawings are not to be 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 other form is required. Drawings are to be suitable for reproduction and be of a quality to produce clear, distinct lines and letters with dark lines on a white background.

Present 8-1/2 by 11 inches sized Shop Drawings as part of the bound volume for submittals required by section. Present larger Drawings in sets.

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. Contractors may use their own number system. Each Drawing is to bear the number of the submittal in a uniform location adjacent to the title block. Place the Government Contract Number in the margin, immediately below the title block, for each Drawing.

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.

Include the nameplate data, size and capacity on Drawings. Also include applicable Federal, military, industry and technical society publication references.

Submit Drawings in PDF format.

1.6.4 Format of SD-03 Product Data and SD-08 Manufacturer's Instructions

Present product data submittals for each section as a complete, bound volume. Include table of contents, listing page and catalog item numbers

for product data.

Indicate, by prominent notation, each product which is being submitted; indicate Specification Section number and paragraph number to which it pertains.

Supplement product data with material prepared for Project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for Project, with information and format as required for submission of SD-07 Certificates.

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. Should manufacturer's data require supplemental information for clarification, submit as specified for SD-07 Certificates.

Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), and 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 Construction Administrator. 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.

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal and 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 construction effort.

Submit manufacturer's instructions prior to installation.

1.6.5 Format of SD-04 Samples

Furnish samples in sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately 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 of Non-Solid Materials: Pint. Examples of non-solid 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.

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.

Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged condition at time of use.

Recording of Sample Installation: Note and preserve the notation of area constituting sample installation but remove notation at final clean up of Project.

When color, texture or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.6.6 Format of SD-05 Design Data and SD-07 Certificates

Provide design data and certificates on 8-1/2 by 11 inches paper. Provide a bound volume for submittals containing numerous pages.

1.6.7 Format of SD-06 Test Reports and SD-09 Manufacturer's Field Reports

Provide reports on 8-1/2 by 11 inches paper in a complete bound volume.

Indicate by prominent notation, each report in the submittal. Indicate Specification number and paragraph number to which it pertains.

1.6.8 Format of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

When submittal includes a document which is to be used in Project or become part of Project record, other than as a submittal, do not apply Contractor's approval stamp to document, but to a separate sheet accompanying document.

1.6.9 Source Drawings for Shop Drawings

The entire set of Source Drawing files (DWG) will not be provided to the Contractor. Only those requested by the Contractor to prepare Shop Drawings may be provided. Request the specific Drawing Number only for the preparation of Shop Drawings. These Drawings may only be provided after award.

1.6.9.1 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 shall be 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 sub consultants 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. 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. The Contractor is responsible for determining if any conflict exists. Use of these Source Drawing files does not relieve the Contractor of 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 indicia of ownership (seals, logos, signatures, initials and dates).

1.6.10 Electronic File Format

Provide submittals in electronic format, with the exception of material samples required for SD-04 Samples items. 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, coordinate the file naming convention with the Construction Administrator. 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 Construction Administrator. Generate PDF files from original documents with bookmarks so that the text included in the PDF file is both 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 scan of a signature.

Email electronic submittal documents fewer than 10MB to an email address as directed by the Construction Administrator. Provide electronic documents over 10MB 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/>.

Provide hard copies of submittals when requested by the Construction Administrator. Up to one additional hard copy of any submittal may be requested at the discretion of the Construction Administrator, at no

additional cost to the Government.

1.7 QUANTITY OF SUBMITTALS

1.7.1 Number of Copies of SD-02 Shop Drawings

Submit shop drawings requiring review electronically and approval only by QC organization.

1.7.2 Number of Copies of SD-03 Product Data and SD-08 Manufacturer's Instructions

Submit in compliance with quantity requirements specified for Shop Drawings.

1.7.3 Number of Samples SD-04 Samples

- a. Submit two samples, or two sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by approving authority and one will be returned to Contractor.
- b. Submit one sample panel or provide one sample installation where directed. Include components listed in technical section or as directed.
- c. Submit one sample installation, where directed.
- d. Submit one sample of non-solid materials.

1.7.4 Number of Copies SD-05 Design Data and SD-07 Certificates

Submit in compliance with quantity requirements specified for Shop Drawings.

1.7.5 Number of Copies SD-06 Test Reports and SD-09 Manufacturer's Field Reports

Submit in compliance with quantity and quality requirements specified for Shop Drawings other than field test results that will be submitted with QC reports.

1.7.6 Number of Copies of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

Unless otherwise specified, submit administrative submittals electronically.

1.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Construction Administrator is not required on information only submittals. The Government reserves the right to 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 Construction Administrator 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 SUBMITTAL REGISTER AND DATABASE

Prepare and maintain submittal register, as the work progresses. Use electronic submittal register program furnished by the Government or any other format. Do not change data which is output in columns (c), (d), (e), and (f) as delivered by Government; retain data which is output in columns (a), (g), (h), and (i) as approved. A Submittal Register showing items of equipment and materials for which submittals are required by the Specifications is provided as an attachment. 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 00.10 10 QUALITY CONTROL SYSTEM (QCS). The Government will provide the initial submittal register in electronic format with the following fields completed, to the extent that will be required by the Government during subsequent usage.

- a. Column (c): Lists Specification Section in which submittal is required.
- b. Column (d): Lists each submittal description (SD No. and type, e.g., SD-02 Shop Drawings) required in each Specification Section.
- c. Column (e): Lists one principal paragraph in 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 Project Requirements.
- d. Column (f): Indicate approving authority for each submittal.

The Designer of Record develops a complete list of submittals during design and identify required submittals in the Specifications, and use the list to prepare the Submittal Register. The list may not be all inclusive and additional submittals may be required by other parts of the Contract. Complete the Submittal Register and submit it to the Construction Administrator for approval within 30 calendar days after Notice to Proceed. The approved Submittal Register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the Contract period. Coordinate the submit dates and need dates with dates in the Contractor prepared progress schedule. Submit monthly or until all submittals have been satisfactorily completed, updates to the Submittal Register showing the Contractor action codes and actual dates with Government action codes. Revise the submittal register when the progress schedule is revised and submit both for approval.

1.9.1 Use of Submittal Register

Submit submittal register as an electronic database, using submittals management program furnished to Contractor. Submit with QC plan and Project Schedule. Verify that all submittals required for 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:

- a. Column (a) Activity Number: Activity number from the Project Schedule.
- b. Column (g) Contractor Submit Date: Scheduled date for approving authority to receive submittals.
- c. Column (h) Contractor Approval Date: Date Contractor needs approval of submittal.

- d. Column (i) Contractor Material: Date that Contractor needs material delivered to Contractor control.

1.9.2 Contractor Use of Submittal Register

Update the following fields in the Government-furnished submittal register program or equivalent fields in program utilized by Contractor with each submittal throughout Contract.

- a. Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.
- b. Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.
- c. Column (l) List date of submittal transmission.
- d. Column (q) List date approval received.

1.9.3 Action Codes

Entries for columns (j) and (o), are to be used are as follows (others may be prescribed by Transmittal Form):

1.9.3.1 Government Review Action Codes

- a. "A" - "Approved as submitted"; "Completed".
- b. "B" - "Approved, except as noted on Drawings"; "Completed".
- c. "C" - "Resubmission required"; "Resubmit".
- d. "D" - "Submittal Not Acceptable".
- e. "E" - "Preliminary Submittal".
- f. "F" - "For Reference, No Acceptance Required".
- g. "G" - "Distribution Copy/Previously Approved".

1.9.3.2 Contractor Action Codes

- a. NR - Not Received.
- b. AN - Approved as noted.
- c. A - Approved.
- d. RR - Disapproved, Revise, and Resubmit.

1.9.4 Copies Delivered to the Government

Deliver one copy of Submittal Register updated by Contractor to Government with each invoice request. Deliver in electronic format, unless a paper copy is requested by Construction Administrator.

1.10 VARIATIONS

Variations from Contract Requirements require both Designer of Record (DOR) and Government approval and will be considered where advantageous to Government.

1.10.1 Considering Variations

Discussion with Construction Administrator prior to submission, after consulting with the DOR, will help ensure functional and quality requirements are met and minimize rejections and re-submittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from Contract Requirements in transmittal letters. Failure to point out deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.

1.10.2 Proposing Variations

When proposing variation, deliver written request to the Construction Administrator, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government, including the DOR's written analysis and approval. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

Check the column "variation" of ENG Form 4025 for submittals which include proposed deviations requested by the Contractor. Set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

1.10.3 Warranting that Variations are Compatible

When delivering a variation for approval, Contractor, including its Designer(s) of Record, 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 normal submittal review period, a period of 10 working days will be allowed for consideration by the Government of submittals with variations.

1.11 SCHEDULING

Schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Include certifications to be submitted with the pertinent drawings 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. Allow for potential resubmittal of

requirements.

- b. Submittals called for by the Contract Documents will be listed on the register. If a submittal is called for 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 Construction Administrator does not relieve the Contractor of supplying submittals required by the Contract Documents but which have been omitted from the register or marked "N/A."
- c. Re-submit register and annotate monthly by the Contractor with actual submission and approval dates. When all items on the register have been fully approved, no further re-submittal is required.
- d. Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."
- e. Except as specified otherwise, allow review period, beginning with receipt by Construction Administrator, that includes at least 15 working days for submittals for QC Manager approval and 20 working days for submittals for Construction Administrator approval. Period of review for submittals with Construction Administrator approval begins when Government receives submittal from QC organization.
- f. Period of review for each resubmittal is the same as for initial submittal.

Within 30 calendar days of notice to proceed, provide, for approval by the Construction Administrator, the following schedule of submittals:

- a. A schedule of shop drawings and technical submittals required by the Specifications and Drawings. Indicate the Specification or Drawing reference requiring the submittal; the material, item, or process for which the submittal is required; the "SD" number and identifying title of the submittal; the Contractor's anticipated submission date and the approval need date.
- b. A separate schedule of other submittals required under the Contract but not listed in the Specifications or Drawings. Schedule will indicate the Contract Requirement reference; the type or title of the submittal; the Contractor's anticipated submission date and the approved need date (if approval is required).

1.11.1 Reviewing, Certifying, Approving Authority

The QC organization is responsible for reviewing and certifying that submittals are in compliance with Contract Requirements. Approving authority on submittals is QC Manager unless otherwise specified for specific submittal. At each "Submittal" paragraph in individual Specification Sections, a notation "G," following a submittal item, indicates Construction Administrator is approving authority for that submittal item. An "S" following a submittal item, indicates that the QC Manager is the approving authority, and that a copy of the approved submittal must be provided to the Designer of Record.

1.11.2 Constraints

Conform to provisions of this Section, unless explicitly stated otherwise

for submittals listed or specified in this Contract.

Submit complete submittals for each definable feature of work. Submit at the same time components of definable feature interrelated as a system.

When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, submittal will be returned without review.

Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

1.11.3 QC Organization Responsibilities

- a. Note date on which submittal was received from Contractor on each submittal.
- b. Review each submittal; and check and coordinate each submittal with requirements of work and Contract Documents.
- c. Review submittals for conformance with Project design concepts and compliance with Contract Documents.
- d. Act on submittals, determining appropriate action based on QC organization's review of submittal.
 - (1) When QC Manager is approving authority, take appropriate action on submittal from the possible actions defined in Paragraph "Approved Submittals".
 - (2) When Construction Administrator is approving authority or when variation has been proposed, forward submittal to Government with certifying statement or return submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of submittal determines appropriate action.
- e. Ensure that material is clearly legible.
- f. Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.
 - (1) When approving authority is Construction Administrator, QC organization will certify submittals forwarded to Construction Administrator with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with Contract Number WHAY142009, is in compliance with the Contract Drawings and Specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Certified by QC Manager _____, Date _____"
(Signature)

- g. Update submittal register as submittal actions occur and maintain the submittal register at Project Site until final acceptance of all work by Construction Administrator.
- h. Retain a copy of approved submittals at Project Site, including Contractor's copy of approved samples.
- i. For "S" submittals, provide a copy of the approved submittal to the Designer of Record.

1.11.4 Government Reviewed Design

The Government will review design submittals for conformance with the technical requirements of the solicitation. Section 01 33 16 DESIGN AFTER AWARD covers the design submittal and review process in detail. Government review is required for deviation from the completed design. Review will be only for conformance with the Contract Requirements. Included are only those construction submittals for which the Designer of Record design documents do not include enough detail to ascertain Contract Compliance. The Government may, but is not required, to review extensions of design such as structural steel or reinforcement shop drawings.

1.12 GOVERNMENT APPROVING AUTHORITY

When approving authority is Construction Administrator, the Government will:

- a. Note date on which submittal was received from QC Manager.
- b. Review submittals for approval within scheduling period specified 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 markings appropriate for action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date submittals. One copy of the submittal will be retained by the Construction Administrator and one copy 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 so identified and returned, as described above.

1.12.1 Review Notations

Construction Administrator review will be completed within 20 calendar days after date of submission. Submittals will be returned to the Contractor with the following notations:

- a. Submittals marked "approved" or "accepted" authorize the Contractor to proceed with the work covered.
- b. Submittals marked "approved as noted" or "approved, except as noted, resubmittal not required," authorize the Contractor to proceed with the work covered provided he takes no exception to the corrections.
- c. Submittals marked "not approved" or "disapproved," or "revise and resubmit," indicate noncompliance with the Contract Requirements or

design concept, or that submittal is incomplete. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is approved.

- d. Submittals marked "not reviewed" will indicate 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.

1.13 DISAPPROVED OR REJECTED SUBMITTALS

Make corrections required by the Construction Administrator. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the Contract Drawings or Specifications; notice as required under the is to be given to the Construction Administrator Contractor is responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, make such revisions and submission of the submittals in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

The initial submittal/shop drawing review and evaluation and one additional review/evaluation of a rejected or modified submittal will be accomplished at no cost to the Contractor. The Architects/Engineers cost to perform subsequent reviews/revaluations of rejected or modified submittals will be assessed by the Construction Administrator to the Contractor and may be offset against the Contract Price. The Contractor shall be responsible for all costs incurred by the Architect/Engineer for review of submittals past the first revision or second submittal of that item.

1.14 APPROVED/ACCEPTED SUBMITTALS

The Construction Administrator's approval or acceptance 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, design, general method of construction, materials, detailing and other information appear to meet the Solicitation and Accepted Proposal.

Approval or acceptance will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this Contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work design, dimensions, all design extensions, such as the design of adequate connections and details, etc., and the satisfactory construction of all work.

After submittals have been approved or accepted by the Construction Administrator, 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, the Contractor to assure 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 which may be damaged in testing, will be returned to the Contractor, at his expense, upon completion of the Contract. Samples not approved 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 of that material. Government reserves the right to disapprove any material or equipment which previously has proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Construction Administrator for testing. Samples failing to meet Contract Requirements will automatically void previous approvals. Contractor to replace such materials or equipment to meet Contract Requirements.

Approval of the Contractor's samples by the Construction Administrator does not relieve the Contractor of his responsibilities under the Contract.

1.16 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained. No payment for materials incorporated in the work will be made if all required Designer of Record or required Government approvals have not been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.17 PROGRESS SCHEDULE

1.17.1 Bar Chart

- a. Submit the progress chart, for approval by the Construction Administrator, at the Preconstruction Conference in one reproducible and 4 copies.
- b. Prepare the progress chart in the form of a bar chart utilizing form "Construction Progress Chart" or comparable format acceptable to the Construction Administrator.
- c. Include no less than the following information on the progress chart:
 - (1) Break out by major headings for primary work activity.
 - (2) A line item break out under each major heading sufficient to track the progress of the work.

- (3) A line item showing Contract finalization task which includes punch list, clean-up and demolition, and final construction drawings.
 - (4) A materials bar and a separate labor bar for each line item. Both bars will show the scheduled percentage complete for any given date within the Contract performance period. Labor bar will also show the number of men (man-load) expected to be working on any given date within the Contract performance period.
 - (5) The estimated cost and percentage weight of total Contract cost for each materials and labor bar on the chart.
 - (6) Separate line items for mobilization and drawing submittal and approval. (These items are to show no associated costs.)
- d. Update the progress schedule in one reproduction and 4 copies every 30 calendar days throughout the Contract performance period.

1.17.2 Project Network Analysis

Submit the initial progress schedule within 21 calendar days of notice to proceed. Schedule is to be updated and resubmitted monthly beginning 7 calendar days after return of the approved initial schedule. Updating to entail complete revision of the graphic and data displays incorporating changes in scheduled dates and performance periods. Redlined updates will only be acceptable for use as weekly status reviews.

Contractor to provide a single point contact from his on-site organization as his Schedule Specialist. Schedule Specialist is to have the responsibility of updating and coordinating the schedule with actual job conditions. Schedule Specialist to participate in weekly status meetings and present current information on the status of purchase orders, shop drawings, off-site fabrication, materials deliveries, Subcontractor activities, anticipated needs for Government furnished equipment, and any problem which may impact the Contract performance period.

Include the following in the project network analysis:

- a. Graphically display with the standard network or arrow diagram capable of illustrating the required data. Drafting to be computer generated on standard 24 by 36 inch (nominal size) drafting sheets or on small 11 by 17 inch minimum sheets with separate overview and detail breakouts. Provide a project network analysis that is legible with a clear, consistent method for continuations and detail referencing. Clearly delineate the critical path on the display. Clearly indicate the Contract milestone date on the Project network analysis graphic display.
- b. Data is to be presented as a separate printout on paper or, where feasible, may be printed on the same sheet as the graphic display. Data is to be organized in a logical coherent display capable of periodic updating.
- c. Include within the data verbal activity descriptions with a numerical ordering system cross referenced to the graphic display. Additionally, costs (broken down into separate materials and costs), duration, early start date, early finish date, late start date, late

finish date, and float are to be detailed for each activity. A running total of the percent completion based on completed activity costs versus total contract cost is to be indicated. A system for indicating scheduled versus actual activity dates and durations is also to be provided.

- d. Sufficient detail to facilitate the Contractor's control of the job and to allow the Construction Administrator to readily follow progress for portions of the work should be shown within the schedule.

1.18 STATUS REPORT ON MATERIALS ORDERS

Within 45 calendar days after notice to proceed, submit, for approval by the Construction Administrator, an initial material status report on all materials orders. This report will be updated and re-submitted every 60 calendar days as the status on material orders changes.

Report to include list, in chronological order by need date, materials orders necessary for completion of the Contract. The following information will be required for each material order listed:

- a. Material name, supplier, and invoice number.
- b. Bar chart line item or CPM activity number affected by the order.
- c. Delivery date needed to allow directly and indirectly related work to be completed within the Contract performance period.
- d. Current delivery date agreed on by supplier.
- e. When item d exceeds item c, the effect that delayed delivery date will have on Contract completion date.
- f. When item d exceeds item c, a summary of efforts made by the Contractor to expedite the delayed delivery date to bring it in line with the needed delivery date, including efforts made to place the order (or subcontract) with other suppliers.

1.19 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets Contract Requirements is to be similar to the following:

CONTRACTOR (Firm Name)
_____ Approved
_____ Approved with corrections as noted on submittal data and/or attached sheets(s)
SIGNATURE: _____

TITLE:	_____
DATE:	_____

For design-build construction, both the Contractor Quality Control System Manager and the Designer of Record are to stamp and sign to certify that the submittal meets Contract Requirements.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

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						S U B M I T	A P P R O V A L N E E D E D B Y	M A T E R I A L N E E D E D B Y	A C T I O N C O D E	D A T E O F A C T I O N	D A T E F W D T O A P P R A U T H / D A T E R C D F R O M C O N T R	A C T I O N C O D E	D A T E F W D T O O T H E R R E V I E W E R	D A T E R C D F R O M O T H R E V I E W E R			A C T I O N C O D E
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	01 11 00		SD-01 Preconstruction Submittals														
			Utility Outage Requests	1.7.1													
			Utility Connection Requests	1.7.1													
			Excavation Permits	1.7.2													
			Burning Permits	1.7.2													
			Salvage Plan	1.10	G												
	01 32 01.00 10		SD-01 Preconstruction Submittals														
			Project Scheduler Qualifications	1.3	G												
			Preliminary Project Schedule	3.4.1	G												
			Initial Project Schedule	3.4.2	G												
			Periodic Schedule Update	3.6.2	G												
	01 33 00		SD-01 Preconstruction Submittals														
			Submittal Register	1.9	G												
	01 35 26		SD-01 Preconstruction Submittals														
			Accident Prevention Plan (APP)	1.6	G												
			SD-06 Test Reports														
			Notifications and Reports	1.11													
			Accident Reports	1.11.2	G												
			SD-07 Certificates														
			Contractor Safety Self-Evaluation	1.4													
			Checklist														
			Confined Space Entry Permit	1.8.1													
			Hot Work Permit	1.8.1													
	01 45 00.00 10		SD-01 Preconstruction Submittals														
			Contractor Quality Control (CQC)	3.2	G												
			Plan														

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(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	01 45 00.00 10		SD-06 Test Reports														
			Verification Statement	3.9													
	01 50 00		SD-01 Preconstruction Submittals														
			Construction Site Plan	1.3	G												
	01 57 19		SD-01 Preconstruction Submittals														
			Preconstruction Survey	1.5.1													
			Solid Waste Management Plan	1.6.1.1	G												
			Environmental Protection Plan	1.6	G												
			Stormwater Notice of Intent		G												
			Dirt and Dust Control Plan	1.6.7.1	G												
			Employee Training Records	1.5.5	G												
			SD-06 Test Reports														
			Solid Waste Management Report	3.5.2.1	G												
			SD-07 Certificates														
			Employee Training Records	1.5.5	G												
			SD-11 Closeout Submittals														
			Stormwater Pollution Prevention Plan	3.2.1	G												
			Stormwater Notice of Termination		G												
			Waste Determination	3.5.1	G												
			Documentation														
			Assembled Employee Training Records	1.5.5	G												
			Solid Waste Management Permit	1.8	G												
			Solid Waste Management Report	3.5.2.1	G												

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	01 57 19		Hazardous Waste/Debris Management	3.5.3.1	G												
	01 57 20.00 10		SD-01 Preconstruction Submittals														
	01 57 23		Environmental Protection Plan	1.7	G												
			SD-06 Test Reports														
			Erosion and Sediment Controls	1.3													
			SD-07 Certificates														
			Mill Certificate or Affidavit	2.1.3													
	01 74 19		SD-01 Preconstruction Submittals														
			Waste Management Plan	1.6	G												
			SD-11 Closeout Submittals														
			Records	1.7													
	01 78 00		SD-11 Closeout Submittals														
			As-Built Drawings	3.1	G												
			Construction Contract	3.3													
			Specifications														
			Interim DD FORM 1354	3.6	G												
			Checklist for DD FORM 1354	3.6	G												
	02 41 00		SD-01 Preconstruction Submittals														
			Demolition Plan		G												
			Existing Conditions	1.11													
			SD-07 Certificates														
			Notification	1.7	G												
			SD-11 Closeout Submittals														
			Receipts	3.3.2													
	31 00 00		SD-01 Preconstruction Submittals														

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	31 00 00		Shoring	3.5	G												
			Dewatering Work Plan	1.3.3	G												
			SD-03 Product Data														
			Utilization of Excavated Materials	3.9	G												
			Rock Excavation	1.2.8													
			Shoulder Construction	3.13													
			SD-06 Test Reports	3.16													
			Testing	2.1													
			Borrow Site Testing														
			SD-07 Certificates	3.16													
			Testing														
	32 11 23		SD-03 Product Data														
			Plant, Equipment, and Tools	1.4	G												
			SD-06 Test Reports														
			Initial Tests	1.5.3.1	G												
			In-Place Tests	1.5.3.2	G												
	32 12 13		SD-06 Test Reports														
			Sampling and Testing	3.7													
	32 12 15.13		SD-02 Shop Drawings														
			Placement Plan	2.1	G												
			SD-03 Product Data														
			Diamond Grinding Plan	2.1.6	G												
			Mix Design	2.4	G												
			Contractor Quality Control	3.1	G												
			SD-04 Samples														
			Aggregates	2.2													

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						S U B M I T	A P P R O V A L N E E D E D B Y	M A T E R I A L N E E D E D B Y	A C T I O N C O D E	D A T E F W D T O A P P R A U T H /	D A T E R C D F R O M C O N T R	D A T E F W D T O O T H E R R E V I E W E R	D A T E R C D F R O M O T H R E V I E W E R	A C T I O N C O D E			D A T E O F A C T I O N
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	32 12 15.13		Asphalt Cement Binder	2.3													
			Warm-Mix Additive	3.1.1													
			SD-06 Test Reports														
			Aggregates	2.2	G												
			QC Monitoring	3.1.3.10													
			SD-07 Certificates														
			Asphalt Cement Binder	2.3	G												
			Testing Laboratory	3.7													
			Warm-Mix Additive	3.1.1													
	32 12 17		SD-04 Samples														
			Bituminous Pavement	1.6.1.6													
			SD-05 Design Data														
			Job-Mix Formula	1.3.2													
			Asphalt Cement Binder	2.2													
			Mix Design	2.3													
			SD-06 Test Reports														
			Specific Gravity Test of Asphalt	2.5.1													
			Coarse Aggregate Tests	2.5.1													
			Weight of Slag Test	2.5.1													
			Percent of Crushed Pieces in	2.5.1													
			Gravel														
			Fine Aggregate Tests	2.5.1													
			Specific Gravity of Mineral Filler	2.5.1													
			Bituminous Mixture Tests	2.5.1													
			Aggregates Tests	3.5.2.1													
			Bituminous Mix Tests	3.5.2.2													

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ACTIVITY NO	TRANSMITTAL NO	SPEC S E C T	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY			MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						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			
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	32 12 17		Pavement Courses	3.5.2.3													
	32 13 11		SD-03 Product Data														
			Diamond Grinding Plan	2.1.6	G												
			Dowels	2.8.1	G												
			Dowel Bar Assemblies	2.8.2	G												
			Equipment	2.10													
			Proposed Techniques	3.1.2	G												
			SD-05 Design Data														
			Preliminary Proposed	2.12.2	G												
			Proportioning														
			Proportioning Studies	2.12.2	G												
			SD-06 Test Reports														
			Batch Plant Manufacturer's	1.3.1	G												
			Inspection Report														
			Slipform Paver Manufacturer's	1.3.1	G												
			Inspection Report														
			Sampling and Testing	2.1.4.1	G												
			Diamond Grinding of PCC	2.1.6	G												
			Surfaces														
			Mixer Performance (Uniformity)	2.10.2.3	G												
			Testing														
			Repair Recommendations Plan	3.9.1	G												
			SD-07 Certificates														
			Contractor Quality Control Staff	1.3.1	G												
			Laboratory Accreditation and	1.3.3													
			Validation														

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TITLE AND LOCATION

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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	D E S C R I P T I O N I T E M S U B M I T T E D	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	C O N T R A C T O R S C H E D U L E D A T E S			C O N T R A C T O R A C T I O N			A P P R O V I N G A U T H O R I T Y			M A I L E D T O C O N T R / D A T E R C D F R M A P P R A U T H	R E M A R K S	
						S U B M I T	A P P R O V A L N E E D E D B Y	M A T E R I A L N E E D E D B Y	A C T I O N C O D E	D A T E O F A C T I O N	D A T E F W D T O O T H E R R E V I E W E R	D A T E F W D T O A P P R A U T H / F R O M C O N T R	D A T E F W D T O O T H R E V I E W E R	D A T E F R O M O T H R E V I E W E R			D A T E O F A C T I O N
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	32 13 11		Commercial Laboratory	1.3.3.3	G												
			NRMCA Certificate of Conformance	2.10													
	32 13 73		SD-03 Product Data Equipment	2.1													
			Manufacturer's Instructions	3.1.1													
			SD-04 Samples	2.2	G												
			Compression Seals														
			SD-06 Test Reports														
			Test Requirements	2.1.3													
	32 16 19		SD-03 Product Data	2.1													
			Concrete	3.2													
			Biodegradable Form Release Agent														
			SD-06 Test Reports														
			Field Quality Control	3.7													
	32 17 23		SD-03 Product Data														
			Surface Preparation Equipment List	2.1.1	G												
			Application Equipment List	2.1.2	G												
			Exterior Surface Preparation	3.2													
			Safety Data Sheets	1.3.1	G												
			Reflective Media for Airfields	2.2.3.1	G												
			Reflective Media for Roads	2.2.3.2	G												
			Waterborne Paint	2.2.1	G												
			Solventborne Paint		G												

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						S U B M I T	A P P R O V A L N E E D E D B Y	M A T E R I A L N E E D E D B Y	A C T I O N C O D E	D A T E O F A C T I O N	D A T E F W D T O A P P R A U T H /	D A T E R C D F R O M C O N T R	D A T E F W D T O O T H E R R E V I E W E R	D A T E R C D F R O M O T H R E V I E W E R			D A T E O F A C T I O N
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	32 17 23		Thermoplastic Compound	1.4	G												
			Raised Pavement Markers		G												
			Primers and Adhesives														
			SD-06 Test Reports														
			Reflective Media for Airfields	2.2.3.1	G												
			Reflective Media for Roads	2.2.3.2	G												
			Waterborne Paint	2.2.1	G												
			Solventborne Paint		G												
			High Build Acrylic Coating (HBAC)		G												
			Thermoplastic Compound	1.4	G												
			Raised Pavement Markers		G												
			Primers and Adhesives														
			Test Reports	3.4.1													
			SD-07 Certificates														
			Qualifications	1.3.2	G												
			Reflective Media for Airfields	2.2.3.1													
			Reflective Media for Roads	2.2.3.2													
			Waterborne Paint	2.2.1													
			Volatile Organic Compound	1.3.1	G												
			Thermoplastic Compound	1.4													
			SD-08 Manufacturer's Instructions														
			Waterborne Paint	2.2.1	G												
			Solventborne Paint		G												
			Thermoplastic Compound	1.4	G												
	32 31 13.53		SD-02 Shop Drawings														

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						S U B M I T	A P P R O V A L N E E D E D B Y	M A T E R I A L N E E D E D B Y	A C T I O N C O D E	D A T E O F A C T I O N	D A T E F W D T O O T H E R R E V I E W E R	D A T E R C D F R O M C O N T R A U T H	D A T E F W D T O O T H E R R E V I E W E R	D A T E R C D F R O M O T H R E V I E W E R			D A T E O F A C T I O N
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	32 31	13.53	Fence Installation	1.3.2													
			Fence Installation	3.1													
			Installation Drawings	1.3.2													
			Location of Gate, Corner, End, And Pull Posts	1.3.2													
			Gate Assembly	1.3.2													
			Gate Assembly	2.6.1													
			Gate Assembly	2.6.1													
			Turnstiles	1.3.2													
			Gate Hardware and Accessories	1.3.2													
			Gate Hardware and Accessories	2.6.3													
			SD-03 Product Data														
			Fence Installation	1.3.2													
			Fence Installation	3.1													
			Gate Assembly	1.3.2													
			Gate Assembly	2.6.1													
			Gate Assembly	2.6.1													
			Gate Hardware and Accessories	1.3.2													
			Gate Hardware and Accessories	2.6.3													
			SD-04 Samples														
			Fabric	2.1.1													
			Posts	2.2													
			Post Caps	2.2.2													
			Braces	2.3													
			Line Posts	2.3													
			Bottom Rail	2.3													

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ACTIVITY NO	TRANSMITTAL NO	SPECIES	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVERNOR CLASSIFICATION	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY			REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION		DATE OF ACTION	DATE RCD FRM APPR AUTH
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	32 31	13.53	Tension Wire	2.2.2													
			Barbed Wire	2.4.2													
			Barbed Wire Supporting Arms	2.2.2													
			Stretcher Bars	2.1.1													
			Gate Posts	2.1.1													
			Gate Hardware and Accessories	1.3.2													
			Gate Hardware and Accessories	2.6.3													
			Turnstiles	1.3.2													
			Padlocks	3.6													
			Wire Ties	2.4.1													
			SD-06 Test Reports														
			Zinc Coating	1.3.1													
			PVC Coating	1.3.1													
			Aluminum Alloy Coating	1.3.1													
			SD-07 Certificates														
			Chain Link Fence	2.2.1													
			Reports	1.3.1													
			Reports	1.3.1													
			Zinc Coating	1.3.1													
			PVC Coating	1.3.1													
			Aluminum Alloy Coating	1.3.1													
			Fabric	2.1.1													
			Barbed Wire	2.4.2													
			Stretcher Bars	2.1.1													
			Gate Hardware and Accessories	1.3.2													
			Gate Hardware and Accessories	2.6.3													

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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	D E S C R I P T I O N I T E M S U B M I T T E D	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	C O N T R A C T O R S C H E D U L E D A T E S			C O N T R A C T O R A C T I O N			A P P R O V I N G A U T H O R I T Y			M A I L E D T O C O N T R / D A T E R C D F R M A P P R A U T H	R E M A R K S	
						S U B M I T	A P P R O V A L N E E D E D B Y	M A T E R I A L N E E D E D B Y	A C T I O N C O D E	D A T E O F A C T I O N	D A T E F W D T O A P P R A U T H / D A T E R C D F R O M C O N T R	D A T E F W D T O O T H E R R E V I E W E R	D A T E R C D F R O M O T H R E V I E W E R	D A T E O F A C T I O N			D A T E R C D F R M A P P R A U T H
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	32 31	13.53	Concrete	2.5													
			Gate Operator	2.7													
			SD-08 Manufacturer's Instructions														
			Fence Installation	1.3.2													
			Fence Installation	3.1													
			Gate Assembly	1.3.2													
			Gate Assembly	2.6.1													
			Gate Assembly	2.6.1													
			Hardware Assembly	3.6													
			Accessories	1.3.1													
			SD-10 Operation and Maintenance														
			Data														
			Electro-Mechanical Locks	2.8													
			Gate Operator	2.7													
			Operating And Maintenance Instructions	3.6													
	32 92	19	SD-03 Product Data														
			Fertilizer	2.4													
			SD-06 Test Reports														
			Topsoil Composition Tests	2.2.3													
			SD-07 Certificates														
			Seed	2.1													
			SD-08 Manufacturer's Instructions														
			Erosion Control Materials	2.7													
	33 40	00	SD-04 Samples														

SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS
11/15

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 ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.34	(2001; R 2012) Protection of the Public on or Adjacent to Construction Sites
ASSE/SAFE Z359.0	(2012) Definitions and Nomenclature Used for Fall Protection and Fall Arrest
ASSE/SAFE Z359.1	(2007) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
ASSE/SAFE Z359.11	(2014) Safety Requirements for Full Body Harnesses
ASSE/SAFE Z359.12	(2009) Connecting Components for Personal Fall Arrest Systems
ASSE/SAFE Z359.13	(2013) Personal Energy Absorbers and Energy Absorbing Lanyards
ASSE/SAFE Z359.14	(2014) Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems
ASSE/SAFE Z359.15	(2014) Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems
ASSE/SAFE Z359.2	(2007) Minimum Requirements for a Comprehensive Managed Fall Protection Program
ASSE/SAFE Z359.3	(2007) Safety Requirements for Positioning and Travel Restraint Systems
ASSE/SAFE Z359.4	(2013) Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
ASSE/SAFE Z359.6	(2009) Specifications and Design Requirements for Active Fall Protection Systems
ASSE/SAFE Z359.7	(2011) Qualification and Verification

Testing of Fall Protection Products

ASSE/SAFE Z490.1 (2009) Criteria for Accepted Practices in Safety, Health, and Environmental Training

ASME INTERNATIONAL (ASME)

ASME B30.20 (2013; INT Oct 2010 - May 2012)
Below-the-Hook Lifting Devices

ASME B30.22 (2010) Articulating Boom Cranes

ASME B30.26 (2015; INT Jun 2010 - Jun 2014) Rigging Hardware

ASME B30.3 (2012) Tower Cranes

ASME B30.5 (2014) Mobile and Locomotive Cranes

ASME B30.8 (2010) Floating Cranes and Floating Derricks

ASME B30.9 (2014; INT Feb 2011 - Nov 2013) Slings

ASTM INTERNATIONAL (ASTM)

ASTM F855 (2015) Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 1048 (2003) Guide for Protective Grounding of Power Lines

IEEE C2 (2012; Errata 1 2012; INT 1-4 2012; Errata 2 2013; INT 5-7 2013; INT 8-10 2014; INT 11 2015) National Electrical Safety Code

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

NASA NPR 8621.1 (2006b; Change 7) NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping

NASA NPR 8715.3 (2008c; Change 9) NASA General Safety Program Requirements

NASA-STD 8719.12 (2011; Change 2) Safety Standard for Explosives, Propellants, and Pyrotechnics

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10 (2013) Standard for Portable Fire Extinguishers

NFPA 241 (2013; Errata 2015) Standard for Safeguarding Construction, Alteration, and

Demolition Operations

NFPA 306	(2014) Standard for Control of Gas Hazards on Vessels
NFPA 51B	(2014) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3-4 2014; AMD 4-6 2014) National Electrical Code
NFPA 70E	(2015; ERTA 1 2015) Standard for Electrical Safety in the Workplace

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual
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U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.147	Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1910.333	Selection and Use of Work Practices
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1915.89	Control of Hazardous Energy (Lockout/Tags-Plus)
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.16	Rules of Construction
29 CFR 1926.450	Scaffolds
29 CFR 1926.500	Fall Protection
CPL 2.100	(1995) Application of the Permit-Required Confined Spaces (PRCS) Standards, 29 CFR 1910.146

1.2 DEFINITIONS

1.2.1 Competent Person (CP)

The CP is a person designated in writing, who, through training, knowledge and experience, is capable of identifying, evaluating, and addressing existing and predictable hazards in the working environment or working

conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures with regards to such hazards.

1.2.2 Competent Person, Confined Space

The CP, Confined Space, is a person meeting the competent person requirements as defined EM 385-1-1 Appendix Q, with thorough knowledge of OSHA's Confined Space Standard, 29 CFR 1910.146, and designated in writing to be responsible for the immediate supervision, implementation and monitoring of the confined space program, who through training, knowledge and experience in confined space entry is capable of identifying, evaluating and addressing existing and potential confined space hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.3 Competent Person, Cranes and Rigging

The CP, Cranes and Rigging, as defined in EM 385-1-1 Appendix Q, is a person meeting the competent person, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the Crane and Rigging Program, who through training, knowledge and experience in crane and rigging is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.4 Competent Person, Excavation/Trenching

A CP, Excavation/Trenching, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and 29 CFR 1926, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the excavation/trenching program, who through training, knowledge and experience in excavation/trenching is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.5 Competent Person, Fall Protection

The CP, Fall Protection, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and in accordance with ASSE/SAFE Z359.0, who has been 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.

1.2.6 Competent Person, Scaffolding

The CP, Scaffolding is a person meeting the competent person requirements in EM 385-1-1 Appendix Q, and designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the scaffolding program. The CP for Scaffolding has enough training, knowledge and experience in scaffolding to correctly identify, evaluate and address existing and potential hazards and also has the authority to take prompt corrective measures with regard to these hazards. CP qualifications must be documented and include experience on the specific scaffolding systems/types being used, assessment of the base material that

the scaffold will be erected upon, load calculations for materials and personnel, and erection and dismantling. The CP for scaffolding must have a documented, minimum of 8-hours of scaffold training to include training on the specific type of scaffold being used (e.g., mast-climbing, adjustable, tubular frame), in accordance with EM 385-1-1 Section 22.B.02.

1.2.7 Competent Person (CP) Trainer

A competent person trainer as defined in EM 385-1-1 Appendix Q, who is qualified in the material presented, and who possesses a working knowledge of applicable technical regulations, standards, equipment and systems related to the subject matter on which they are training Competent Persons. A competent person trainer must be familiar with the typical hazards and the equipment used in the industry they are instructing. The training provided by the competent person trainer must be appropriate to that specific industry. The competent person trainer must evaluate the knowledge and skills of the competent persons as part of the training process.

1.2.8 High Risk Activities

High Risk Activities are activities that involve work at heights, crane and rigging, excavations and trenching, scaffolding, electrical work, and confined space entry.

1.2.9 High Visibility Accident

A High Visibility Accident is any mishap which may generate publicity or high visibility.

1.2.10 Load Handling Equipment (LHE)

LHE is a term used to describe cranes, hoists and all other hoisting equipment (hoisting equipment means equipment, including crane, derricks, hoists and power operated equipment used with rigging to raise, lower or horizontally move a load).

1.2.11 Medical Treatment

Medical Treatment is 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 though provided by a physician or registered personnel.

1.2.12 Near Miss

A Near Miss is a mishap resulting in no personal injury and zero property damage, but given a shift in time or position, damage or injury may have occurred (e.g., a worker falls off a scaffold and is not injured; a crane swings around to move the load and narrowly misses a parked vehicle).

1.2.13 Operating Envelope

The Operating Envelope is the area surrounding any crane or load handling equipment. Inside this "envelope" is the crane, the operator, riggers and crane walkers, other personnel involved in the operation, rigging gear between the hook, the load, the crane's supporting structure (i.e., ground or rail), the load's rigging path, the lift and rigging procedure.

1.2.14 Qualified Person (QP)

The QP is a person designated in writing, who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems related to the subject matter, the work, or the Project.

1.2.15 Qualified Person, Fall Protection (QP for FP)

A QP for FP is a person meeting the requirements of EM 385-1-1 Appendix Q, and ASSE/SAFE Z359.0, 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, and evaluating and specifying fall protection and rescue systems.

1.2.16 Recordable Injuries or Illnesses

Recordable Injuries or Illnesses are any work-related injury or illness that results in:

- a. Death, regardless of the time between the injury and death, or the length of the illness;
- b. Days away from work (any time lost after day of injury/illness onset);
- c. Restricted work;
- d. Transfer to another job;
- e. Medical treatment beyond first aid;
- f. Loss of consciousness; or
- g. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (a) through (f) above.

1.3 SUBMITTALS

Government approval 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. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G

SD-06 Test Reports

Notifications and Reports

Accident Reports; G

Submit reports as their incident occurs, in accordance with the requirements of Paragraph, "Notifications and Reports".

SD-07 Certificates

Contractor Safety Self-Evaluation Checklist

Crane Operators/Riggers

Confined Space Entry Permit

Hot Work Permit

Certificate of Compliance

Machinery & Mechanized Equipment Certification Form

1.4 CONTRACTOR SAFETY SELF-EVALUATION CHECKLIST

Construction Administrator will provide a "Contractor Safety Self-Evaluation checklist" to the Contractor at the pre-construction conference. Complete the checklist monthly and submit with each request for payment voucher. An acceptable score of 90 or greater is required. Failure to submit the completed safety self-evaluation checklist or achieve a score of at least 90 may result in retention of up to 10 percent of the voucher.

1.5 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.5.1 Personnel Qualifications

1.5.1.1 Site Safety and Health Officer (SSHO)

Provide an SSHO that meets the requirements of EM 385-1-1 Section 1. The SSHO must ensure that the requirements of 29 CFR 1926.16 are met for the Project. Provide a Safety oversight team that includes a minimum of one (1) person at each Project Site to function as the Site Safety and Health Officer (SSHO). The SSHO or an equally-qualified Alternate SSHO must be at the work site at all times to implement and administer the Contractor's safety program and government-accepted Accident Prevention Plan. The SSHO and Alternate SSHO must have the required training, experience, and qualifications in accordance with EM 385-1-1 Section 01.A.17, and all associated sub-paragraphs.

If the SSHO is off-site for a period longer than 24 hours, an equally-qualified alternate SSHO must be provided and must fulfill the same roles and responsibilities as the primary SSHO. When the SSHO is temporarily (up to 24 hours) off-site, a Designated Representative (DR), as identified in the AHA may be used in lieu of an Alternate SSHO, and must be on the Project Site at all times when work is being performed. Note that the DR is a collateral duty safety position, with safety duties in addition to their full time occupation.

1.5.1.1.1 Additional Site Safety and Health Officer (SSHO) Requirements and Duties

The SSHO must have completed a 40 hour Contract safety awareness course based on the content and principles of EM 385-1-1, and instructed in accordance with the guidelines of ASSE/SAFE Z490.1, by a trainer meeting the qualifications of Paragraph "Qualified Trainer Requirements". If the SSHO does not have a current certification, certification must be obtained

within 60 days, maximum, of Contract Award.

1.5.1.2 Contractor Quality Control (QC) Manager:

The Contractor Quality Control Manager [cannot be the SSHO on this Project, even though the QC has safety inspection responsibilities as part of the QC duties.][can be the SSHO on this Project.]

1.5.1.3 Competent Person Qualifications

Provide Competent Persons in accordance with EM 385-1-1, Appendix Q and herein. Competent Persons for high risk activities include confined space, cranes and rigging, excavation/trenching, fall protection, and electrical work. The CP for these activities must be designated in writing, and meet the requirements for the specific activity (i.e., competent person, fall protection).

The Competent Person identified in the Contractor's Safety and Health Program and accepted Accident Prevention Plan, must be on-site at all times when the work that presents the hazards associated with their professional expertise is being performed. Provide the credentials of the Competent Persons(s) to the the Construction Administrator for information in consultation with the Safety Office.

1.5.1.3.1 Competent Person for Confined Space Entry

Provide a Confined Space (CP) Competent Person who meets the requirements of EM 385-1-1, Appendix Q, and herein. The CP for Confined Space Entry must supervise the entry into each confined space.

Since this work involves marine operations that handle combustible or hazardous materials, this person must have the ability to understand and follow through on the air sampling, Personal Protective Equipment (PPE), and instructions of a Marine Chemist, Coast Guard authorized persons, or Certified Industrial Hygienist. Confined space and enclosed space work must comply with NFPA 306, OSHA 29 CFR 1915, Subpart B, "Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment," or as applicable, 29 CFR 1910.147 for general industry.

1.5.1.3.2 Competent Person for Scaffolding

Provide a Competent Person for Scaffolding who meets the requirements of EM 385-1-1, Section 22.B.02 and herein.

1.5.1.3.3 Competent Person for Fall Protection

Provide a Competent Person for Fall Protection who meets the requirements of EM 385-1-1, Section 21.C.04 and herein.

1.5.1.4 Qualified Trainer Requirements

Individuals qualified to instruct the 40 hour Contract safety awareness course, or portions thereof, must meet the definition of a Competent Person Trainer, and, at a minimum, possess a working knowledge of the following subject areas: EM 385-1-1, Electrical Standards, Lockout/Tagout, Fall Protection, Confined Space Entry for Construction; Excavation, Trenching and Soil Mechanics, and Scaffolds in accordance with 29 CFR 1926.450, Subpart L.

Completed the following courses:

- a. OSHA 510, Occupational Safety and Health Standards for Construction.
- b. OSHA 500, Trainer Course in OSHA Standards for Construction.
- c. OSHA 3095, Electrical Standards.
- d. OSHA 7115, Lockout/Tagout.
- e. OSHA 3110 1 Fall Arrest Systems.
- f. OSHA 2264, Permit-Required Confined Space Entry.
- g. OSHA 3010, Excavation, Trenching and Soil Mechanics.
- h. Scaffolds in accordance with 29 CFR 1926.450, Subpart L.
- i. NAVFAC 40-hour Construction Safety Hazard Awareness Training.

Instructors are required to:

- a. Prepare class presentations that cover construction-related safety requirements.
- b. Ensure that all attendees attend all sessions by using a class roster signed daily by each attendee. Maintain copies of the roster for at least five (5) years. This is a certification class and must be attended 100 percent. In cases of emergency where an attendee cannot make it to a session, the attendee can make it up in another class session for the same subject.
- c. Update training course materials whenever an update of the EM 385-1-1 becomes available.
- d. Provide a written exam of at least 50 questions. Students are required to answer 80 percent correctly to pass.
- e. Request, review and incorporate student feedback into a continuous course improvement program.

1.5.2 Personnel Duties

1.5.2.1 Duties of the Site Safety and Health Officer (SSHO)

The SSHO must:

- a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production report.
- b. Conduct mishap investigations and complete required accident reports. Report mishaps and near misses.
- c. Use OSHA's Form 300 to log work-related injuries and illnesses occurring on the Project Site for Prime Contractors and Subcontractors. Post and maintain the Form 300 on the site Safety Bulletin Board.

- d. Maintain applicable safety reference material on the job site.
- e. Attend the pre-construction conference, pre-work meetings including preparatory meetings, and periodic in-progress meetings.
- f. Review the APP and AHAs for compliance with EM 385-1-1, and approve, sign, implement and enforce them.
- g. Establish a Safety and Occupational Health (SOH) Deficiency Tracking System that lists and monitors outstanding deficiencies until resolution.
- h. Ensure Subcontractor compliance with safety and health requirements.
- i. Maintain a list of hazardous chemicals on site and their material Safety Data Sheets (SDS).
- j. Maintain a weekly list of high hazard activities involving energy, equipment, excavation, entry into confined space, and elevation, and be prepared to discuss details during QC Meetings.
- k. Provide and keep a record of site safety orientation and indoctrination for Contractor employees, Subcontractor employees, and site visitors.

Superintendent, QC Manager, and SSHO are subject to dismissal if the above duties are not being effectively carried out. If Superintendent, QC Manager, or SSHO are dismissed, Project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

1.5.3 Meetings

1.5.3.1 Preconstruction Conference

- a. Contractor representatives who have a responsibility or significant role in accident prevention on the Project must attend the preconstruction conference. This includes the Project Superintendent, Site Safety and Occupational Health officer, quality control 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. 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 Construction Administrator as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, and Government review of AHAs to preclude Project delays.
- c. Deficiencies in the submitted APP, identified during the Construction Administrator's review, must be corrected, and the APP re-submitted for review prior to the start of construction. Work is not permitted to begin work until an APP is established that is acceptable to the Construction Administrator.

- d. The functions of a Preconstruction conference may take place at the Post-Award Kickoff meeting for Design Build Contracts.

1.5.3.2 Safety Meetings

Conduct safety meetings to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent Safety and Occupational Health (SOH) training and motivation. Conduct meetings at least once a month for all supervisors on the Project location. The SSHO, supervisors, foremen, or CDSOs must conduct meetings at least once a week for the trade workers. Document meeting minutes to include the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Maintain documentation on-site and furnish copies to the Construction Administrator on request. Notify the Construction Administrator of all scheduled meetings 7 calendar days in advance.

1.6 ACCIDENT PREVENTION PLAN (APP)

A qualified person must prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, Appendix A, and as supplemented herein. Cover all paragraph and subparagraph elements in EM 385-1-1, Appendix A and show compliance with NASA NPR 8715.3. The APP must be job-specific and address any unusual or unique aspects of the Project or activity for which it is written. The APP must interface with the Contractor's overall safety and health program referenced in the APP in the applicable APP element, and made site-specific. Describe the methods to evaluate past safety performance of potential Subcontractors in the selection process. Also, describe innovative methods used to ensure and monitor safe work practices of Subcontractors. 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 must be signed by an officer of the firm (Prime Contractor senior person), the individual preparing the APP, the on-site superintendent, the designated SSHO, the Contractor Quality Control Manager, and any designated Certified Safety Professional (CSP) or Certified Health Physicist (CIH). The SSHO must provide and maintain the APP and a log of signatures by each Subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Construction Administrator. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Submit the APP to the Construction Administrator 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. Once reviewed and accepted by the Construction Administrator, the APP and attachments will be enforced as part of the Contract. Disregarding the provisions of this Contract or the accepted APP is cause for stopping of work, at the discretion of the Construction Administrator, until the matter has been rectified. Continuously review and amend the APP, as necessary, throughout the life of the Contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Construction Administrator, Project

Superintendent, SSHO and Quality Control Manager. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. Should any severe hazard exposure (i.e., imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Construction Administrator within 24 hours of discovery. Eliminate and remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34), and the environment.

1.6.1 Names and Qualifications

Provide plans in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

- a. Names and qualifications (resumes including education, training, experience and certifications) of site safety and health personnel designated to perform work on this Project to include the designated Site Safety and Health Officer and other competent and qualified personnel to be used. Specify the duties of each position.
- b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: Excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection, use and maintenance.

1.6.2 Plans

Provide plans in the APP in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

1.6.2.1 Confined Space Entry Plan

Develop a confined or enclosed space entry plan in accordance with EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, OSHA Directive CPL 2.100, and any other Federal, State and local regulatory requirements identified in this Contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by Contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

1.6.2.2 Fall Protection and Prevention (FP&P) Plan

The plan must comply with the requirements of EM 385-1-1, Section 21.D and ASSE/SAFE Z359.2, be site specific, and address all fall hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet. A competent person or qualified person for fall protection must prepare and sign the plan documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, roles and responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Review and revise, as necessary, the Fall Protection

and Prevention Plan documentation as conditions change, but at a minimum every six months, for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Plan documentation at the job site for the duration of the Project. Include the Fall Protection and Prevention Plan documentation in the Accident Prevention Plan (APP).

1.6.2.3 Rescue and Evacuation Plan

Provide a Rescue and Evacuation Plan in accordance with EM 385-1-1 Section 21.N and ASSE/SAFE Z359.2, and include in the FP&P Plan and as part of the APP. 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.

1.6.2.4 Excavation Plan

Identify the safety and health aspects of excavation, and provide and prepare the plan in accordance with EM 385-1-1, Section 25.A and Section 31 00 00 EARTHWORK.

1.6.2.5 Site Demolition Plan

Identify the safety and health aspects, and prepare in accordance with Section 02 41 00 DEMOLITION AND DECONSTRUCTION. Include engineering survey as applicable.

1.7 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW) involving a type of work presenting hazards not experienced in previous Project operations, or where a new work crew or Subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, Subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Construction Administrator. AHAs must be signed by the SSHO, Superintendent, QC Manager and the Subcontractor Foreman performing the work. Format the AHA in accordance with EM 385-1-1, Section 1 or as directed by the Construction Administrator. Submit the AHA for review at least 15 working days prior to the start of each activity task, or DFOW. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

AHAs must identify competent persons required for phases involving high risk activities, including confined entry, crane and rigging, excavations, trenching, electrical work, fall protection, and scaffolding.

1.8 DISPLAY OF SAFETY INFORMATION

1.8.1 Safety Bulletin Board

Within one calendar day after commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of Project do not facilitate a bulletin board, an alternative method,

acceptable to the Construction Administrator, that is accessible and includes all mandatory information for employee and visitor review, may be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by EM 385-1-1, Section 01.A.06. Additional items required to be posted include:

- a. Confined space entry permit.
- b. Hot work permit.

1.9 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the Project, including those listed in Paragraph "References". Maintain applicable equipment manufacturer's manuals.

1.10 EMERGENCY MEDICAL TREATMENT

Contractors must arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

1.11 NOTIFICATIONS and REPORTS

1.11.1 Accident Notification

Notify the Construction Administrator as soon as practical, but no more than twenty-four hours, after any mishaps, including recordable accidents, incidents, and near misses, as defined in EM 385-1-1 Appendix Q, any report of injury, illness, load handling equipment (LHE) or rigging mishaps, or any property damage in accordance with NASA NPR 8621.1. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. Immediate reporting is required for electrical mishaps, to include Arc Flash; shock; uncontrolled release of hazardous energy (includes electrical and non-electrical); load handling equipment or rigging; fall from height (any level other than same surface); and underwater diving. These mishaps must be investigated in depth to identify all causes and to recommend hazard control measures.

Within notification 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 (for example, type of construction equipment used and PPE used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's investigation(s) of any mishap.

1.11.2 Accident Reports

- a. Conduct an accident investigation for recordable injuries and illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. Complete the applicable NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS). USACE Accident Report Form 3394, and provide the report to the Construction Administrator within 5 calendar day(s) of the accident. The Construction Administrator will provide

copies of any required or special forms.

1.12 HOT WORK

1.12.1 Permit and Personnel Requirements

Submit and obtain a written permit prior to performing "Hot Work" (i.e., welding or cutting) or operating other flame-producing/spark producing devices, from the Safety Officer. A permit is required from the Explosives Safety Office for work in and around where explosives are processed, stored, or handled. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. Provide at least two 20 pound 4A:20 BC rated extinguishers for normal "Hot Work". The extinguishers must be current inspection tagged, and contain an 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 must be trained in accordance with NFPA 51B and remain on-site for a minimum of one hour after completion of the task or as specified on the hot work permit.

1.12.2 Work Around Flammable Materials

Obtain services from a NFPA Certified Marine Chemist for "HOT WORK" within or around flammable materials (such as fuel systems or welding/cutting on fuel pipes) or confined spaces (such as sewer wet wells, manholes, or vaults) that have the potential for flammable or explosive atmospheres.

Whenever these materials, except beryllium and chromium (VI), are encountered in indoor operations, local mechanical exhaust ventilation systems that are sufficient to reduce and maintain personal exposures to within acceptable limits must be used and maintained in accordance with manufacturer's instruction and supplemented by exceptions noted in EM 385-1-1, Section 06.H.

1.13 CONFINED SPACE ENTRY REQUIREMENTS.

Confined space entry must comply with Section 34 of EM 385-1-1, OSHA 29 CFR 1926, OSHA 29 CFR 1910, OSHA 29 CFR 1910.146, and OSHA Directive CPL 2.100. Any potential for a hazard in the confined space requires a permit system to be used.

1.13.1 Entry Procedures

Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. Comply with EM 385-1-1, Section 34 for entry procedures. Hazards pertaining to the space must be reviewed with each employee during review of the AHA.

1.13.2 Forced Air Ventilation

Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its action level.

1.13.3 Sewer Wet Wells

Sewer wet wells require continuous atmosphere monitoring with audible

alarm for toxic gas detection.

1.13.4 Rescue Procedures and Coordination with Local Emergency Responders

Develop and implement an on-site rescue and recovery plan and procedures. The rescue plan must not rely on local emergency responders for rescue from a confined space.

1.14 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

- a. Secure outside equipment and materials and place materials that could be damaged in protected areas.
- b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.
- c. Ensure that temporary erosion controls are adequate.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 CONSTRUCTION AND OTHER WORK

Comply with EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be worn or carried/available on each person. Mandatory PPE includes:

- a. Hard Hat;
- b. Long Pants;
- c. Appropriate Safety Shoes;
- d. Appropriate Class Reflective Vests.

3.1.1 Worksite Communication

Employees working alone in a remote location or away from other workers must be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means). The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. An employee check-in/check-out communication procedure must be developed to ensure employee safety.

3.2 PRE-OUTAGE COORDINATION MEETING

Apply for utility outages at least 15 days in advance. As a minimum, the request must 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, attend a pre-outage coordination meeting with the Construction Administrator 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 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Provide and operate a Hazardous Energy Control Program (HECP) in accordance with EM 385-1-1 Section 12, 29 CFR 1910.333, 29 CFR 1915.89, and Paragraph "Hazardous Energy Control Program (HECP)".

3.4 FALL PROTECTION PROGRAM

Establish a fall protection program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify roles and 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 in accordance with ASSE/SAFE Z359.2 and EM 385-1-1, Sections 21.A and 21.D.

3.4.1 Training

Institute a fall protection training program. As part of the Fall Protection Program, provide training for each employee who might be exposed to fall hazards. Provide training by a competent person for fall protection in accordance with EM 385-1-1, Section 21.C. Document training and practical application of the competent person in accordance with EM 385-1-1, Section 21.C.04 and ASSE/SAFE Z359.2 in the AHA.

3.4.2 Fall Protection Equipment and Systems

Enforce use of personal fall protection equipment and systems designated (to include fall arrest, restraint, and positioning) for each specific work activity in the Site Specific Fall Protection and Prevention Plan and AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1, Section 21.

Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 Section 21.I, 29 CFR 1926.500 Subpart M, ASSE/SAFE Z359.0, ASSE/SAFE Z359.1, ASSE/SAFE Z359.2, ASSE/SAFE Z359.3, ASSE/SAFE Z359.4, ASSE/SAFE Z359.6, ASSE/SAFE Z359.7, ASSE/SAFE Z359.11, ASSE/SAFE Z359.12, ASSE/SAFE Z359.13, ASSE/SAFE Z359.14, and ASSE/SAFE Z359.15.

3.4.2.1 Additional Personal Fall Protection

In addition to the required fall protection systems, other protection such as safety skiffs, personal floatation devices, and life rings, are required when working above or next to water in accordance with EM 385-1-1, Sections 21.0 through 21.0.06. Personal fall protection systems and

equipment are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall protection systems are required when operating other equipment such as scissor lifts. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, travel, or while performing work.

3.4.2.2 Personal Fall Protection Harnesses

Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. The use of body belts is not acceptable. Harnesses must 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. Snap hooks and carabiners must be self-closing and self-locking, capable of being opened only by at least two consecutive deliberate actions and have a minimum gate strength of 3,600 lbs in all directions. Use webbing, straps, and ropes made of synthetic fiber. The maximum free fall distance when using fall arrest equipment must not exceed 6 feet, unless the proper energy absorbing lanyard is used. Always take into consideration the total fall distance and any swinging of the worker (pendulum-like motion), that can occur during a fall, when attaching a person to a fall arrest system. All full body harnesses must be equipped with Suspension Trauma Preventers such as stirrups, relief steps, or similar in order to provide short-term relief from the effects of orthostatic intolerance in accordance with EM 385-1-1, Section 21.I.06.

3.4.3 Fall Protection for Roofing Work

Implement fall protection controls based on the type of roof being constructed and work being performed. Evaluate the roof area to be accessed 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 a roof having a slope less than or equal to 4:12 (vertical to horizontal), protect personnel from falling by use of personal fall arrest/restraint systems, guardrails, or safety nets. A safety monitoring system is not adequate fall protection and is not authorized. Provide in accordance with 29 CFR 1926.500.
2. For work greater than 6 feet from an edge, erect and install warning lines in accordance with 29 CFR 1926.500 and EM 385-1-1, Section L.

- ##### b. Steep-Sloped Roofs:
- Work on a roof having a slope greater than 4:1 (vertical to horizontal) requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also applies to residential or housing type construction.

3.4.4 Horizontal Lifelines (HLL)

Provide HLL in accordance with EM 385-1-1, Section 21.I.08.d.2. Commercially manufactured horizontal lifelines (HLL) must 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). The competent person

for fall protection may (if deemed appropriate by the qualified person) supervise the assembly, disassembly, use and inspection of the HLL system under the direction of the qualified person. Locally manufactured HLLs are not acceptable unless they are custom designed for limited or site specific applications by a Registered Professional Engineer who is qualified in designing HLL systems.

3.4.5 Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with EM 385-1-1, Section 21.F.01 and 29 CFR 1926 Subpart M.

3.4.6 Rescue and Evacuation Plan and Procedures

When personal fall arrest systems are used, ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue or assisted-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within 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). The plan must comply with the requirements of EM 385-1-1, ASSE/SAFE Z359.2, and ASSE/SAFE Z359.4.

3.5 WORK PLATFORMS

3.5.1 Scaffolding

Provide employees 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. Comply with the following requirements:

- a. Scaffold platforms greater than 20 feet in height must be accessed by use of a scaffold stair system.
- b. Ladders commonly provided by scaffold system manufacturers are prohibited for accessing scaffold platforms greater than 20 feet maximum in height.
- c. An adequate gate is required.
- d. Employees performing scaffold erection and dismantling must be qualified.
- e. Scaffold must be capable 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.
- f. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward.
- g. Special care must be given to ensure scaffold systems are not overloaded.
- h. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited. The first tie-in must be at the height equal to 4 times the width of the

smallest dimension of the scaffold base.

- i. Scaffolding other than suspended types must bear on base plates upon wood mudsills (2 in by 10 in by 8 in minimum) or other adequate firm foundation.
- j. Scaffold or work platform erectors must have fall protection during the erection and dismantling of scaffolding or work platforms that are more than 6 feet.
- k. Delineate fall protection requirements when working above 6 feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.5.2 Elevated Aerial Work Platforms (AWPs)

Workers must be anchored to the basket or bucket in accordance with manufacturer's specifications and instructions (anchoring to the boom may only be used when allowed by the manufacturer and permitted by the CP). Lanyards used must be sufficiently short to prohibit worker from climbing out of basket. The climbing of rails is prohibited. Lanyards with built-in shock absorbers are acceptable. Self-retracting devices are not acceptable. Tying off to an adjacent pole or structure is not permitted unless a safe device for 100 percent tie-off is used for the transfer.

Use of AWPs must be operated, inspected, and maintained as specified in the operating manual for the equipment and delineated in the AHA. Operators of AWPs must be designated as qualified operators by the Prime Contractor. Maintain proof of qualifications on site for review and include in the AHA.

3.6 EQUIPMENT

3.6.1 Material Handling Equipment (MHE)

- a. Material handling equipment such as forklifts must not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. Material handling equipment fitted with personnel work platform attachments are prohibited from traveling or positioning while personnel are working on the platform.
- b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions. Material Handling Equipment Operators must be trained in accordance with OSHA 29 CFR 1910, Subpart N.
- c. Operators of forklifts or power industrial trucks must be licensed in accordance with OSHA.

3.6.2 Load Handling Equipment (LHE)

- a. Equip cranes and derricks as specified in EM 385-1-1, Section 16.
- b. Notify the Construction Administrator 15 working days in advance of any LHE entering the activity, in accordance with EM 385-1-1, Section 16.A.02, so that necessary quality assurance spot checks can be coordinated. Prior to cranes entering federal activities, a Crane Access Permit must be obtained from the Construction Administrator. A copy of the permitting process will be provided at the Preconstruction

Conference. Contractor's operator must remain with the crane during the spot check. Rigging gear must comply with OSHA, ASME B30.9 Standards and host country safety standards.

- c. Comply with the LHE manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.
- d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, ASME B30.8 for floating cranes and floating derricks, ASME B30.9 for slings, ASME B30.20 for below the hook lifting devices and ASME B30.26 for rigging hardware.
- e. Under no circumstance must a Contractor make a lift at or above 90 percent of the cranes rated capacity in any configuration.
- f. When operating in the vicinity of overhead transmission lines, operators and riggers must be alert to this special hazard and follow the requirements of EM 385-1-1 Section 11, and ASME B30.5 or ASME B30.22 as applicable.
- g. Do not use crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane. Additionally, submit a specific AHA for this work to the Construction Administrator. Ensure the activity and AHA are thoroughly reviewed by all involved personnel.
- h. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.
- i. All employees must keep clear of loads about to be lifted and of suspended loads.
- j. 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.
- l. A physical barricade must be positioned to prevent personnel access where accessible areas of the LHE's rotating superstructure poses a risk of striking, pinching or crushing personnel.
- m. Maintain inspection records in accordance by EM 385-1-1, Section 16.D, including shift, monthly, and annual inspections, the signature of the person performing the inspection, and the serial number or other identifier of the LHE that was inspected. Records must be available for review by the Construction Administrator.
- n. Maintain written reports of operational and load testing in accordance with EM 385-1-1, Section 16.F, listing the load test procedures used along with any repairs or alterations performed on the LHE. Reports must be available for review by the Construction Administrator.
- o. Certify that all LHE operators have been trained in proper use of all

safety devices (e.g., anti-two block devices).

- p. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. At wind speeds greater than 20 mph, the operator, rigger and lift supervisor must cease all crane operations, evaluate conditions and determine if the lift may proceed. Base the determination to proceed or not on wind calculations per the manufacturer and a reduction in LHE rated capacity if applicable. Include this maximum wind speed determination as part of the activity hazard analysis plan for that operation.

3.6.3 Machinery and Mechanized Equipment

- a. Proof of qualifications for operator must be kept on the Project Site for review.
- b. Manufacture specifications or owner's manual for the equipment must be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

3.6.4 USE OF EXPLOSIVES

Explosives must not be used or brought to the Project Site without prior written approval from the Construction Administrator. Such approval does not relieve the Contractor of responsibility for injury to persons or for damage to property due to blasting operations.

Storage of explosives, when permitted on Government property, must be only where directed and in approved storage facilities. These facilities must be kept locked at all times except for inspection, delivery, and withdrawal of explosives. Perform explosive work in accordance with NASA-STD 8719.12. This document is available at:

<http://www.hq.nasa.gov/office/codeq/doctree/871912.htm>

3.7 EXCAVATIONS

Soil classification must be performed by a competent person in accordance with 29 CFR 1926 and EM 385-1-1.

3.7.1 Utility Locations

Provide a third party, independent, private utility locating company to positively identify underground utilities in the work area in addition to any station locating service and coordinated with the station utility department.

3.7.2 Utility Location Verification

Physically verify underground utility locations, including utility depth, by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within 3 feet of the underground system.

3.7.3 Utilities Within and Under Concrete, Bituminous Asphalt, and Other Impervious Surfaces

Utilities located within and under concrete slabs or pier structures, bridges, parking areas, and the like, are extremely difficult to identify. Whenever Contract work involves chipping, saw cutting, or core drilling through concrete, bituminous asphalt or other impervious surfaces, the existing utility location must be coordinated with station utility departments in addition to location and depth verification by a third party, independent, private locating company. The third party, independent, private locating company must locate utility depth by use of Ground Penetrating Radar (GPR), X-ray, bore scope, or ultrasound prior to the start of demolition and construction. Outages to isolate utility systems must 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.

3.8 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1, Appendix A, Sections 11 and 12.

3.8.1 Conduct of Electrical Work

As delineated in EM 385-1-1, electrical work is to be conducted in a de-energized state unless there is no alternative method for accomplishing the work. In those cases obtain an energized work permit from the Construction Administrator. The energized work permit application must be accompanied by the AHA and a summary of why the equipment/circuit needs to be worked energized. 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. Attach temporary grounds in accordance with ASTM F855 and IEEE 1048. 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 is 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 are permitted to enter. When work requires work near energized circuits as defined by NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves and 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. Ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.147.

3.8.2 Qualifications

Electrical work must be performed by QP personnel with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed, and must be identified in the appropriate AHA. Journeyman/Apprentice ratio must be in accordance with State, Local and Host Nation requirements applicable to where work is being performed.

3.8.3 Arc Flash

Conduct a hazard analysis/arc flash hazard analysis whenever work on or near energized parts greater than 50 volts is necessary, in accordance with NFPA 70E.

All personnel entering the identified arc flash protection boundary must be QPs and properly trained in NFPA 70E requirements and procedures. Unless permitted by NFPA 70E, no Unqualified Person is permitted to approach nearer than the Limited Approach Boundary of energized conductors and circuit parts. Training must be administered by an electrically qualified source and documented.

3.8.4 Grounding

Ground electrical circuits, equipment and enclosures in accordance with NFPA 70 and IEEE C2 to provide a permanent, continuous and effective path to ground unless otherwise noted by EM 385-1-1.

Check grounding circuits to ensure that the circuit between the ground and a grounded power conductor has a resistance low enough to permit sufficient current flow to allow the fuse or circuit breaker to interrupt the current.

3.8.5 Testing

Temporary electrical distribution systems and devices must be inspected, tested and found acceptable for Ground-Fault Circuit Interrupter (GFCI) protection, polarity, ground continuity, and ground resistance before initial use, before use after modification and at least monthly. Monthly inspections and tests must be maintained for each temporary electrical distribution system, and signed by the electrical CP or QP.

-- End of Section --

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS

11/14

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.

AACE INTERNATIONAL (AACE)
1265 Suncrest Towne Centre Drive
Morgantown, WV 26505-1876 USA
Ph: 304-296-8444
Fax: 304-291-5728
E-mail: info@aacei.org
Internet: <http://www.aacei.org>

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)
2111 Wilson Blvd, Suite 500
Arlington, VA 22201
Ph: 703-524-8800
Fax: 703-562-1942
Internet: <http://www.ahrinet.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@ashto.org
Internet: <http://www.aashto.org>

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)
38800 Country Club Drive
Farmington Hills, MI 48331-3439
Ph: 248-848-3700
Fax: 248-848-3701
E-mail: bkstore@concrete.org
Internet: <http://www.concrete.org>

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)
1800 East Oakton Street
Des Plaines, IL 60018
Ph: 847-699-2929
Internet: <http://www.asse.org>

AMERICAN WATER WORKS ASSOCIATION (AWWA)
6666 West Quincy Avenue
Denver, CO 80235-3098
Ph: 303-794-7711
E-mail: distribution@awwa.org
Internet: <http://www.awwa.org>

ASME INTERNATIONAL (ASME)
Two Park Avenue, M/S 10E
New York, NY 10016-5990
Ph: 800-843-2763
Fax: 973-882-1717
E-mail: customercare@asme.org
Internet: <http://www.asme.org>

ASPHALT INSTITUTE (AI)
2696 Research Park Drive
Lexington, KY 40511-8480
Ph: 859-288-4960
Fax: 859-288-4999
E-mail: info@asphaltinstitute.org
Internet: <http://www.asphaltinstitute.org>

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
Ph: 877-909-2786
Internet: <http://www.astm.org>

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
445 and 501 Hoes Lane
Piscataway, NJ 08854-4141
Ph: 732-981-0060 or 800-701-4333
Fax: 732-562-9667
E-mail: onlinesupport@ieee.org
Internet: <http://www.ieee.org>

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Ph: 617-770-3000
Fax: 617-770-0700
Internet: <http://www.nfpa.org>

NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)
Manager, Customer Service
900 Spring Street
Silver Spring, MD 20910
Ph: 240-485-1165
E-mail: jjenkins@nrmca.org (Jacques Jenkins)
Internet: <http://www.nrmca.org>

U.S. AIR FORCE (USAF)
Air Force Publishing Distribution Center
Ph: 202-404-2438 Internet: <http://www.e-publishing.af.mil/>

U.S. ARMY CORPS OF ENGINEERS (USACE)
CRD-C DOCUMENTS available on Internet:
http://www.wbdg.org/ccb/browse_cat.php?c=68
Order Other Documents from:
USACE Publications Depot
Attn: CEHEC-IM-PD
2803 52nd Avenue
Hyattsville, MD 20781-1102
Ph: 301-394-0081
Fax: 301-394-0084
E-mail: pubs-army@usace.army.mil
Internet: <http://www.publications.usace.army.mil/>
or
<http://www.hnc.usace.army.mil/Missions/Engineering/TECHINFO.aspx>

U.S. DEPARTMENT OF AGRICULTURE (USDA)
Order AMS Publications from:
AGRICULTURAL MARKETING SERVICE (AMS)
Seed Regulatory and Testing Branch
801 Summit Crossing Place, Suite C
Gastonia, NC 28054-2193
Ph: 704-810-8871
Fax: 704-852-4189
E-mail: seed.ams@usda.gov
Internet: <http://www.ams.usda.gov/lsg/seed.htm>
Order Other Publications from:
U.S. Department of Agriculture, Rural Utilities Program
USDA Rural Development, Room 4051-S
Mail Stop 1510
1400 Independence Avenue SW
Washington, DC 20250-1510
Phone: (202) 720-9540
TTY: (800) 877-8339 (Federal Relay Service)
Fax: (202) 720-1725
Internet: http://www.rurdev.usda.gov/utilities_lp.html

U.S. DEPARTMENT OF DEFENSE (DOD)
Order DOD Documents from:
Room 3A750-The Pentagon
1400 Defense Pentagon
Washington, DC 20301-1400
Ph: 703-571-3343
FAX: 215-697-1462
E-mail: customerservice@ntis.gov
Internet: <http://www.ntis.gov>
Obtain Military Specifications, Standards and Related Publications
from:
Acquisition Streamlining and Standardization Information System
(ASSIST)
Department of Defense Single Stock Point (DODSSP)
Document Automation and Production Service (DAPS)
Building 4/D
700 Robbins Avenue
Philadelphia, PA 19111-5094
Ph: 215-697-6396 - for account/password issues

Internet: <http://assist.daps.dla.mil/online/start/>; account registration required
Obtain Unified Facilities Criteria (UFC) from:
Whole Building Design Guide (WBDG)
National Institute of Building Sciences (NIBS)
1090 Vermont Avenue NW, Suite 700
Washington, CD 20005
Ph: 202-289-7800
Fax: 202-289-1092
Internet: http://www.wbdg.org/references/docs_refs.php

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20004
Ph: 202-272-0167
Internet: <http://www2.epa.gov/libraries>
--- Some EPA documents are available only from:
National Technical Information Service (NTIS)
5301 Shawnee Road
Alexandria, VA 22312
Ph: 703-605-6050 or 1-688-584-8332
Fax: 703-605-6900
E-mail: info@ntis.gov
Internet: <http://www.ntis.gov>

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)
Order for sale documents from:
Superintendent of Documents
U.S. Government Printing Office (GPO)
710 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800
Fax: 202-512-2104
E-mail: contactcenter@gpo.gov
Internet: <http://www.gpoaccess.gov>
Order free documents from:
Federal Aviation Administration
Department of Transportation
800 Independence Avenue, SW
Washington, DC 20591
Ph: 1-866-835-5322
Internet: <http://www.faa.gov>

U. S. GREEN BUILDING COUNCIL (USGBC)
2101 L St NW, Suite 500
Washington, D.C. 20037
Ph: 800-795-1747
Internet: <http://www.usgbc.org>

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
8601 Adelphi Road
College Park, MD 20740-6001
Ph: 866-272-6272
Fax: 301-837-0483
Internet: <http://www.archives.gov>
Order documents from:
Superintendent of Documents
U.S. Government Printing Office (GPO)

20MIL21201 AASF Aircraft Apron Repair
Bradley ARNGB Windsor Locks, Connecticut

102422

710 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800
Fax: 202-512-2104
E-mail: contactcenter@gpo.gov
Internet: <http://www.gpoaccess.gov>

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

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SECTION 01 45 00.00 10

QUALITY CONTROL
02/10

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 D3740	(2012a) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E329	(2014a) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all associated costs will be included in the applicable Bid Schedule prices.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval or 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 Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor Quality Control (CQC) Plan; G

SD-05 Design Data

Discipline-Specific Checklists

SD-06 Test Reports

Verification Statement

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Establish and maintain an effective quality control (QC) system that complies with the Contract Clause titled "Inspection of Construction." QC consist of plans, procedures, and organization necessary to produce an end product which complies with the Contract Requirements. The QC system must cover all construction design and construction operations, both onsite and offsite, and be keyed to the proposed construction design and construction sequence. The Project Superintendent will be held responsible for the quality of work and is subject to removal by the Construction Administrator for non-compliance with the quality requirements specified in the Contract. In this context the highest level manager responsible for the overall construction activities at the site, including quality and production is the Project Superintendent. The Project Superintendent must maintain a physical presence at the site at all times and is responsible for all construction and related activities at the site, except as otherwise acceptable to the Construction Administrator.

3.2 QUALITY CONTROL PLAN

Submit no later than 0 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The Government will consider an interim plan for the first 60 days of operation. Construction Design and 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 accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional work.

3.2.1 Content of the CQC Plan

Include, as a minimum, the following to cover all design and construction construction operations, both onsite and offsite, including work by Subcontractors, fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect/engineers (AE), 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 will implement the three phase control system for all aspects of the work specified. Include a CQC System Manager who reports to the Project 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. Letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities will be issued by the CQC System Manager. Copies of these letters must be furnished to the Government.

- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of Subcontractors, offsite fabricators, suppliers, and purchasing agents, Subcontractors, designers of record, consultants, architect engineers (AE), offsite fabricators, suppliers, and purchasing agents. These procedures must be in accordance with 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 approved by the Construction Administrator must be used.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction design and construction deficiencies from identification through acceptable corrective action. Establish verification procedures 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.

3.2.2 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction design and construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction design and 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.

3.2.3 Notification of Changes

After acceptance of the CQC Plan, notify the Construction Administrator in writing of any proposed change. Proposed changes are subject to acceptance by the Construction Administrator.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, Post-award Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, meet with the Construction Administrator or Authorized Representative and discuss the Contractor's quality control system. Submit the CQC Plan a minimum of 20 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details must be developed, including the forms for recording the CQC operations operations, design activities, 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 will be prepared by the Government, signed by both the Contractor and the Construction Administrator and will 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 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a Safety and Health Manager, CQC System Manager CQC System Manager, a Design Quality Manager, and sufficient number of additional qualified personnel to ensure safety and Contract Compliance. The Safety and Health Manager must report directly to a senior Project (or corporate) official independent from the CQC System Manager. The Safety and Health Manager will also serve as a member of the CQC Staff 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 must 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 will be subject to acceptance by the Construction Administrator. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly complete and furnish all letters, Material Submittals, Shop Drawing Submittals, Schedules and all other Project documentation to the CQC organization. The CQC organization is responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Construction Administrator.

3.4.2 CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization who is responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager must be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 10 years construction experience on construction similar to this Contract. This CQC System Manager must be on the site at all times during construction and be employed by the Prime Contractor. The CQC System Manager must be assigned no other duties. Identify in the plan an alternate to serve in the event of the CQC System Manager's absence. The requirements for the alternate are the same as the CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the Contract, provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: Electrical, mechanical, civil, structural, architectural, and LEED Specialist. These individuals or specialized technical companies must be directly employed by the Prime Contractor and may not be employed by a supplier or Subcontractor on this Project and may be employees of the Prime or Subcontractor; be responsible to the CQC System Manager; be physically present at the construction site

during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan. A single person may cover more than one area provided that they are qualified to perform QC activities in each designated and that workload allows.

Experience Matrix	
Area	Qualifications
Civil	Graduate Civil Engineer or Construction Manager with 2 years experience in the type of work being performed on this project or technician with 5 yrs related experience
Submittals	Submittal Clerk with 1 year experience
Concrete, Pavements and Soils	Materials Technician with 2 years experience for the appropriate area

3.4.4 Additional Requirement

In addition to the above experience and education requirements, the CQC System Manager must have completed the Construction Quality Management (CQM) for Contractors course. If the CQC System Manager does not have a current certification, obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Command and the Army Corps of Engineers. Contact the Construction Administrator for information on the next scheduled class.

The Construction Quality Management Training certificate expires after 5 years. If the CQC System Manager's certificate has expired, retake the course to remain current.

3.4.5 Organizational Changes

Maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, revise the CQC Plan to reflect the changes and submit the changes to the Construction Administrator for acceptance.

3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, must comply with the requirements in Section 01 33 00 SUBMITTAL PROCEDURES. The CQC organization is responsible for certifying that all submittals and deliverables are in compliance with the Contract Requirements. When Section 23 08 00.00 10 COMMISSIONING OF HVAC SYSTEMS are included in the Contract, the submittals required by those Sections must be coordinated with Section 01 33 00 SUBMITTAL PROCEDURES to ensure adequate time is allowed for each type of submittal required.

3.6 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 must be conducted by the CQC System Manager for each definable feature of the construction work as follows:

3.6.1 Preparatory Phase

This phase is 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 includes:

- a. A review of each paragraph of applicable Specifications, reference codes, and standards. Make available during the preparatory inspection a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field. Maintain and make available in the field for use by Government personnel until final acceptance of the work.
- b. Review of the Contract Drawings.
- c. Check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the Contract.
- f. 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.
- g. Review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. Check to ensure that the portion of the plan for the work to be performed has been accepted by the Construction Administrator.
- j. Discussion of the initial control phase.
- k. The Government must be notified at least 24 hours in advance of beginning the preparatory control phase. 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. Document the results of the preparatory phase actions by separate minutes prepared by the CQC System Manager and attach to the daily CQC report. Instruct applicable workers as to the acceptable level of workmanship required in order to meet Contract Specifications.

3.6.2 Initial Phase

This phase is accomplished at the beginning of a definable feature of work. Accomplish the following:

- a. Check work to ensure that it is in full compliance with Contract Requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full Contract Compliance. Verify required control inspection and testing are in compliance with the Contract.
- 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 must be notified at least 48 hours in advance of beginning the initial phase for definable feature of work. Prepare separate minutes of this phase by the CQC System Manager and attach to the daily CQC report. Indicate the exact location of initial phase for definable feature of work for future reference and comparison with follow-up phases.
- g. The initial phase for definable feature of work should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Perform daily checks to assure control activities, including control testing, are providing continued compliance with Contract Requirements, until completion of the particular feature of work. Record the checks in the CQC documentation. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases 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.

3.7 TESTS

3.7.1 Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to Contract Requirements. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. Procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the Project Site. 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. Record results of all tests taken, both passing and failing on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Construction Administrator, actual test reports may be submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Construction Administrator. 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.

3.7.2 Testing Laboratories

The listing of validated testing laboratories is available at <http://gsl.erdc.usace.army.mil/SL/MTC/>.

3.7.2.1 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 must meet criteria detailed in ASTM D3740 and ASTM E329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$1,500.00 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.

3.7.3 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 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Conduct an inspection of the work by the CQC System Manager near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and

Completion of Work", or by the Specifications. Prepare and include in the CQC documentation a punch list of items which do not conform to the approved Drawings and Specifications, as required by Paragraph "Documentation". Include within the list of deficiencies the estimated date by which the deficiencies will be corrected. Make a second inspection the CQC System Manager or staff to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the work is complete and ready for use. A Government Pre-Final Punch List may be developed as a result of this inspection. 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. Correct any items noted on the Pre-Final inspection in a timely manner. These inspections and any deficiency corrections required by this paragraph must 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.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the Superintendent or other primary management person, and the Construction Administrator's Representative must 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 Construction Administrator based upon results of the Pre-Final inspection. Notify the Construction Administrator at least 14 days prior to the final acceptance inspection and 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 Construction Administrator to bill the Contractor for the Government's additional inspection cost in accordance with the Contract Clause titled "Inspection of Construction".

3.9 DOCUMENTATION

Maintain current records providing factual evidence that required quality control activities and/or tests have been performed. Include in these records the work of Subcontractors and suppliers 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. Identify the control phase (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. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identification of the Independent Technical Review (ITR) team, the ITR review comments, responses and the record of resolution of the comments.
- k. Contractor's Verification Statement.

Indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the Contract. Furnish the original and one copy of these records in report form to the Government daily, after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, prepare and submit one report for every 7 days of no work and on the last day of a no work period. All calendar days must be accounted for throughout the life of the Contract. The first report following a day of no work will be for that day only. Reports must be signed and dated by the CQC System Manager. Include copies of test reports and copies of reports prepared by all subordinate quality control personnel within the CQC System Manager Report.

3.10 NOTIFICATION OF NONCOMPLIANCE

The Construction Administrator will notify the Contractor of any detected noncompliance with the foregoing requirements. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, will be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Construction Administrator 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 will be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS
08/09

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.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241 (2013; Errata 2015) Standard for Safeguarding Construction, Alteration, and Demolition Operations

NFPA 70 (2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3-4 2014; AMD 4-6 2014) National Electrical Code

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1 (2007; Rev K) Obstruction Marking and Lighting

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD (2009) Manual on Uniform Traffic Control Devices

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval or 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 Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Site Plan; G

1.3 CONSTRUCTION SITE PLAN

Prior to the start of work, submit 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 HURRICANE CONDITION OF READINESS

Unless directed otherwise, comply with:

- a. Condition FOUR (Sustained winds of 50 knots or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping 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 4 feet high. Remove all debris, trash, or objects that could become missile hazards. Contact Construction Administrator for Condition of Readiness (COR) updates and completion of required actions.
- b. Condition THREE (Sustained winds of 50 knots 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. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness. Contact Construction Administrator for weather and COR updates and completion of required actions.
- c. Condition TWO (Sustained winds of 50 knots or greater expected within 24 hours): Curtail or cease routine activities until securing operation is complete. Reinforce or remove form work 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 Construction Administrator for weather and Condition of Readiness (COR) updates and completion of required actions.
- d. Condition ONE (Sustained winds of 50 knots or greater expected within 12 hours): Secure the jobsite, and leave Government premises.

PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

2.1.1 Bulletin Board

Immediately upon beginning of work, provide a weatherproof glass-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, and other information approved by the Construction Administrator.

2.2 TEMPORARY TRAFFIC CONTROL

2.2.1 Fencing

Provide fencing along the construction site at all open excavations and tunnels to control access by unauthorized people.

- a. The safety fencing must be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 48 inches high and maximum mesh size of 2 inches, supported and tightly secured to steel posts located on maximum 10 foot centers, constructed at the approved location. Install fencing to be able to restrain a force of at least 250 pounds against it.
- b. Enclose the Project work area and Contractor lay-down area with a 8 ft high chain link fence and gates. Remove the fence upon completion and acceptance of the work. Intent is to block (screen) public view of the construction.
- c. In addition, prior to the start of work, enclose those areas at the construction site which are not within the construction fence with a temporary safety fence, including gates and warning signs, to protect the public from construction activities. The safety fence shall match the base standard color (or bright orange where it protects excavated areas), shall be made of high density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on minimum 10 foot centers. Remove the fence from the work site upon completion of the Contract.

2.2.2 Temporary Wiring

Provide temporary wiring in accordance with NFPA 241 and NFPA 70. Include frequent inspection of all equipment and apparatus.

PART 3 EXECUTION

3.1 EMPLOYEE PARKING

Contractor employees will park privately owned vehicles in an area designated by the Construction Administrator. This area will be within reasonable walking distance of the construction site. Contractor employee parking must not interfere with existing and established parking requirements of the government installation.

3.2 TEMPORARY BULLETIN BOARD

Locate the bulletin board at the Project Site in a conspicuous place easily accessible to all employees, as approved by the Construction Administrator.

3.3 AVAILABILITY AND USE OF UTILITY SERVICES

3.3.1 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.

3.3.2 Payment for Utility Services

- a. The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the Contract. Unless otherwise provided in the Contract, the amount of each utility service consumed will be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined

by the Construction Administrator. Carefully conserve any utilities furnished without charge.

- b. Reasonable amounts of the following utilities will be made available to the Contractor.

Utility Services		
	Cost (\$) per	Unit
Electricity		
Potable Water		
Salt Water		
Compressed Air		
Steam		
Natural Gas		
Sanitary Sewer		

- c. The point at which the Government will deliver such utilities or services and the quantity available is as indicated. Pay all costs incurred in connecting, converting, and transferring the utilities to the work. Make connections, including providing backflow-preventing devices on connections to domestic water lines; and providing transformers; and make disconnections. Under no circumstances will taps to base fire hydrants be allowed for obtaining domestic water.

3.3.3 Meters and Temporary Connections

At the Contractors expense and in a manner satisfactory to the Construction Administrator, provide and maintain necessary temporary connections, distribution lines, and meter bases (Government will provide meters) required to measure the amount of each utility used for the purpose of determining charges. Notify the Construction Administrator, in writing, 5 working days before final electrical connection is desired so that a utilities contract can be established. The Government will provide a meter and make the final hot connection after inspection and approval of the Contractor's temporary wiring installation. The Contractor will not make the final electrical connection.

3.3.4 Advance Deposit

An advance deposit for utilities consisting of an estimated month's usage or a minimum of \$50.00 will be required. The last monthly bills for the fiscal year will normally be offset by the deposit and adjustments will be billed or returned as appropriate. Services to be rendered for the next fiscal year, beginning 1 October, will require a new deposit. Notification of the due date for this deposit will be mailed to the Contractor prior to the end of the current fiscal year.

3.3.5 Final Meter Reading

Before completion of the work and final acceptance of the work by the Government, notify the Construction Administrator, in writing, 5 working

days before termination is desired. The Government will take a final meter reading, disconnect service, and remove the meters. Then remove all the temporary distribution lines, meter bases, and associated paraphernalia. Pay all outstanding utility bills before final acceptance of the work by the Government.

3.3.6 Electricity

Provide connections, sized to provide service required for power and lighting. Locate feeder and branch wiring with area distribution boxes so that power is available throughout the Project Site by use of power cords. 120/240 electrical volt feeder service is available. Provide lighting as required for safe and secure operations. Electricity used will be furnished by the Government.

3.3.7 Water

Make connections to existing facilities to provide water for construction purposes. Water used will be furnished by the Government.

3.3.8 Sanitation

- a. Provide and maintain within the construction area minimum field-type sanitary facilities approved by the Construction Administrator and periodically empty wastes 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 any municipal, district, or commercial sanitary sewer system. Any penalties and / or fines associated with improper discharge will be the responsibility of the Contractor. Coordinate with the Construction Administrator and follow station regulations and procedures when discharging into the station sanitary sewer system. Maintain these conveniences at all times without nuisance. Include provisions for pest control and elimination of odors. Government toilet facilities will not be available to Contractor's personnel.
- b. Provide temporary sewer and sanitation facilities that are self-contained units with both urinals and stool capabilities. Ventilate the units to control odors and fumes and empty and clean them at least once a week or more often if required by the Construction Administrator. The doors shall be self-closing. The exterior of the unit shall match the base standard color. Locate the facility behind the construction fence or out of the public view.

3.3.9 Telephone

Make arrangements and pay all costs for telephone facilities desired.

3.3.10 Obstruction Lighting of Cranes

Provide a minimum of 2 aviation red or high intensity white obstruction lights on temporary structures (including cranes) over 100 feet above ground level. Light construction and installation must comply with FAA AC 70/7460-1. Lights must be operational during periods of reduced visibility, darkness, and as directed by the Construction Administrator.

3.3.11 Fire Protection

Provide temporary fire protection equipment for the protection of

personnel and property during construction. Remove debris and flammable materials weekly to minimize potential hazards.

3.4 TRAFFIC PROVISIONS

3.4.1 Maintenance of Traffic

- a. Conduct operations in a manner that will not close any thoroughfare or interfere in any way with traffic on railways or highways except with written permission of the Construction Administrator at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan 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 Construction Administrator prior to starting any activity that will obstruct traffic.
- c. Provide, erect, and maintain, at Contractors expense, lights, barriers, signals, passageways, detours, and other items, that may be required by the Life Safety Signage, overhead protection authority having jurisdiction.

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 Construction Administrator. 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.

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 any damage to roads caused by construction operations.

3.4.3 Dust Control

Dust control methods and procedures must be approved by the Construction Administrator. Treat dust abatement on access roads with applications of calcium chloride, water sprinklers, or similar methods or treatment.

3.5 CONTRACTOR'S TEMPORARY FACILITIES

Contractor-owned or -leased trailers must be identified by Government assigned numbers.

3.5.1 Safety

Protect the integrity of any installed safety systems or personnel safety devices. If entrance into systems serving safety devices is required, the Contractor must obtain prior approval from the Construction Administrator. 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 Construction Administrator.

3.5.2 Administrative Field Offices

Provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will be available to the Contractor's personnel.

3.5.3 Storage Area

Construct a temporary 6 foot high chain link fence around trailers and materials. Include plastic strip inserts, colored [green][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 Construction Administrator 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 any given 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.

3.5.4 Supplemental Storage Area

Upon Contractor's request, the Construction Administrator will designate another or supplemental area for the Contractor's 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. Fencing of materials or equipment will not be required at this site; however, the Contractor is responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. Utilities will not be provided to this area by the Government.

3.5.5 Appearance of Trailers

- a. Trailers utilized by the Contractor for administrative or material storage purposes must present a clean and neat exterior appearance and be in a state of good repair. Trailers which, in the opinion of the Construction Administrator, require exterior painting or maintenance will not be allowed on installation property.
- b. Paint using suitable paint and maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal.

3.5.6 Trailers or Storage Buildings

- a. Trailers or storage buildings will be permitted, where space is available, subject to the approval of the Construction Administrator. The trailers or buildings shall be in good condition, free from visible damage rust and deterioration, and meet all applicable safety requirements. Trailers shall be roadworthy and comply with all appropriate state and local vehicle requirements. Failure to maintain

storage trailers or buildings to these standards shall result in the removal of non-complying units at the Contractor's expense. A sign not smaller than 24 by 24 inches shall be conspicuously placed on the trailer depicting the company name, business phone number, and emergency phone number. Trailers shall be anchored to resist high winds and must meet applicable state or local standards for anchoring mobile trailers.

3.5.7 Maintenance of Storage Area

- a. Keep fencing in a state of good repair and proper alignment. Grassed or unpaved areas, which are not established roadways, will 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; gravel gradation will be at the Contractor's discretion. 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 will be edged or trimmed neatly.
- b. Cut grass (or annual weeds) within the construction and storage sites to a maximum 4 inch height at least once a week during the growing season unless the grass area is not visible to the public. Trim the grass around fences at time of grass cutting. Maintain grass or weeds on stockpiled earth as described above.

3.5.8 Security Provisions

Provide adequate outside security lighting at the Contractor's temporary facilities. The Contractor will be responsible for the security of its own equipment; in addition, the Contractor will notify the appropriate law enforcement agency requesting periodic security checks of the temporary Project field office.

3.5.9 Storage in Existing Buildings

The Contractor will be working in and around an existing building; the storage of material will be allowed where indicated. Provide 8 foot high security fence with a lockable gate around the storage area. Remove at the completion of work.

3.5.10 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.

3.5.10.1 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; 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.

3.6 GOVERNMENT FIELD OFFICE

3.6.1 Trailer-Type Mobile Office

The Contractor may, at its option, furnish and maintain a trailer-type mobile office acceptable to the Construction Administrator and providing as a minimum the facilities specified above. Securely anchor the trailer to the ground at all four corners to guard against movement during high winds.

3.7 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, will become the property of the Contractor and be removed from the work site.

3.8 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.

3.9 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 any 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.

3.10 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletin board, signs, barricades, haul roads, and any other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence that will become the property of the Contractor. Restore areas used by the Contractor for the storage of equipment or material, or other use 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.

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SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS

11/15

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)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
40 CFR 112	Oil Pollution Prevention
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
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 300.125	National Oil and Hazardous Substances Pollution Contingency Plan - Notification and Communications
40 CFR 355	Emergency Planning and Notification
40 CFR 372	Toxic Chemical Release Reporting: Community Right-to-Know
40 CFR 403	General Pretreatment Regulations for Existing and New Sources of Pollution
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 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 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.

1.2.2 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.

1.2.3 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.

1.2.4 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).

1.2.5 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.

1.2.6 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.

1.2.7 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.

1.2.8 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.

1.2.9 Regulated Waste

Regulated waste are solid wastes that have specific additional Federal, State, or local controls for handling, storage, or disposal.

1.2.10 Sediment

Sediment is soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.11 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:

1.2.11.1 Debris

Debris is non-hazardous solid material generated during the construction, demolition, or renovation of a structure that exceeds 2-1/2 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][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.

1.2.11.2 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.

1.2.11.3 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.

1.2.11.4 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.

1.2.11.5 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, wire rope, 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][may not] 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.

1.2.11.6 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".

1.2.11.7 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.

1.2.11.8 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.

1.2.12 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.

1.2.13 Wastewater

Wastewater is the used water and solids from a community that flow to a treatment plant.

1.2.13.1 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.

1.2.14 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. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey

Solid Waste Management Plan; G

Environmental Protection Plan; G

Stormwater Notice of Intent (for NPDES coverage under the general permit for construction activities); G

Dirt and Dust Control Plan; G

Employee Training Records; G

SD-06 Test Reports

Laboratory Analysis

Disposal Requirements

Solid Waste Management Report; G

Erosion and Sediment Control Inspection Reports

SD-07 Certificates

Employee Training Records; G

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

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 Construction Administrator. 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 QUALITY ASSURANCE

1.5.1 Preconstruction Survey and Protection of Features

This paragraph supplements the Contract Clause "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 Construction Administrator, 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 Construction Administrator 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.

1.5.2 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 Construction Administrator. Submit copies of regulatory notifications to the Construction Administrator 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).

1.5.3 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 Construction Administrator 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.

1.5.4 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 Construction Administrator.

1.5.5 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. Ensure every employee completes a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures compliance with Federal, State, and local regulatory requirements for RCRA Large Quantity Generator. Provide a Position Description for each employee, by Subcontractor, based on the Davis-Bacon Wage Rate designation or other equivalent method, evaluating the employee's association with hazardous and regulated wastes. This Position Description will include training requirements as defined in 40 CFR 265 for a Large Quantity Generator facility. Submit these Assembled Employee Training Records to the Construction Administrator 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.

1.5.6 Non-Compliance Notifications

The Construction Administrator 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 Construction Administrator of the proposed corrective action and take such action when approved by the Construction Administrator. The Construction Administrator 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 Construction Administrator may take under the Contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

1.6 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 Construction Administrator or Construction Administrator 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 30 days after notice to proceed. 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:

1.6.1 General Overview and Purpose

1.6.1.1 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.

1.6.1.2 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.

1.6.1.3 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.

1.6.1.4 Communications

Communication and training procedures that will be used to convey environmental management requirements to Contractor employees and Subcontractors.

1.6.1.5 Contact Information

Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

1.6.2 General Site Information

1.6.2.1 Drawings

Drawings showing locations of proposed, material storage areas, structures, sanitary facilities, storm drains and conveyances, and stockpiles of excess soil.

1.6.2.2 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.

1.6.2.3 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.

1.6.3 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).

1.6.4 Protection of the Environment from Waste Derived from Contractor Operations

Control and disposal of solid and sanitary waste. Control and disposal of hazardous waste.

This item consist of the management procedures for hazardous waste to be generated. The elements of those procedures will coincide with the Installation Hazardous Waste Management Plan. The Construction Administrator will provide a copy of the Installation Hazardous Waste Management Plan. 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.

1.6.5 Prevention of Releases to the Environment

Procedures to prevent releases to the environment.

Notifications in the event of a release to the environment.

1.6.6 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.

1.6.7 Clean Air Act Compliance

1.6.7.1 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.

1.6.7.2 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).

1.6.7.3 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 LICENSES AND PERMITS

Obtain licenses and permits required for the construction of the Project and in accordance with CT General Statutes. Notify the Government of all general use permitted equipment the Contractor plans to use on site.

1.8 SOLID WASTE MANAGEMENT PERMIT

Provide the Construction Administrator 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.

1.8.1 Solid Waste Management Report

Monthly, submit a solid waste disposal report to the Construction Administrator. 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.

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 Construction Administrator's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Construction Administrator. 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 Construction Administrator and Installation Environmental Office to determine appropriate action for trees and other landscape features scarred or damaged by equipment operations.

3.2 STORMWATER

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 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.

3.2.1.1 Erosion Control

Prevent erosion by mulching and Geotextiles. Stabilize slopes by seeding, or such combination of these methods necessary for effective erosion control.

Provide seeding in accordance with Section 32 92 19 SEEDING.

3.2.1.2 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, storm drain inlet protection, location and details of installation and construction are indicated on the Drawings.

3.2.2 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.

3.2.3 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 Construction Administrator. 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.

3.3 AIR RESOURCES

3.3.1 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 Construction Administrator. 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".

3.3.2 Burning

Burning is prohibited on the Government premises.

3.3.3 Accidental Venting of Refrigerant

Accidental venting of a refrigerant is a release and must be reported immediately to the Construction Administrator.

3.3.4 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.

3.3.5 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.

3.3.5.1 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. Perform work involving removal of hazardous material in accordance with 29 CFR 1910.

3.3.6 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.

3.4 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 Construction Administrator. Describe the anticipated types of the hazardous materials to be used in the construction when requesting information.

3.4.1 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.

3.4.2 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 Construction Administrator 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 as appropriate
C&D Debris Recycled	cubic yards as appropriate
Total C&D Debris Generated	cubic yards as appropriate
Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount)	cubic yards as appropriate

3.5 WASTE MANAGEMENT AND DISPOSAL

3.5.1 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.

3.5.2 Solid Waste Management

3.5.2.1 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 Construction Administrator unless required by other provisions or Specifications of this Contract or public law.

3.5.2.2 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. 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.

3.5.3 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 Construction Administrator.

3.5.3.1 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 Construction Administrator 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.

3.5.3.2 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 Construction Administrator and provide the following information (Attach Site Plan to the Request):

Contract Number	[_____]
Contractor	[_____]
Haz/Waste or Regulated Waste POC	[_____]
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 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"

3.5.3.3 Hazardous Waste Disposal

3.5.3.3.1 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.

3.5.3.3.1.1 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 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).

3.5.3.3.1.2 Labeling

Determine the Department of Transportation's (DOT's) proper shipping names for waste (each container requiring disposal) and demonstrate to the Construction Administrator 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.

3.5.3.4 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.

3.5.4 Releases/Spills of Oil and Hazardous Substances

3.5.4.1 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 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, and the Construction Administrator.

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 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.

3.5.4.2 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.

3.5.5 Mercury Materials

Immediately report to the Environmental Office and the Construction Administrator instances of breakage or mercury spillage. Clean mercury spill area to the satisfaction of the Construction Administrator.

Do not recycle a mercury spill cleanup; manage it as a hazardous waste for disposal.

3.5.6 Wastewater

3.5.6.1 Disposal of wastewater must be as specified below.

3.5.6.1.1 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.

3.6 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Safety Plan, in accordance with Section 01 35 26 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 Construction Administrator 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.

3.7 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.

3.8 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 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.

3.8.1 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".

3.8.2 Oil Storage Including Fuel Tanks

Provide secondary containment and overflow 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 Construction Administrator 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.

3.9 POST CONSTRUCTION CLEANUP

Clean up areas used for construction in accordance with Contract Clause "Cleaning Up". Unless otherwise instructed in writing by the Construction Administrator, 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.

-- End of Section --

SECTION 01 57 20.00 10
ENVIRONMENTAL PROTECTION
04/06

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. AIR FORCE (USAF)

AFI 32-1053 (2009) Integrated Pest Management Program

U.S. ARMY (DA)

DA AR 200-1 (2007) Environmental Protection and Enhancement

U.S. ARMY CORPS OF ENGINEERS (USACE)

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

WETLANDS DELINEATION MANUAL (1987) Corps of Engineers Wetlands Delineation Manual

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

33 CFR 328 Definitions of Waters of the United States
40 CFR 260 Hazardous Waste Management System: General
40 CFR 261 Identification and Listing of Hazardous Waste
40 CFR 262 Standards Applicable to Generators of Hazardous Waste
40 CFR 279 Standards for the Management of Used Oil
40 CFR 302 Designation, Reportable Quantities, and Notification
40 CFR 355 Emergency Planning and Notification
40 CFR 68 Chemical Accident Prevention Provisions
49 CFR 171 - 178 Hazardous Materials Regulations

1.2 DEFINITIONS

1.2.1 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 and/or historically.

1.2.2 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.

1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means 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 etc.), waste thinners, excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

1.2.4 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.

1.2.5 Project Pesticide Coordinator

The Project Pesticide Coordinator (PPC) is an individual that resides at a Civil Works Project office and that is responsible for oversight of pesticide application on Project grounds.

1.2.6 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor must discharge water at a rate which 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. Land Application must be in compliance with all applicable Federal, State, and local laws and regulations.

1.2.7 Pesticide

Pesticide is defined as 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.

1.2.8 Pests

The term "pests" means 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.

1.2.9 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

1.2.10 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.2.11 Wetlands

Those areas that are inundated or saturated by surface or ground water 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. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with WETLANDS DELINEATION MANUAL.

1.3 GENERAL REQUIREMENTS

Minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the Project boundaries and those affected outside the limits of permanent work must be protected during the entire duration of this Contract. Comply with all applicable environmental Federal, State, and local laws and regulations. Any delays resulting from failure to comply with environmental laws and regulations will be the Contractor's responsibility.

1.4 SUBCONTRACTORS

Ensure compliance with this Section by Subcontractors.

1.5 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.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation;

submittals not having a "G" designation are for Contractor Quality Control approval or 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 Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan; G

1.7 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction activities or delivery of materials to the site, submit an Environmental Protection Plan for review and approval by the Construction Administrator. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Issues of concern must be defined within the Environmental Protection Plan as outlined in this Section. Address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this Section, but are considered necessary, must be identified and discussed after those items formally identified in this Section. Prior to submittal of the Environmental Protection Plan, meet with the Construction Administrator for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. The Environmental Protection Plan must be current and maintained onsite by the Contractor.

1.7.1 Compliance

No requirement in this Section will relieve the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor will be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.7.2 Contents

Include in the environmental protection plan, but not limit it to, the following:

- a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.
- b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.
- c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
- d. Description of the Contractor's environmental protection personnel training program.
- e. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. The

plan must include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. A Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.

- f. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.
- g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.
- h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.
- i. Drawing showing the location of borrow areas.
- j. Include in the Spill Control plan the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of EM 385-1-1. Include in this plan, as a minimum:
 - (1) The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual will immediately notify the Construction Administrator, Base Fire Department and Base Environmental Office in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. Include in the plan a list of the required reporting channels and telephone numbers.
 - (2) The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.
 - (3) Training requirements for Contractor's personnel and methods of accomplishing the training.
 - (4) A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.
 - (5) The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.
 - (6) The methods and procedures to be used for expeditious contaminant

cleanup.

- k. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris and schedules for disposal.
 - (1) Identify any Subcontractors responsible for the transportation and disposal of solid waste. Submit licenses or permits for solid waste disposal sites that are not a commercial operating facility.
 - (2) Evidence of the disposal facility's acceptance of the solid waste must be attached to this plan during the construction. Attach a copy of each of the Non-hazardous Solid Waste Diversion Reports to the disposal plan. Submit the report for the previous quarter on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted (e.g., the first working day of January, April, July, and October).
 - (3) Indicate in the report the total amount of waste generated and total amount of waste diverted in cubic yards or tons along with the percent that was diverted.
 - (4) A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. Detail in the plan the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.
- l. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the Project Site.
- m. A contaminant prevention plan that: Identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be onsite at any given time must be included in the contaminant prevention plan. Update the plan as new hazardous materials are brought onsite or removed from the site.
- n. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan must include the design of the pond including Drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, the plan must include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If surface discharge will be the method of disposal, include a copy of the permit and associated documents as an attachment prior to discharging the waste water. If disposal is to a sanitary sewer, the plan must include documentation that the Waste Water Treatment Plant Operator has approved the flow

rate, volume, and type of discharge.

- o. A historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the Project Site: And/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction. Include in the plan methods to assure the protection of known or discovered resources, identifying lines of communication between Contractor personnel and the Construction Administrator.
- p. Include and update a pesticide treatment plan, as information becomes available. Include in the plan: 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 (i.e., pounds of active ingredient applied), equipment used for application and calibration of equipment. Federal, State, Regional and Local pest management record keeping and reporting requirements as well as any additional Installation Project Office specific requirements are the Contractor's responsibility in conformance with DA AR 200-1 Chapter 5--Pest Management, Section 5-4 "Program requirements", AFI 32-1053 Sections 3.4.13 and 3.4.14 for data required to be reported to the Installation.

1.7.3 Appendix

Attach to the Environmental Protection Plan, as an appendix, copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents.

1.8 PROTECTION FEATURES

This paragraph supplements the Contract Clause "Protection Of Existing Vegetation, Structures, Equipment, Utilities, And Improvements". Prior to start of any onsite construction activities, the Contractor and the Construction Administrator will make a joint condition survey. Immediately following the survey, the Contractor will prepare a brief report including 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. This survey report will be signed by both the the Contractor and the Construction Administrator upon mutual agreement as to its accuracy and completeness. The Contractor must protect those environmental features included in the survey report and any indicated on the Drawings, regardless of interference which their preservation may cause to the work under the Contract.

1.9 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations from the Drawings, Plans and Specifications, requested by the Contractor and which may have an environmental impact, will be subject to approval by the Construction Administrator and may require an extended review, processing, and approval time. The Construction Administrator

reserves the right to disapprove alternate methods, even if they are more cost effective, if the Construction Administrator determines that the proposed alternate method will have an adverse environmental impact.

1.10 NOTIFICATION

The Construction Administrator 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 Environmental Protection plan. After receipt of such notice, the Contractor will inform the Construction Administrator of the proposed corrective action and take such action when approved by the Construction Administrator. The Construction Administrator 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 Construction Administrator may take under the Contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

Obtaining and complying with all environmental permits and commitments required by Federal, State, Regional, and local environmental laws and regulations is the Contractor's responsibility.

3.2 LAND RESOURCES

Confine all activities to areas defined by the Drawings and Specifications. Identify any land resources to be preserved within the work area prior to the beginning of any construction. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval, except in areas indicated on the drawings or specified to be cleared. Ropes, cables, or guys will not be fastened to or attached to any trees for anchorage unless specifically authorized. Provide effective protection for land and vegetation resources at all times, as defined in the following subparagraphs. Remove stone, soil, or other materials displaced into uncleared areas.

3.2.1 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 which 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. The Contractor's personnel must be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the Drawings to be preserved must be clearly identified by marking, fencing, or wrapping with boards, or any other

approved techniques. Restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.2.3 Erosion and Sediment Controls

Providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations is the Contractor's responsibility. Select and maintain the erosion and sediment controls such that water quality standards are not violated as a result of construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. Construct or install temporary and permanent erosion and sediment control best management practices (BMPs) as indicated on the Drawings and as specified in Section 01 57 23 TEMPORARY STORM WATER POLLUTION CONTROL. BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. The Contractor's best management practices must also be in accordance with the National Pollutant Discharge Elimination System (NPDES). Remove any temporary measures after the area has been stabilized.

3.2.4 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 Construction Administrator. Temporary movement or relocation of Contractor facilities will be made only when approved. Erosion and sediment controls must be provided for onsite borrow and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or work areas must be controlled to protect adjacent areas.

3.3 WATER RESOURCES

Monitor all water areas affected by construction activities to prevent pollution of surface and ground waters. Do not apply toxic or hazardous chemicals to soil or vegetation unless otherwise indicated. For construction activities immediately adjacent to impaired surface waters, the Contractor must be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

3.4 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance with all Federal and State air emission and performance laws and standards.

3.4.1 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 which would cause the Federal, State, and local air pollution standards to be exceeded or

which 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 at all times. 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 all State and local visibility regulations.

3.4.2 Odors

Odors from construction activities must be controlled at all times. The odors must be in compliance with State regulations and/or local ordinances and may not constitute a health hazard.

3.4.3 Sound Intrusions

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the State of New York rules.

3.4.4 Burning

Burning is prohibited on the Government premises.

3.5 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes will be as directed below, unless otherwise specified in other sections and/or shown on the Drawings.

3.5.1 Solid Wastes

Place solid wastes (excluding clearing debris) in containers which are emptied on a regular schedule. Handling, storage, and disposal must be conducted to prevent contamination. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with solid waste. Transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill will be the minimum acceptable offsite solid waste disposal option. Verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate.

3.5.2 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 6 inches of the top. Wastes will be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.5.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. At a minimum, manage and store hazardous waste in

compliance with 40 CFR 262[in accordance with the [Installation] [Project Office] hazardous waste management plan]. Take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. Segregate hazardous waste from other materials and wastes, protect it from the weather by placing it in a safe covered location, and take precautionary measures such as berming or other appropriate measures against accidental spillage. Storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations is the Contractor's responsibility. Transport Contractor generated hazardous waste off Government property within 30 days in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. Dispose of hazardous waste in compliance with Federal, State, and local laws and regulations. Spills of hazardous or toxic materials must be immediately reported to the Construction Administrator and the Facility Environmental Office. Cleanup and cleanup costs due to spills are the Contractor's responsibility. The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility.

3.5.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles must be conducted in a manner that affords the maximum protection against spill and evaporation. Manage and store fuel, lubricants and oil in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded must be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. Storage of fuel on the Project Site is not allowed. Fuel must be brought to the Project Site each day that work is performed.

3.5.5 Waste Water

Disposal of waste water will be as specified below.

- a. Waste water from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc., will not be allowed 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 all Federal, State, Regional and Local laws and regulations.
- b. For discharge of ground water, the Contractor will surface discharge in accordance with the requirements of the NPDES or State STORM WATER DISCHARGES FROM CONSTRUCTION SITES permit.
- c. Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing will be land applied in accordance with all Federal, State, and local laws and regulations for land application.

3.6 RECYCLING AND WASTE MINIMIZATION

Participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the Project.

3.7 NON-HAZARDOUS SOLID WASTE DIVERSION REPORT

Maintain an inventory of non-hazardous solid waste diversion and disposal of construction and demolition debris. Submit a report to the Construction Administrator on the first working day after each fiscal year quarter, starting the first quarter that non-hazardous solid waste has been generated. Include the following in the report:

- a. Construction and Demolition (C&D) Debris Disposed = 10 cubic yards.
- b. Construction and Demolition (C&D) Debris Recycled = 10 cubic yards.
- c. Total C&D Debris Generated = 10 cubic yards.
- d. Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount) = 10 cubic yards.

3.8 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources will be temporarily suspended. Resources covered by this paragraph include but are not limited to: Any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, immediately notify the Construction Administrator so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Cease all activities that may result in impact to or the destruction of these resources. Secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.9 BIOLOGICAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The protection of threatened and endangered animal and plant species, including their habitat, is the Contractor's responsibility in accordance with Federal, State, Regional, and local laws and regulations.

3.10 INTEGRATED PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, the Contractor through the Construction Administrator, must coordinate with the Installation Pest Management Coordinator (IPMC) Project Pesticide Coordinator (PPC) at the earliest possible time prior to pesticide application. Discuss integrated pest management strategies with the Construction Administrator (KO) and receive concurrence from the KO through the COR prior to the application of any pesticide associated with these Specifications. Installation Project Office Pest Management personnel will be given the opportunity to be present at all meetings concerning treatment measures for pest or disease control and during application of the pesticide.

3.10.1 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.

3.10.2 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.

3.10.3 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.

3.10.4 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 Construction Administrator will designate locations for water used in formulating. Do not allow the equipment to overflow. All equipment must be inspected for leaks, clogging, wear, or damage and repaired prior to application of pesticide.

3.11 PREVIOUSLY USED EQUIPMENT

Clean all previously used construction equipment prior to bringing it onto the Project Site. Ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the USDA jurisdictional office for additional cleaning requirements.

3.12 MAINTENANCE OF POLLUTION FACILITIES

Maintain permanent and temporary pollution control facilities and devices for the duration of the Contract or for that length of time construction activities create the particular pollutant.

3.13 MILITARY MUNITIONS

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 Construction Administrator.

3.14 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel must be trained in all phases of environmental protection and pollution control. Conduct environmental protection/pollution control meetings for all personnel prior to commencing construction activities. Additional meetings must be conducted 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, wetlands, and endangered species and their habitat that are known to be in the area.

3.15 CONTAMINATED MEDIA MANAGEMENT

Manage contaminated environmental media consisting of, but not limited to, ground water, soils, and sediments.

3.16 POST CONSTRUCTION CLEANUP

The Contractor will clean up all areas used for construction in accordance with Contract Clause "Cleaning Up". Unless otherwise instructed in writing by the Construction Administrator, obliterate all signs 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. The disturbed area must be graded, filled and the entire area seeded unless otherwise indicated.

-- End of Section --

SECTION 01 57 23

TEMPORARY STORM WATER POLLUTION CONTROL
04/08

PART 1 GENERAL

1.1 SUMMARY

The work consists of implementing the storm water pollution prevention measures to prevent sediment from entering streams or water bodies as specified in this Section in conformance with the requirements of Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollutant Discharge Elimination System (NPDES).

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 D4439	(2011) Geosynthetics
ASTM D4491	(1999a; R 2009) Water Permeability of Geotextiles by Permittivity
ASTM D4533	(2011) Trapezoid Tearing Strength of Geotextiles
ASTM D4632	(2008) Grab Breaking Load and Elongation of Geotextiles
ASTM D4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D4873	(2002; R 2009) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

1.3 EROSION AND SEDIMENT CONTROLS

The controls and measures required of the Contractor are described below.

1.3.1 Stabilization Practices

The stabilization practices to be implemented include temporary seeding, mulching, geotextiles, and erosion control mats. On the daily CQC Report, record the dates when the major grading activities occur, (e.g., excavation and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in Paragraphs "Unsuitable Conditions" and "No Activity For Less Than 21 Days", initiate stabilization practices as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

1.3.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases or is precluded by unsuitable conditions caused by the weather, initiate stabilization practices as soon as practicable after conditions become suitable.

1.3.1.2 No Activity for Less Than 21 Days

When the total time period in which construction activity is temporarily ceased on a portion of the site is 21 days minimum, stabilization practices do not have to be initiated on that portion of the site until 14 days have elapsed after construction activity temporarily ceased.

1.3.1.3 Burnoff

Burnoff of the ground cover is not permitted.

1.3.1.4 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified, and protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

1.3.2 Stormwater Drainage

There will be no discharge of excavation ground water to the sanitary sewer, storm drains, or to the river without prior specific authorization of the Environmental Programs Division in writing. Discharge of hazardous substances will not be permitted under any circumstances. Construction site runoff will be prevented from entering any storm drain. Provide erosion protection of the surrounding soils.

1.3.3 Structural Practices

Implement structural 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 structural practices in a timely manner, during the construction process, to minimize erosion and sediment runoff.

1.3.3.1 Silt Fences

Provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Properly install silt fences to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g., clearing and grubbing, excavation, embankment, and grading). Install silt fences in the locations indicated on the Drawings. Obtain approval from the Construction Administrator prior to final removal of silt fence barriers.

1.3.3.2 Straw Bales

Provide bales of straw as a temporary structural practice on paved surfaces to minimize erosion and sediment runoff. If bales are used, properly place the bales to effectively retain sediment immediately after completing each phase of work (e.g., excavation, embankment, and grading) in each independent runoff area. Show on the Drawings areas where straw

bales are to be used. The Construction Administrator will approve the final removal of straw bale barriers.

1.3.4 Vegetation and Mulch

- a. Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.
- b. Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish a suitable stand of grass. The seeding operation will be as specified in Section 32 92 19 SEEDING.

1.4 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 Section 01 33 00 SUBMITTAL PROCEDURES:

SD-06 Test Reports

Erosion and Sediment Controls

SD-07 Certificates

Mill Certificate or Affidavit

1.5 DELIVERY, STORAGE, AND HANDLING

Identify, store and handle filter fabric in accordance with ASTM D4873.

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCES

2.1.1 Filter Fabric

Provide geotextile that complies with the requirements of ASTM D4439, and consists of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and contains stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure. Provide synthetic filter fabric that contains ultraviolet ray inhibitors and stabilizers to assure a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE		
PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile Elongation (percent)	ASTM D4632	100 lbs. min. 30 percent max.
Trapezoid Tear	ASTM D4533	55 lbs. min.
Permittivity	ASTM D4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D4751	20-100

2.1.2 Silt Fence Stakes and Posts

Use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 by 2 inches when oak is used and 4 by 4 inches when pine is used, and have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 5 feet.

2.1.3 Mill Certificate or Affidavit

Provide a mill certificate or affidavit attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. Specify in the mill certificate or affidavit the actual Minimum Average Roll Values and identify the fabric supplied by roll identification numbers. Submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

2.2 COMPONENTS FOR STRAW BALES

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. Provide bales with a standard cross section of 14 by 18 inches. Wire-bound or string-tie all bales. Use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 2 by 2 inches in cross section and have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 3 feet.

PART 3 EXECUTION

3.1 INSTALLATION OF SILT FENCES

Extend silt fences a minimum of 16 inches above the ground surface without exceeding 34 inches above the ground surface. Provide filter fabric from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, splice together filter fabric at a support post, with a minimum 6 inch overlap, and securely sealed. Excavate trench approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4 by 4 inch trench shall be backfilled and the soil compacted over the filter fabric. Remove

silt fences upon approval by the Construction Administrator.

3.2 INSTALLATION OF STRAW BALES

Place the straw bales in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Install straw bales so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. Entrench and backfill the barrier. Excavate a trench the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging with straw), backfill the excavated soil against the barrier. Conform the backfill soil with the ground level on the downhill side and build up to 4 inches against the uphill side of the barrier. Scatter loose straw over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Securely anchor each bale by at least two stakes driven through the bale. Drive the first stake or steel post in each bale toward the previously laid bale to force the bales together. Drive stakes or steel pickets a minimum 18 inches deep into the ground to securely anchor the bales.

3.3 FIELD QUALITY CONTROL

Maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. Use the following procedures to maintain the protective measures.

3.3.1 Silt Fence Maintenance

Inspect the silt fences in accordance with Paragraph titled "Inspections," of this Section. Any required repairs shall be made promptly. Pay close attention to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, replace the fabric promptly. Remove sediment deposits when deposits reach one-third of the height of the barrier. Remove a silt fence when it is no longer required. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall [receive erosion control] [be seeded in accordance with Section 32 05 33 LANDSCAPE ESTABLISHMENT, except that the coverage requirements in Paragraph titled "Establishment" of this Section do not apply].

3.3.2 Straw Bale Maintenance

Inspect straw bale barriers in accordance with Paragraph titled "Inspections". Pay close attention to the repair of damaged bales, end runs and undercutting beneath bales. Accomplish necessary repairs to barriers or replacement of bales in a promptly manner. Remove sediment deposits when deposits reach one-half of the height of the barrier. At the each end of each row turn bales uphill when used to retain sediment. Remove a straw bale barrier when it is no longer required. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade. Seed the areas disturbed by this shaping in accordance with Section 32 92 19 SEEDING.

3.4 INSPECTIONS

3.4.1 General

Inspect disturbed areas of the construction site, areas that have not been finally stabilized used for storage of materials exposed to precipitation, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Conduct inspections at least once every month where sites have been finally stabilized.

3.4.2 Inspections Details

Inspect disturbed areas and areas used for material storage that are exposed to precipitation for evidence of, or the potential for, pollutants entering the drainage system. Observe erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan to ensure that they are operating correctly. Inspect discharge locations or points to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Inspect locations where vehicles exit the site for evidence of offsite sediment tracking.

3.4.3 Inspection Reports

For each inspection conducted, prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. Furnish the report to the Construction Administrator within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

-- End of Section --

SECTION 01 74 19

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
01/07

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. GREEN BUILDING COUNCIL (USGBC)

LEED BD+C (2009; R 2010) Leadership in Energy and Environmental Design(tm) Building Design and Construction (LEED-NC)

LEED GBDC Ref Guide (2009; R 2010) LEED Reference Guide for Green Building Design, Construction and Major Renovations of Commercial and Institutional Buildings including Core & Shell and K-12 Projects

1.2 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse. Divert a minimum of 75 percent by weight of total Project solid waste from the landfill.

1.3 MANAGEMENT

Develop and implement a waste management program. Take a pro-active, responsible role in the management of construction and demolition waste and require all Subcontractors, vendors, and suppliers to participate in the effort. The Environmental Manager, as specified in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS, is responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste, consider the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal Project Completion mandates. Implement any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling accrue to the Contractor. Appropriately permit firms and facilities used for recycling, reuse, and disposal for the intended use to the extent required by Federal, State, and local regulations. Also, 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 Project.

1.4 SUBMITTALS

Government approval 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. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Waste Management Plan; G; (LEED BD+C)

SD-11 Closeout Submittals

Records; (LEED BD+C)

1.5 MEETINGS

Conduct Construction Waste Management meetings. After award of the Contract and prior to commencement of work, schedule and conduct a meeting with the Construction Administrator to discuss the proposed Waste Management Plan and to develop a mutual understanding relative to the details of waste management. The requirements for this meeting may be fulfilled during the coordination and mutual understanding meeting outlined in Section 01 45 00.00 2001 45 00.00 10 QUALITY CONTROL. At a minimum, discuss environmental and waste management goals and issues at the following additional meetings:

- a. Pre-bid meeting.
- b. Preconstruction meeting.
- c. Regular site meetings.
- d. Work safety meetings.

1.6 WASTE MANAGEMENT PLAN

Submit a waste management plan within 20 days after Contract Award and not less than 10 days before the preconstruction meeting. The plan demonstrates how to meet the the Project Waste Diversion Goal. Also, include the following in the plan:

- a. Name of individuals on the Contractor's staff responsible for waste prevention and management.
- 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

wastes.

- e. Characterization, including estimated types and quantities, of the waste to be generated.
- f. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the Project.
- g. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity. Include the name, location, and phone number for each reuse facility to be used, and provide a copy of the permit or license for each facility.
- h. List of specific waste materials 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, location, and phone number, including a copy of the permit or license for each facility.
- i. Identification of materials that cannot be recycled/reused with an explanation or justification, to be approved by the Construction Administrator.
- j. Description of the means by which any waste materials identified in item (h) above will be protected from contamination.
- k. 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).
- l. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

Revise and resubmit Plan as required by the Construction Administrator. Approval of Contractor's Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting Project cumulative waste diversion requirement. Distribute copies of the Waste Management Plan to each Subcontractor, the Quality Control Manager, and the Construction Administrator.

1.7 RECORDS

Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Keep records in accordance with the LEED GBDC Ref Guide and using the LEED BD+C Letter Template. Quantities may be measured by weight or by volume, but must be consistent throughout. List each type of waste separately noting the disposal or diversion date. Identify the landfill, recycling center, waste processor, or other organization used to process or receive the solid waste. Provide explanations for any waste not recycled or reused. With each application for payment, submit updated documentation for solid waste disposal and diversion, and submit manifests, weight tickets, receipts, and invoices

specifically identifying the Project and waste material. Make the records available to the Construction Administrator during construction, and deliver to the Construction Administrator upon completion of the construction and include in the Sustainability Notebook a copy of the records.

Demolition accomplished by other parties on this Project Site count toward the Project's total waste diversion cumulative score for LEED BD+C and for sustainability requirements. Information on the quantity and disposition of these materials will be provided by the Construction Administrator. Include this data in records, annotated to indicate that it was accomplished by another party.

1.8 REPORTS

Provide quarterly reports and a final report to Construction Administrator. Include Project name, information for waste generated this quarter, and cumulative totals for the Project in quarterly and final reports. Also include in each report, supporting documentation to include manifests, weight tickets, receipts, and invoices specifically identifying the Project and waste material. Include timber harvest and demolition information, if any.

1.9 COLLECTION

Separate, store, protect, and handle at the site identified recyclable and salvageable waste products in a manner that maximizes recyclability and salvagability of identified materials. Provide the necessary containers, bins and storage areas to facilitate effective waste management and clearly and appropriately identify them. Provide materials for barriers and enclosures around recyclable material storage areas which are nonhazardous and recyclable or reusable. Locate out of the way of construction traffic. Provide adequate space for pick-up and delivery and convenience to Subcontractors. Recycling and waste bin areas are to be kept neat and clean, and handle recyclable materials to prevent contamination of materials from incompatible products and materials. Clean contaminated materials prior to placing in collection containers. Use cleaning materials that are nonhazardous and biodegradable. Handle hazardous waste and hazardous materials in accordance with applicable regulations and coordinate with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. Separate materials by one of the following methods:

1.9.1 Source Separated Method

Separate waste products and materials that are recyclable from trash and sorted as described below into appropriately marked separate containers and then transported 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 following category types as appropriate to the Project waste and to the available recycling and reuse programs in the Project area:

- a. Land clearing debris.
- b. Asphalt.
- c. Concrete and masonry.

- d. Metal (e.g., banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, lead brass, bronze).
 - (1) Ferrous.
 - (2) Non-ferrous.
- e. Wood (nails and staples allowed).
- f. Debris.
- g. Glass (colored glass allowed).
- h. Paper.
 - (1) Bond.
 - (2) Newsprint.
 - (3) Cardboard and paper packaging materials.
- i. Plastic.

Type	
1	Polyethylene Terephthalate (PET, PETE)
2	High Density Polyethylene (HDPE)
3	Vinyl (Polyvinyl Chloride or PVC)
4	Low Density Polyethylene (LDPE)
5	Polypropylene (PP)
6	Polystyrene (PS)
7	Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.

- j. Gypsum.
- k. Non-hazardous paint and paint cans.
- l. Carpet.
- m. Ceiling tiles.
- n. Insulation.
- o. Beverage containers.

1.9.2 Co-Mingled Method

Place waste products and recyclable materials into a single container and then transport to a recycling facility where the recyclable materials are sorted and processed.

1.9.3 Other Methods

Other proposed methods may be used when approved by the Construction Administrator.

1.10 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Construction Administrator and in compliance with waste management procedures. Except as otherwise specified in other sections of the Specifications, dispose of in accordance with the following:

1.10.1 Reuse

Give first consideration to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. [Coordinate reuse with the Construction Administrator.][Reuse materials as indicated.]Consider sale or donation of waste suitable for reuse.

1.10.2 Recycle

Recycle waste materials not suitable for reuse, but having value as being recyclable. Recycle all fluorescent lamps, HID lamps, and mercury-containing thermostats removed from the site. Arrange for timely pickups from the site or deliveries to recycling facilities in order to prevent contamination of recyclable materials.

1.10.3 Waste

Dispose of materials with no practical use or economic benefit to waste-to-energy plants where available. As the last choice, dispose of materials at a landfill or incinerator.

1.10.4 Return

Set aside and protect misdelivered and substandard products and materials and return to supplier for credit.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 01 78 00

CLOSEOUT SUBMITTALS
08/11

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.

ASTM INTERNATIONAL (ASTM)

ASTM E1971 (2005; R 2011) Stewardship for the
Cleaning of Commercial and Institutional
Buildings

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N (2014) Navy and Marine Corps Design
Procedures

UFC 1-300-08 (2009, with Change 2) Criteria for
Transfer and Acceptance of DoD Real
Property

1.2 DEFINITIONS

1.2.1 As-Built Drawings

As-Built Drawings are developed and maintained by the Contractor and depict actual conditions, including deviations from the Contract Documents. These deviations and additions may result from coordination required by, but not limited to: Contract Modifications; official responses to Contractor submitted Requests for Information; direction from the Construction Administrator; designs which are the responsibility of the Contractor, and differing site conditions. Maintain the as-builts throughout construction as red-lined hard copies on site and/or red-lined PDF files. As-Built Drawings are further defined in NFAS 5252.236-9310. These files serve as the basis for the creation of the Record Drawings.

1.2.2 Record Drawings

The Record Drawings are the final compilation of actual conditions reflected in the As-Built Drawings.

1.3 SOURCE DRAWING FILES

Request the full set of Electronic Drawings, in the source format, for Record Drawing preparation, after award and at least 30 days prior to required use.

1.3.1 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 shall be 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 sub consultants 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 CAD Drawing files are not construction documents. Differences may exist between the CAD files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic CAD files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. 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. The Contractor is responsible for determining if any conflict exists. Use of these Source Drawing files does not relieve the Contractor of 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 indicia of ownership (seals, logos, signatures, initials and dates).

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval or 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 Section 01 33 00 SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

As-Built Drawings; G

Construction Contract Specifications

Certification of EPA Designated Items; G

Interim DD FORM 1354; G

Checklist for DD FORM 1354; G

1.5 QUALITY CONTROL

Additions and corrections to the Contract Drawings must be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols must be the same as the original line colors, line weights, lettering, layering conventions, and symbols.

1.6 WARRANTY MANAGEMENT

1.6.1 Warranty Management Plan

Develop a warranty management plan which contains information relevant to the clause Warranty of Construction. At least 30 days before the planned pre-warranty conference, submit one set of the warranty management plan. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan must 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 must include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase must be submitted to the Construction Administrator for approval prior to each monthly pay estimate. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period will begin on the date of Project acceptance and continue for the full product warranty period. A joint 4 month and 9 month warranty inspection will be conducted, measured from time of acceptance, by the Contractor, Construction Administrator and the Customer Representative. Include within the warranty management plan, but not 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. Furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the Project location.
- c. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs.
- d. A list for each warranted 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. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have extended warranties must 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) Organization, names and phone numbers of persons to call for warranty service.

(11) Typical response time and repair time expected for various warranted equipment.

- 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.

1.6.2 Performance Bond

The Performance Bond must remain effective throughout the construction period.

- a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Construction Administrator will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.
- b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Construction Administrator will have the right to recoup expenses from the bonding company.
- c. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure to respond will be cause for the Construction Administrator to proceed against the Contractor.

1.6.3 Pre-Warranty Conference

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

1.6.4 Contractor's Response to Construction Warranty Service Requirements

Following oral or written notification by the Construction Administrator, respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. Submit a report on any warranty item that has been repaired during the warranty period. Include within the report 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 back charge the construction warranty payment item established.

- a. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.
- b. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.
- c. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 AS-BUILT DRAWINGS

Provide and maintain two black line print copies of the PDF Contract Drawings for As-Built Drawings. Submit As-Built Drawings 30 days prior to Beneficial Occupancy Date(BOD).

3.1.1 Markup Guidelines

Make comments and markup the Drawings complete without reference to letters, memos, or materials that are not part of the As-Built Drawing. Show what was changed, how it was changed, where items(s) were relocated and change related details. These working as-built markup prints must be neat, legible and accurate as follows:

- a. Use base colors of red, green, and blue. Color code for changes as follows:
 - (1) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.
 - (2) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.
 - (3) Additions (Green) - Added items, lettering in notes and leaders.
- b. Provide a legend if colors other than the "base" colors of red, green, and blue are used.
- c. Add and denote any additional equipment or material facilities, service lines, incorporated under As-Built Revisions if not already

shown in legend.

- d. Use frequent written explanations on Markup Drawings to describe changes. Do not totally rely on graphic means to convey the revision.
- e. Use legible lettering and precise and clear digital values when marking prints. Clarify ambiguities concerning the nature and application of change involved.
- f. Wherever a revision is made, also make changes to related section views, details, legend, profiles, plans and elevation views, schedules, notes and call out designations, and mark accordingly to avoid conflicting data on all other sheets.
- g. For deletions, cross out all features, data and captions that relate to that revision.
- h. For changes on small-scale drawings and in restricted areas, provide large-scale inserts, with leaders to the applicable location.
- i. Indicate one of the following when attaching a print or sketch to a markup print:
 - (1) Add an entire Drawing to Contract Drawings.
 - (2) Change the Contract Drawing to show.
 - (3) Provided for reference only to further detail the initial design.
- j. Incorporate all Shop and Fabrication Drawings into the Markup Drawings.

3.1.2 As-Built Drawings Content

Revise As-Built Drawings in accordance with direction by Construction Administrator. Provide one set of paper copies from PDF Drawings to show the as-built conditions by red-line process during the execution of the Project. Keep these working as-built markup drawings current on a weekly basis and at least one set available on the jobsite at all times. Changes from the Contract Drawings which are made during construction or additional information which might be uncovered in the course of construction must be accurately and neatly recorded as they occur by means of details and notes. Show on the as-built drawings, but not limited to, the following information:

- 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, show by offset dimensions to two permanently fixed surface features the end of each run including each change in direction on the Record Drawings. Locate valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.
- b. The location and dimensions of any changes within the building structure.
- c. Layout and Schematic Drawings of electrical circuits and piping.

- d. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from Contract Plans.
- e. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to Shop Drawings, fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.
- f. The topography, invert elevations and grades of drainage installed or affected as part of the Project construction.
- g. Changes or Revisions which result from the final inspection.
- h. Where Contract Drawings or Specifications present options, show only the option selected for construction on the working as-built markup Drawings.
- i. If borrow material for this Project is from sources on Government property, or if Government property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.
- j. Changes in location of equipment and architectural features.
- k. Modifications (include within change order price the cost to change working as-built markup Drawings to reflect modifications) and compliance with FC 1-300-09N procedures.
- l. Actual location of anchors, construction and control joints, etc., in concrete.
- m. Unusual or uncharted obstructions that are encountered in the Contract work area during construction.

3.2 FINAL APPROVED SHOP DRAWINGS

Submit final approved Project Shop Drawings 30 days after transfer of the completed facility.

3.3 CONSTRUCTION CONTRACT SPECIFICATIONS

Submit final PDF file record construction Contract Specifications, including revisions thereto, 30 days after transfer of the completed facility.

3.4 AS-BUILT RECORD OF EQUIPMENT AND MATERIALS

Furnish one copy of preliminary record of equipment and materials used on the Project 15 days prior to final inspection. This preliminary submittal will be reviewed and returned 7 days after final inspection with Government comments. Submit two sets of final record of equipment and materials 10 days after final inspection. 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

3.5 CLEANUP

Provide final cleaning in accordance with ASTM E1971 and submit one copy of the listing of completed final clean-up items. Leave premises "broom clean." Use only non-hazardous cleaning materials, including natural cleaning materials, in the final cleanup. Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Clean and/or Replace filters of operating equipment and comply with the Indoor Air Quality (IAQ) Management Plan. Clean debris from roofs, gutters, downspouts and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site. Recycle, salvage, and return construction and demolition waste from Project in accordance with Sections 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS and 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.

3.6 REAL PROPERTY RECORD

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete draft DD FORM 1354 provided to the Contractor by the Construction Administrator. Submit an accounting of all installed property with Interim DD FORM 1354. Include any additional assets, improvements, and alterations from the Draft DD FORM 1354. Contact the Construction Administrator for any Project specific information necessary to complete the DD FORM 1354. Refer to UFC 1-300-08 for instruction on completing the DD FORM 1354.

Submit the completed Checklist for DD FORM 1354 of Installed Building Equipment items. Attach this list to the updated DD FORM 1354.

-- End of Section --

SECTION 02 41 00

DEMOLITION
05/10

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-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)

AHRI Guideline K (2009) Guideline for Containers for Recovered Non-Flammable Fluorocarbon Refrigerants

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 145 (1991; R 2012) Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes

AASHTO T 180 (2015) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.6 (2006) Safety Requirements for Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

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

U.S. DEFENSE LOGISTICS AGENCY (DLA)

DLA 4145.25 (Jun 2000; Reaffirmed Oct 2010) Storage and Handling of Liquefied and Gaseous Compressed Gases and Their Full and Empty Cylinders
<http://www.aviation.dla.mil/UserWeb/aviationengineerir>

U.S. DEPARTMENT OF DEFENSE (DOD)

DOD 4000.25-1-M (2006) MILSTRIP - Military Standard Requisitioning and Issue Procedures

MIL-STD-129 (2014; Rev R) Military Marking for Shipment and Storage

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1 (2015; Rev L) Obstruction Marking and
Lighting

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

40 CFR 61 National Emission Standards for Hazardous
Air Pollutants

40 CFR 82 Protection of Stratospheric Ozone

49 CFR 173.301 Shipment of Compressed Gases in Cylinders
and Spherical Pressure Vessels

1.2 PROJECT DESCRIPTION

1.2.1 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Construction Administrator. Remove rubbish and debris from the Project Site; do not allow accumulations on airfield pavements. The work includes demolition 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 Construction Administrator. 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 Construction Administrator. 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, deconstruction, or demolition work performed under this Contract. Do not overload pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Construction Administrator 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 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

Protect materials and equipment from the weather at all times. Have materials and workmen ready to provide adequate and temporary covering of exposed areas.

1.3.3 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction 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.

1.3.4 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. 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, deconstruction, 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.

1.5 AVAILABILITY OF WORK AREAS

Areas in which the work is to be accomplished will be available per the Contract and as directed by the Government.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. 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 Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Demolition Plan; G

Existing Conditions

SD-07 Certificates

Notification; G

Notification of Demolition and Renovation Form

SD-11 Closeout Submittals

Receipts

1.7 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 State's environmental protection agency and the Construction Administrator 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 ASSE/SAFE A10.6. Comply with the Environmental Protection Agency requirements specified. Use of explosives will not be permitted.

1.7.1 Dust and Debris Control

Prevent the spread of dust and debris on airfield pavements 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. Sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to aircraft.

1.8 PROTECTION

1.8.1 Traffic Control Signs

- a. Where aircraft safety is endangered in the area of removal work, use traffic barricades with flashing lights. Anchor barricades in a manner to prevent displacement by wind, jet, or prop blast. Notify the Construction Administrator prior to beginning such work.
- b. Provide a minimum of 2 FAA Type L-810 steady burning red obstruction lights on temporary structures above ground level. Light construction and installation shall comply with FAA AC 70/7460-1. Lights shall be operational during periods of reduced visibility, darkness, and as directed by the Construction Administrator. Maintain the temporary services during the period of construction and remove only after permanent services have been installed and tested and are in operation.

1.8.2 Protection of Personnel

Before, during, and after the demolition work continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the Project Site. No area or trench will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.9 FOREIGN OBJECT DAMAGE (FOD)

Aircraft and aircraft engines are subject to FOD from debris and waste material lying on airfield pavements. Remove all such materials that may appear on operational aircraft pavements due to the Contractor's operations. If necessary, the Construction Administrator may require the Contractor to install a temporary barricade at the Contractor's expense to control the spread of FOD potential debris. The barricade shall include a fence covered with a fabric designed to stop the spread of debris. Anchor the fence and fabric to prevent displacement by winds or jet/prop blasts. Remove barricade when no longer required.

1.10 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 Construction Administrator.

1.11 EXISTING CONDITIONS

Before beginning any demolition or deconstruction 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 Construction Administrator showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 4 inches will be acceptable as a record of existing conditions. Include in the record 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. Fill material shall conform to the definition of satisfactory soil material as defined in AASHTO M 145, Soil Classification Groups A-1, A-2-4, A-2-5, and A-3. In addition, fill material shall be free from roots and other organic matter, trash, debris, frozen materials, and stones larger than 2 inches in any dimension.
- b. Proposed fill material must be sampled and tested by an approved soil testing laboratory, as follows:

Soil classification	AASHTO M 145
Moisture-density relations	AASHTO T 180, Method B or D

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

Inspect and evaluate existing structures on-site for reuse. 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 on-site 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 Construction Administrator. 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 or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

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

Sawcut concrete and asphaltic concrete paving and slabs including aggregate base as indicated to full depth. Provide neat sawcuts at limits of pavement removal as indicated. Pavement and slabs not to be used in this Project shall be removed from the Site at Contractor's expense.

3.1.4 Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces, using on-site materials when available. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Finished surfaces of patched area shall be flush with the adjacent existing surface and shall match the existing adjacent surface as closely as possible as to texture and finish.

3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition or deconstruction work in areas occupied by structures to be demolished or deconstructed until all demolition and deconstruction in the area has been completed and debris removed.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

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 deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Construction Administrator of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Construction Administrator to begin demolition and deconstruction. 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 Disposal of Ozone Depleting Substance (ODS)

Class I and Class II ODS are defined in Section, 602(a) and (b), of The Clean Air Act. Prevent discharge of Class I and Class II ODS to the atmosphere. Place recovered ODS in cylinders meeting AHRI Guideline K suitable for the type ODS (filled to no more than 80 percent capacity) and provide appropriate labeling. Recovered ODS shall be removed from Government property and disposed of in accordance with 40 CFR 82. Products, equipment and appliances containing ODS in a sealed, self-contained system (e.g., residential refrigerators and window air conditioners) shall be disposed of in accordance with 40 CFR 82. Submit receipts or bills of lading, as specified. Submit a shipping receipt or bill of lading for all containers of ozone depleting substance (ODS) shipped to the Defense Depot, Richmond, Virginia.

3.3.2.1 Special Instructions

No more than one type of ODS is permitted in each container. A warning/hazardous label shall be applied to the containers in accordance with Department of Transportation regulations. All cylinders including but not limited to fire extinguishers, spheres, or canisters containing an ODS shall have a tag with the following information:

- a. Activity name and unit identification code;
- b. Activity point of contact and phone number;
- c. Type of ODS and pounds of ODS contained;
- d. Date of shipment;
- e. National stock number (for information, call (804) 279-4525).

3.3.2.2 Fire Suppression Containers

Deactivate fire suppression system cylinders and canisters with electrical charges or initiators prior to shipment. Also, safety caps must be used to cover exposed actuation mechanisms and discharge ports on these special cylinders.

3.3.3 Transportation Guidance

Ship all ODS containers in accordance with MIL-STD-129, DLA 4145.25 (also referenced one of the following: Army Regulation 700-68, Naval Supply Instruction 4440.128C, Marine Corps Order 10330.2C, and Air Force Regulation 67-12), 49 CFR 173.301, and DOD 4000.25-1-M.

3.3.4 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable combustible material off 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 non-salvageable 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 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property.

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 directed.

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 31 00 00

EARTHWORK
08/08

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 T 180 (2015) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop
- AASHTO T 224 (2010) Standard Method of Test for Correction for Coarse Particles in the Soil Compaction Test

AMERICAN WATER WORKS ASSOCIATION (AWWA)

- AWWA C600 (2010) Installation of Ductile-Iron Water Mains and Their Appurtenances

ASTM INTERNATIONAL (ASTM)

- ASTM C136/C136M (2014) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- ASTM D1140 (2017) Standard Test Methods for Determining the Amount of Material Finer than 75- μ m (No. 200) Sieve in Soils by Washing
- ASTM D1556/D1556M (2015; E 2016) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
- ASTM D1557 (2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2700 kN-m/m³)
- ASTM D2487 (2011) Soils for Engineering Purposes (Unified Soil Classification System)
- ASTM D4318 (2010; E 2014) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D698 (2012; E 2014; E 2015) Laboratory Compaction Characteristics of Soil Using

Standard Effort (12,400 ft-lbf/cu. ft.
(600 kN-m/cu. m.))

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 600/4-79/020 (1983) Methods for Chemical Analysis of
Water and Wastes

EPA SW-846.3-3 (1999, Third Edition, Update III-A) Test
Methods for Evaluating Solid Waste:
Physical/Chemical Methods

1.2 DEFINITIONS

1.2.1 Satisfactory Materials

Satisfactory materials comprise any materials classified by ASTM D2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP. Satisfactory materials for grading comprise stones less than 8 inches, except for fill material for pavements and railroads which comprise stones less than 3 inches in any dimension.

1.2.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory which contains root and other organic matter or frozen material. Notify the Construction Administrator when encountering any contaminated materials.

1.2.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are non-plastic. Perform testing, required for classifying materials, in accordance with ASTM D4318, ASTM C136/C136M, and ASTM D1140.

1.2.4 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D1557 abbreviated as a percent of laboratory maximum density. Since ASTM D1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, express the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve as a percentage of the maximum density in accordance with AASHTO T 180 and corrected with AASHTO T 224. To maintain the same percentage of coarse material, use the "remove and replace" procedure as described in "Note 8" of Paragraph 7.2 in AASHTO T 180.

1.2.5 Overhaul

Overhaul is the authorized transportation of satisfactory excavation or borrow materials in excess of the free-haul limit. Overhaul is the product of the quantity of materials hauled beyond the free-haul limit,

and the distance such materials are hauled beyond the free-haul limit, expressed in station yards.

1.2.6 Topsoil

Material suitable for topsoils obtained from off-site areas is defined as: Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than 1 inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.

1.2.7 Hard/Unyielding Materials

Hard/Unyielding materials comprise weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller. These materials usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.8 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

1.2.9 Unstable Material

Unstable materials are too wet to properly support the utility pipe, conduit, or appurtenant structure.

1.2.10 Select Granular Material

1.2.10.1 General Requirements

Select granular material consist of materials classified as GW, GP, SW, or SP, by ASTM D2487 where indicated.

1.2.11 Initial Backfill Material

Initial backfill consists of select granular material or satisfactory materials free from rocks 3 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, free the initial backfill material of stones larger than 3 inches in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

1.2.12 Expansive Soils

Expansive soils are defined as soils that have a plasticity index equal to or greater than 40 when tested in accordance with ASTM D4318.

1.2.13 Non-Frost Susceptible (NFS) Material

Non-frost susceptible material are a uniformly graded washed sand with a maximum particle size of 1/2 inch and less than 5 percent passing the No. 200 size sieve, and with not more than 3 percent by weight finer than the No. 400 sieve.

1.3 SYSTEM DESCRIPTION

Subsurface soil boring logs are shown on the Drawings. The subsoil investigation report and samples of materials taken from subsurface investigations may be examined at the Contractor's request. These data represent the best subsurface information available; however, variations may exist in the subsurface between boring locations.

1.3.1 Classification of Excavation

No consideration will be given to the nature of the materials, and all excavation will be designated as unclassified excavation.

1.3.2 Blasting

Blasting will not be permitted.

1.3.3 Dewatering Work Plan

Submit procedures for accomplishing dewatering work.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00
SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Shoring; G

Dewatering Work Plan; G

SD-03 Product Data

Utilization of Excavated Materials; G

Rock Excavation

Opening of any Excavation or Borrow Pit

Shoulder Construction

SD-06 Test Reports

Testing

Borrow Site Testing

Within 24 hours of conclusion of physical tests, submit 3 copies of test results, including calibration curves and results of

calibration tests.

SD-07 Certificates

Testing

PART 2 PRODUCTS

2.1 REQUIREMENTS FOR OFF-SITE SOILS

Test off-site soils brought in for use as backfill for Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and full Toxicity Characteristic Leaching Procedure (TCLP) including ignitability, corrosivity, and reactivity. Backfill shall contain a maximum of 100 parts per million (ppm) of total petroleum hydrocarbons (TPH) and a maximum of 10 ppm of the sum of Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and shall pass the TCPL test. Determine TPH concentrations by using EPA 600/4-79/020 Method 418.1. Determine BTEX concentrations by using EPA SW-846.3-3 Method 5030/8020. Perform TCLP in accordance with EPA SW-846.3-3 Method 1311. Provide Borrow Site Testing for TPH, BTEX, and TCLP from a composite sample of material from the borrow site, with at least one test from each borrow site. Do not bring material on-site until tests have been approved by the Construction Administrator.

PART 3 EXECUTION

3.1 STRIPPING OF TOPSOIL

Where indicated or directed, strip topsoil to a depth of 4 inches. Spread topsoil on areas already graded and prepared for topsoil, or transported and deposited in stockpiles convenient to areas that are to receive application of the topsoil later, or at locations indicated or specified. Keep topsoil separate from other excavated materials, brush, litter, objectionable weeds, roots, stones larger than 2 inches in diameter, and other materials that would interfere with planting and maintenance operations. Remove from the site any surplus of topsoil from excavations and gradings.

3.2 GENERAL EXCAVATION

Perform excavation of every type of material encountered within the limits of the Project to the lines, grades, and elevations indicated and as specified. Perform the grading in accordance with the typical sections shown and the tolerances specified in Paragraph "Finishing". Transport satisfactory excavated materials and place in fill or embankment within the limits of the work. Excavate unsatisfactory materials encountered within the limits of the work below grade and replace with satisfactory materials as directed. Include such excavated material and the satisfactory material ordered as replacement in excavation. Dispose surplus satisfactory excavated material not required for fill or embankment in areas approved for surplus material storage or designated waste areas. Dispose unsatisfactory excavated material in designated waste or spoil areas. During construction, perform excavation and fill in a manner and sequence that will provide proper drainage at all times. Excavate material required for fill or embankment in excess of that produced by excavation within the grading limits from the borrow areas indicated or from other approved areas selected by the Contractor as specified.

3.2.1 Ditches, Gutters, and Channel Changes

Finish excavation of ditches, gutters, and channel changes by cutting accurately to the cross sections, grades, and elevations shown on Drawings. Do not excavate ditches and gutters below grades shown. Backfill the excessive open ditch or gutter excavation with satisfactory, thoroughly compacted, material or with suitable stone or cobble to grades shown. Dispose excavated material as shown or as directed, except in no case allow material be deposited a maximum 4 feet from edge of a ditch. Maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.2.2 Drainage Structures

Make excavations to the lines, grades, and elevations shown, or as directed. Provide trenches and foundation pits of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Clean rock or other hard foundation material of loose debris and cut to a firm, level, stepped, or serrated surface. Remove loose disintegrated rock and thin strata. Do not disturb the bottom of the excavation when concrete or masonry is to be placed in an excavated area. Do not excavate to the final grade level until just before the concrete or masonry is to be placed.

3.2.3 Drainage

Provide for the collection and disposal of surface and subsurface water encountered during construction. Completely drain construction site during periods of construction to keep soil materials sufficiently dry. Construct storm drainage features (ponds/basins) at the earliest stages of Site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and ground water conditions presented by the Plans and Specifications and to employ necessary measures to permit construction to proceed.

3.2.4 Dewatering

Control groundwater flowing toward or into excavations to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. Do not permit French drains, sumps, ditches or trenches within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Take control measures by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, maintain the water level continuously, at least 2 feet below the working level. Operate dewatering system continuously until construction work below existing water levels is complete. Submit performance records weekly.

3.2.5 Trench Excavation Requirements

Excavate the trench as recommended by the manufacturer of the pipe to be installed. Slope trench walls below the top of the pipe, or make vertical, and of such width as recommended in the manufacturer's printed installation manual. Provide vertical trench walls where no manufacturer's printed installation manual is available. Shore trench walls more than 3 feet high, cut back to a stable slope, or provide with equivalent means of protection for employees who may be exposed to moving ground or cave in. Shore vertical trench walls more than 3 feet high. Excavate trench walls which are cut back to at least the angle of repose of the soil. Give special attention to slopes which may be adversely affected by weather or moisture content. Do not exceed the trench width below the pipe top of 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter, and do not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, provide redesign, stronger pipe, or special installation procedures by the Contractor. The Contractor is responsible for the cost of redesign, stronger pipe, or special installation procedures without any additional cost to the Government.

3.2.5.1 Bottom Preparation

Grade the bottoms of trenches accurately to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Excavate bell holes to the necessary size at each joint or coupling to eliminate point bearing. Remove stones of 3 inch or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, to avoid point bearing.

3.2.5.2 Removal of Unyielding Material

Where overdepth is not indicated and unyielding material is encountered in the bottom of the trench, remove such material 12 inch below the required grade and replaced with suitable materials as provided in Paragraph "Backfilling and Compaction".

3.2.5.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, remove such material to the depth directed and replace it to the proper grade with select granular material as provided in Paragraph "Backfilling and Compaction". When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the Contractor is responsible for excavating the resulting material and replacing it without additional cost to the Government.

3.2.5.4 Excavation for Appurtenances

Provide excavation for manholes, catch-basins, inlets, or similar structures sufficient to leave at least 12 inches clear between the outer structure surfaces and the face of the excavation or support members. Clean rock or loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Remove loose disintegrated rock and thin strata. Specify removal of unstable material. When concrete or masonry is to be placed in an excavated area, take special care not to disturb the bottom of the excavation. Do not excavate to the final grade level until just before the concrete or masonry is to be

placed.

3.2.5.5 Jacking, Boring, and Tunneling

Unless otherwise indicated, provide excavation by open cut except that sections of a trench may be jacked, bored, or tunneled if, in the opinion of the Construction Administrator, the pipe, cable, or duct can be safely and properly installed and backfill can be properly compacted in such sections.

3.2.6 Underground Utilities

The Contractor is responsible for movement of construction machinery and equipment over pipes and utilities during construction. Perform work adjacent to non-Government utilities as indicated in accordance with procedures outlined by utility company. Excavation made with power-driven equipment is not permitted within 2 feet of known Government-owned utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the Contract excavation until approval for backfill is granted by the Construction Administrator. Report damage to utility lines or subsurface construction immediately to the Construction Administrator.

3.3 SELECTION OF BORROW MATERIAL

Select borrow material to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Obtain borrow material from the borrow areas within the limits of the Project Site, selected by the Contractor and approved by the Owner, or from approved private sources. Unless otherwise provided in the Contract, the Contractor is responsible for obtaining the right to procure material, pay royalties and other charges involved, and bear the expense of developing the sources, including rights-of-way for hauling from the owners. Borrow material from approved sources on Government-controlled land may be obtained without payment of royalties. Unless specifically provided, do not obtain borrow within the limits of the Project Site without prior written approval. Consider necessary clearing, grubbing, and satisfactory drainage of borrow pits and the disposal of debris thereon related operations to the borrow excavation.

3.4 OPENING AND DRAINAGE OF EXCAVATION AND BORROW PITS

Excavate borrow pits and other excavation areas providing adequate drainage. Transport overburden and other spoil material to designated spoil areas or otherwise dispose of as directed. Provide neatly trimmed and drained borrow pits after the excavation is completed. Ensure that excavation of any area, operation of borrow pits, or dumping of spoil material results in minimum detrimental effects on natural environmental conditions.

3.5 SHORING

3.5.1 General Requirements

Submit a Shoring and Sheet piling plan for approval 15 days prior to starting work. Submit Drawings and calculations, certified by a State of

Connecticut registered professional engineer, describing the methods for shoring and sheeting of excavations. Finish shoring, including sheet piling, and install as necessary to protect workmen, banks, adjacent paving, structures, and utilities. Remove shoring, bracing, and sheeting as excavations are backfilled, in a manner to prevent caving.

3.5.2 Geotechnical Engineer

Hire a professional geotechnical engineer to provide inspection of excavations and soil/groundwater conditions throughout construction. The geotechnical engineer is responsible for performing pre-construction and periodic Site Visits throughout construction to assess Site Conditions. The geotechnical engineer is responsible for updating the excavation, sheeting and dewatering plans as construction progresses to reflect changing conditions and submit an updated plan if necessary. Submit a monthly written report, informing the Contractor and Construction Administrator of the status of the plan and an accounting of the Contractor's adherence to the plan addressing any present or potential problems. The Construction Administrator is responsible for arranging meetings with the geotechnical engineer at any time throughout the Contract duration.

3.6 GRADING AREAS

Where indicated, divide work into grading areas within which satisfactory excavated material will be placed in embankments, fills, and required backfills. Do not haul satisfactory material excavated in one grading area to another grading area except when so directed in writing. Place and grade stockpiles of satisfactory and unsatisfactory as specified. Keep stockpiles in a neat and well drained condition, giving due consideration to drainage at all times. Clear, grub, and seal by rubber-tired equipment, the ground surface at stockpile locations; separately stockpile excavated satisfactory and unsatisfactory materials. Protect stockpiles of satisfactory materials from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, remove and replace such material with satisfactory material from approved sources.

3.7 FINAL GRADE OF SURFACES TO SUPPORT CONCRETE

Do not excavate to final grade until just before concrete is to be placed. Only use excavation methods that will leave the foundation rock in a solid and unshattered condition. Roughen the level surfaces, and cut the sloped surfaces, as indicated, into rough steps or benches to provide a satisfactory bond. Protect shales from slaking and all surfaces from erosion resulting from ponding or water flow.

3.8 GROUND SURFACE PREPARATION

3.8.1 General Requirements

Remove and replace unsatisfactory material with satisfactory materials, as directed by the Construction Administrator, in surfaces to receive fill or in excavated areas. Scarify the surface to a depth of 6 inches before the fill is started. Plow, step, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that the fill material will bond with the existing material. When subgrades are less than the specified density, break up the ground surface to a minimum depth of 6 inches,

pulverizing, and compacting to the specified density. When the subgrade is part fill and part excavation or natural ground, scarify the excavated or natural ground portion to a depth of 12 inches and compact it as specified for the adjacent fill.

3.8.2 Frozen Material

Do not place material on surfaces that are muddy, frozen, or contain frost. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Moisten material as necessary to plus or minus 2 percent of optimum moisture.

3.9 UTILIZATION OF EXCAVATED MATERIALS

Dispose unsatisfactory materials removing from excavations into designated waste disposal or spoil areas. Use satisfactory material removed from excavations, insofar as practicable, in the construction of fills, embankments, subgrades, shoulders, bedding (as backfill), and for similar purposes. Submit procedure and location for disposal of unused satisfactory material. Submit proposed source of borrow material. Do not waste any satisfactory excavated material without specific written authorization. Dispose of satisfactory material, authorized to be wasted, in designated areas approved for surplus material storage or designated waste areas as directed. Clear and grub newly designated waste areas on Government-controlled land before disposal of waste material thereon. Stockpile and use coarse rock from excavations for constructing slopes or embankments adjacent to streams, or sides and bottoms of channels and for protecting against erosion. Do not dispose excavated material to obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.

3.10 BACKFILLING AND COMPACTION

Place backfill adjacent to any and all types of structures, in successive horizontal layers of loose material not more than 8 inches in depth. Compact to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials in accordance with ASTM D1557, to prevent wedging action or eccentric loading upon or against the structure. Backfill material must be within the range of -2 to +2 percent of optimum moisture content at the time of compaction.

Prepare ground surface on which backfill is to be placed and provide compaction requirements for backfill materials in conformance with the applicable portions of Paragraphs "Ground Surface Preparation". Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.10.1 Trench Backfill

Backfill trenches to the grade shown. Backfill the trench to 2 feet above the top of pipe prior to performing the required pressure tests. Leave the joints and couplings uncovered during the pressure test.

3.10.1.1 Replacement of Unyielding Material

Replace unyielding material removed from the bottom of the trench with

select granular material or initial backfill material.

3.10.1.2 Replacement of Unstable Material

Replace unstable material removed from the bottom of the trench or excavation with select granular material placed in layers not exceeding 6 inches loose thickness.

3.10.1.3 Bedding and Initial Backfill

Place initial backfill material and compact it with approved tampers to a height of at least 1 foot above the utility pipe or conduit. Bring up the backfill evenly on both sides of the pipe for the full length of the pipe. Take care to ensure thorough compaction of the fill under the haunches of the pipe. Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Compact backfill to top of pipe to 95 percent of ASTM D698 maximum density. Provide plastic piping with bedding to spring line of pipe. Provide materials as follows:

3.10.1.3.1 Class I

Angular, 0.25 to 1.5 inches, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

3.10.1.3.2 Class II

Coarse sands and gravels with maximum particle size of 1.5 inch, including various graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in ASTM D2487.

3.10.1.3.3 Sand

Clean, coarse-grained sand, State of Connecticut Department of Transportation Standard Specifications for Roads and Bridges, Section M.08.

3.10.1.3.4 Gravel and Crushed Stone

Clean, coarsely graded natural gravel, crushed stone or a combination thereof identified as State of Connecticut Department of Transportation Standard Specifications for Roads and Bridges, Section M.08, or having a classification of GW or GP in accordance with ASTM D2487 for bedding and backfill.

3.10.1.4 Final Backfill

Fill the remainder of the trench, except for special materials for roadways, railroads and airfields, with satisfactory material. Place backfill material and compact as follows:

3.10.1.4.1 Roadways and Airfields

Place backfill up to the required elevation as specified. Do not permit water flooding or jetting methods of compaction.

3.10.1.4.2 Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas

Deposit backfill in layers of a maximum of 12 inches loose thickness, and compact it to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils. Do not permit compaction by water flooding or jetting. Apply this requirement to all other areas not specifically designated above.

3.10.2 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed and the concrete has been allowed to cure for 7 days, place backfill in such a manner that the structure will not be damaged by the shock of falling earth. Deposit the backfill material, compact it as specified for final backfill, and bring up the backfill evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.11 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

3.12 SUBGRADE PREPARATION

3.12.1 Proof Rolling

Finish proof rolling on an exposed subgrade free of surface water (wet conditions resulting from rainfall) which would promote degradation of an otherwise acceptable subgrade. Proof roll the existing subgrade with six passes of a 15 ton, pneumatic-tired roller. Operate the roller in a systematic manner to ensure the number of passes over all areas, and at speeds between 2-1/2 to 3-1/2 mph. When proof rolling, provide one-half of the passes made with the roller in a direction perpendicular to the other passes. Notify the Construction Administrator a minimum of 3 days prior to proof rolling. Perform proof rolling in the presence of the Construction Administrator. Undercut rutting or pumping of material as directed by the Construction Administrator and replace with fill and backfill material.

3.12.2 Construction

Shape subgrade to line, grade, and cross section, and compact as specified. Include plowing, disking, and any moistening or aerating required to obtain specified compaction for this operation. Remove soft or otherwise unsatisfactory material and replace with satisfactory excavated material or other approved material as directed. Excavate rock encountered in the cut section to a depth of 6 inches below finished grade for the subgrade. Bring up low areas resulting from removal of unsatisfactory material or excavation of rock to required grade with satisfactory materials, and shape the entire subgrade to line, grade, and cross section and compact as specified. After rolling, do not show deviations for the surface of the subgrade for airfields greater than 1/2 inch when tested with a 16 foot straightedge applied both parallel and at right angles to the centerline of the area. Do not vary the elevation of the finish subgrade more than 0.05 foot from the established grade and cross section.

3.12.3 Compaction

Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Except for paved areas, compact each layer of the embankment to at least 90 percent of laboratory maximum density in accordance with ASTM D1557.

3.12.3.1 Subgrade for Pavements

Compact subgrade for pavements to at least 95 percentage laboratory maximum density for the depth below the surface of the pavement shown. When more than one soil classification is present in the subgrade, thoroughly blend, reshape, and compact the top 12 inches of subgrade.

3.12.3.2 Subgrade for Shoulders

Compact subgrade for shoulders to at least 95 percentage laboratory maximum density for the full depth of the shoulder in accordance with ASTM D1557.

3.12.3.3 Subgrade for Airfield Pavements

Compact top 24 inches below finished pavement or top 12 inches of subgrades, whichever is greater, to 100 percent of ASTM D1557; compact fill and backfill material to 100 percent of ASTM D1557.

3.13 SHOULDER CONSTRUCTION

Construct shoulders of satisfactory excavated or borrow material or as otherwise shown or specified. Submit advanced notice on shoulder construction for rigid pavements. Construct shoulders immediately after adjacent paving is complete. In the case of rigid pavements, do not construct shoulders until permission of the Construction Administrator has been obtained. Compact the entire shoulder area to at least the percentage of maximum density as specified in Paragraph "Subgrade Preparation" above, for specific ranges of depth below the surface of the shoulder. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Finish shoulder construction in proper sequence in such a manner that adjacent ditches will be drained effectively and that no damage of any kind is done to the adjacent completed pavement. Align the completed shoulders true to grade and shaped to drain in conformity with the cross section shown.

3.14 FINISHING

Finish the surface of excavations, embankments, and subgrades to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. Provide the degree of finish for graded areas within 0.1 foot of the grades and elevations indicated except that the degree of finish for subgrades specified in Paragraph "Subgrade Preparation". Finish gutters and ditches in a manner that will result in effective drainage. Finish the surface of areas to be turfed from settlement or washing to a smoothness suitable for the application of turfing materials. Repair graded, topsoiled, or backfilled areas prior to acceptance of the work, and re-established grades to the required elevations and slopes.

3.14.1 Grading Around Structures

Construct areas within 5 feet outside of each building and structure line true-to-grade, shape to drain, and maintain free of trash and debris until final inspection has been completed and the work has been accepted.

3.15 PLACING TOPSOIL

On areas to receive topsoil, prepare the compacted subgrade soil to a 2 inches depth for bonding of topsoil with subsoil. Spread topsoil evenly to a thickness of 4 inches and grade to the elevations and slopes shown. Do not spread topsoil when frozen or excessively wet or dry. Obtain material required for topsoil in excess of that produced by excavation within the grading limits from off-site areas.

3.16 TESTING

Perform testing by a Corps validated commercial testing laboratory or the Contractor's validated testing facility. Submit qualifications of the Corps validated commercial testing laboratory or the Contractor's validated testing facilities. If the Contractor elects to establish testing facilities, do not permit work requiring testing until the Contractor's facilities have been inspected, Corps validated and approved by the Construction Administrator.

- a. Determine field in-place density in accordance with ASTM D1556/D1556M.
- b. When test results indicate, as determined by the Construction Administrator, that compaction is not as specified, remove the material, replace and recompact to meet Specification Requirements.
- c. Perform tests on recompacted areas to determine conformance with Specification Requirements. Appoint a registered professional civil engineer to certify inspections and test results. These certifications shall state that the tests and observations were performed by or under the direct supervision of the engineer and that the results are representative of the materials or conditions being certified by the tests. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each type operation.

3.16.1 Fill and Backfill Material Gradation

One test per 500 cubic yards stockpiled or in-place source material. Determine gradation of fill and backfill material in accordance with ASTM C136/C136M.

3.16.2 In-Place Densities

- a. One test per 500 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated machines.
- b. One test per 200 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by hand-operated machines.
- c. One test per 200 linear feet, or fraction thereof, of each lift of embankment or backfill for airfields.

3.16.3 Moisture Contents

In the stockpile, excavation, or borrow areas, perform a minimum of two tests per day per type of material or source of material being placed during stable weather conditions. During unstable weather, perform tests as dictated by local conditions and approved by the Construction Administrator.

3.16.4 Optimum Moisture and Laboratory Maximum Density

Perform tests for each type material or source of material including borrow material to determine the optimum moisture and laboratory maximum density values. One representative test per 500 cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density.

3.16.5 Tolerance Tests for Subgrades

Perform continuous checks on the degree of finish specified in Paragraph "Subgrade Preparation" during construction of the subgrades.

3.17 DISPOSITION OF SURPLUS MATERIAL

Remove surplus material or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber from Government property to an approved location.

-- End of Section --

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SECTION 32 11 23

AGGREGATE BASE COURSES
08/17

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 in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

- | | |
|--------------|--|
| AASHTO T 180 | (2015) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop |
| AASHTO T 224 | (2010) Standard Method of Test for Correction for Coarse Particles in the Soil Compaction Test |
| AASHTO T 88 | (2013) Standard Method of Test for Particle Size Analysis of Soils |

ASTM INTERNATIONAL (ASTM)

- | | |
|-----------------|--|
| ASTM C117 | (2017) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing |
| ASTM C127 | (2015) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate |
| ASTM C128 | (2015) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate |
| ASTM C131/C131M | (2014) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine |
| ASTM C136/C136M | (2014) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates |
| ASTM C29/C29M | (2017a) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate |
| ASTM C88 | (2013) Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate |

ASTM D1556/D1556M	(2015; E 2016) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
ASTM D1557	(2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³) (2700 kN-m/m ³)
ASTM D2167	(2015) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2487	(2011) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D4318	(2010; E 2014) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D5821	(2013) Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	(2017a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D75/D75M	(2014) Standard Practice for Sampling Aggregates
ASTM E11	(2016) Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

1.2 DEFINITIONS

For the purposes of this Specification, the following definitions apply.

1.2.1 Aggregate Base Course

Aggregate base course (ABC) is well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.2.2 Graded-Crushed Aggregate Base Course

Graded-crushed aggregate (GCA) base course is well graded, crushed, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.2.3 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure presented in ASTM D1557 abbreviated as a percent of laboratory maximum dry density. Since ASTM D1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve will be expressed as a percentage of the laboratory maximum dry density in

accordance with AASHTO T 180 Method D and corrected with AASHTO T 224.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, and Tools; G

Waybills and Delivery Tickets

SD-06 Test Reports

Initial Tests; G

In-Place Tests; G

1.4 EQUIPMENT, TOOLS, AND MACHINES

All plant, equipment, and tools used in the performance of the Work will be subject to approval by the Construction Administrator before the Work is started. Maintain all plant, equipment, and tools in satisfactory working condition at all times. Submit a list of proposed equipment, including descriptive data. Use equipment capable of minimizing segregation, producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

1.5 QUALITY ASSURANCE

Sampling and testing are the responsibility of the Contractor. Perform sampling and testing using a laboratory approved in accordance with Section 01 45 00.00 10 QUALITY CONTROL. Work requiring testing will not be permitted until the testing laboratory has been inspected and approved. Test the materials to establish compliance with the specified requirements and perform testing at the specified frequency. The Construction Administrator may specify the time and location of the tests. Furnish copies of test results to the Construction Administrator within 24 hours of completion of the tests.

1.5.1 Sampling

Take samples for laboratory testing in conformance with ASTM D75/D75M. When deemed necessary, the sampling will be observed by the Construction Administrator.

1.5.2 Tests

1.5.2.1 Sieve Analysis

Perform sieve analysis in conformance with ASTM C117 and ASTM C136/C136M using sieves conforming to ASTM E11. Perform particle-size analysis of the soils in conformance with AASHTO T 88.

1.5.2.2 Liquid Limit and Plasticity Index

Determine liquid limit and plasticity index in accordance with ASTM D4318.

1.5.2.3 Moisture-Density Determinations

Determine the laboratory maximum dry density and optimum moisture content in accordance with ASTM D1557.

1.5.2.4 Field Density Tests

Measure field density in accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938. For the method presented in ASTM D6938 check the calibration curves and adjust them, if necessary, using only the sand cone method as described in Paragraph "Calibration", of the ASTM publication. Tests performed in accordance with ASTM D6938 result in a wet unit weight of soil and ASTM D6938 will be used to determine the moisture content of the soil. Also check the calibration curves furnished with the moisture gauges along with density calibration checks as described in ASTM D6938. Make the calibration checks of both the density and moisture gauges using the prepared containers of material method, as described in Paragraph "Calibration" of ASTM D6938, on each different type of material being tested at the beginning of a job and at intervals as directed.

- a. Submit certified copies of test results for approval not less than 30 days before material is required for the Work.
- b. Submit calibration curves and related test results prior to using the device or equipment being calibrated.
- c. Submit copies of field test results within 24 hours after the tests are performed.

1.5.2.5 Wear Test

Perform wear tests on ABC and GCA course material in conformance with ASTM C131/C131M.

1.5.2.6 Soundness

Perform soundness tests on GCA in accordance with ASTM C88.

1.5.2.7 Weight of Slag

Determine weight per cubic foot of slag in accordance with ASTM C29/C29M on the ABC and GCA course material.

1.5.3 Testing Frequency

1.5.3.1 Initial Tests

Perform one of each of the following tests, on the proposed material prior to commencing construction, to demonstrate that the proposed material meets all specified requirements when furnished. If materials from more than one source are going to be utilized, this testing shall be completed for each source.

- a. Sieve analysis.

- b. Liquid limit and plasticity index.
- c. Moisture-density relationship.
- d. Wear.
- e. Soundness.
- f. Weight per cubic foot of slag.

1.5.3.2 In-Place Tests

Perform each of the following tests on samples taken from the placed and compacted ABC. Samples shall be taken and tested at the rates indicated. Perform sampling and testing of recycled concrete aggregate at twice the specified frequency until the material uniformity is established.

- a. Perform density tests on every lift of material placed and at a frequency of one set of tests for every 250 square yards, or portion thereof, of completed area.
- b. Perform sieve analysis on every lift of material placed and at a frequency of one sieve analysis for every 500 square yards, or portion thereof, of material placed.
- c. Perform liquid limit and plasticity index tests at the same frequency as the sieve analysis.
- d. Measure the total thickness of the base course at intervals, in such a manner as to ensure one measurement for each 500 square yards of base course. Measurements shall be made in 3 inch diameter test holes penetrating the base course.

1.5.4 Approval of Material

Select the source of the material 30 days prior to the time the material will be required in the Work. Tentative approval of material will be based on initial test results. Final approval of the materials will be based on sieve analysis, liquid limit, and plasticity index tests performed on samples taken from the completed and fully compacted course(s).

1.6 ENVIRONMENTAL REQUIREMENTS

Perform construction when the atmospheric temperature is above 35 degrees F. When the temperature falls below 35 degrees F, protect all completed areas by approved methods against detrimental effects of freezing. Correct completed areas damaged by freezing, rainfall, or other weather conditions to meet specified requirements.

PART 2 PRODUCTS

2.1 AGGREGATES

Provide ABC consisting of clean, sound, durable particles of crushed stone, crushed slag, crushed gravel, angular sand, or other approved material. Provide ABC that is free of lumps of clay, organic matter, and other objectionable materials or coatings. The portion retained on the No. 4 sieve is known as coarse aggregate; that portion passing the No. 4

sieve is known as fine aggregate. When the coarse and fine aggregate is supplied from more than one source, provide aggregate from each source that meets the specified requirements.

2.1.1 Coarse Aggregate

Provide coarse aggregates with angular particles of uniform density. Separately stockpile coarse aggregate supplied from more than one source.

- a. Crushed Gravel: Provide crushed gravel that has been manufactured by crushing gravels and that meets all the requirements specified below.
- b. Crushed Stone: Provide crushed stone consisting of freshly mined quarry rock, meeting all the requirements specified below.
- c. Crushed Recycled Concrete: Crushed recycled concrete shall not be used.
- d. Crushed Slag: Provide crushed slag that is an air-cooled blast-furnace product having an air dry unit weight of not less than 70 pcf as determined by ASTM C29/C29M, and meets all the requirements specified below.

2.1.1.1 Aggregate Base Course

The percentage of loss of ABC coarse aggregate must not exceed 50 percent when tested in accordance with ASTM C131/C131M. Provide aggregate that contains no more than 30 percent flat and elongated particles. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, the crushed aggregates must contain at least 50 percent by weight of crushed pieces having two or more freshly fractured faces determined in accordance with ASTM D5821. When two fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as two fractured faces. Manufacture crushed gravel from gravel particles 50 percent of which, by weight, are retained on the maximum size sieve listed in TABLE 1.

2.1.1.2 Graded-Crushed Aggregate Base Course

The percentage of loss of GCA coarse aggregate must not exceed 40 percent loss when tested in accordance with ASTM C131/C131M. Provide GCA coarse aggregate that does not exhibit a loss greater than 18 percent weighted average, at five cycles, when tested for soundness in magnesium sulfate, or 12 percent weighted average, at five cycles, when tested in sodium sulfate in accordance with ASTM C88. Provide aggregate that contains no more than 20 percent flat and elongated particles for the fraction retained on the 1/2 inch sieve nor 20 percent for the fraction passing the 1/2 inch sieve. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, the crushed aggregate must contain at least 90 percent by weight of crushed pieces having two or more freshly fractured faces determined in accordance with ASTM D5821. When two fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as two fractured faces. Manufacture crushed gravel from gravel particles 90 percent of which by weight are retained on the maximum size sieve listed in TABLE 1.

2.1.2 Fine Aggregate

Fine aggregates shall be angular particles of uniform density. When the fine aggregate is supplied from more than one source, aggregate from each source shall meet the specified requirements.

2.1.2.1 Aggregate Base Course

ABC fine aggregate shall consist of screenings, angular sand, crushed recycled concrete fines, or other finely divided mineral matter processed or naturally combined with the course aggregate.

TABLE 1. GRADATION OF AGGREGATES			
Percentage of Weight Passing Square-Mesh Sieve			
Sieve Designation	No. 1	No. 2	No. 3
1 inch	45 - 80	60 - 100	100
1/2 inch	30 - 60	30 - 65	40 - 70
No. 4	20 - 50	20 - 50	20 - 50
No. 10	15 - 40	15 - 40	15 - 40
No. 40	5 - 25	5 - 25	5 - 25
No. 200	0 - 8	0 - 8	0 - 8
NOTE 1: Particles having diameters less than No. 635 shall not be in excess of 3 percent by weight of the total sample tested.			
NOTE 2: The values are based on aggregates of uniform specific gravity. If materials from different sources are used for the coarse and fine aggregates, they shall be tested in accordance with ASTM C127 and ASTM C128 to determine their specific gravities. If the specific gravities vary by more than 10 percent, the percentages passing the various sieves shall be corrected as directed by the Construction Administrator.			

2.2 LIQUID LIMIT AND PLASTICITY INDEX

Apply liquid limit and plasticity index requirements to the completed course and to any component that is blended to meet the required gradation. The portion of any component or of the completed course passing the No. 40 sieve must be either non-plastic or have a liquid limit not greater than 25 and a plasticity index not greater than 5.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

When the ABC or GCA is constructed in more than one layer, clean the previously constructed layer of loose and foreign matter by sweeping with power sweepers or power brooms, except that hand brooms may be used in

areas where power cleaning is not practicable. Provide adequate drainage during the entire period of construction to prevent water from collecting or standing on the working area. Provide line and grade stakes as necessary for control. Grade stakes shall be in lines parallel to the centerline of the area under construction and suitably spaced for string lining.

3.2 OPERATION OF AGGREGATE SOURCES

Clearing, stripping, and excavating are the responsibility of the Contractor. Operate the aggregate sources to produce the quantity and quality of materials meeting the specified requirements in the specified time limit. Upon completion of the Work, the aggregate sources on Government property shall be conditioned to drain readily and shall be left in a satisfactory condition. Aggregate sources on private lands shall be conditioned in agreement with local laws or authorities.

3.3 STOCKPILING MATERIAL

Clear and level storage sites prior to stockpiling of material. Stockpile all materials, including approved material available from excavation and grading, in the manner and at the locations designated. Aggregates shall be stockpiled on the cleared and leveled areas designated by the Construction Administrator to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

3.4 PREPARATION OF UNDERLYING COURSE OR SUBGRADE

Prior to constructing the base course(s), the underlying course or subgrade shall be cleaned of all foreign substances. At the time of construction of the base course(s), the underlying course or subgrade shall meet specified compaction and surface tolerances. The underlying course shall conform to Section 31 00 00 EARTHWORK. Ruts or soft yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the requirements set forth herein shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses containing sands or gravels, as defined in ASTM D2487, the surface shall be stabilized prior to placement of the base course(s). Stabilization shall be accomplished by mixing ABC into the underlying course and compacting by approved methods. The stabilized material shall be considered as part of the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained in a satisfactory condition until the base course is placed.

3.5 INSTALLATION

3.5.1 Mixing the Materials

Mix the coarse and fine aggregates in a stationary plant, or in a traveling plant or bucket loader on an approved paved working area. Make adjustments in mixing procedures or in equipment, as directed, to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to insure a satisfactory base course meeting all requirements of this Specification.

3.5.2 Placing

Place the mixed material on the prepared subgrade or subbase in layers of uniform thickness with an approved spreader. When a compacted layer 6 inches or less in thickness is required, place the material in a single layer. When a compacted layer in excess of 6 inches is required, place the material in layers in excess of equal thickness. No layer shall be thicker than 6 inches or thinner than 3 inches when compacted. The layers shall be so placed that when compacted they will be true to the grades or levels required with the least possible surface disturbance. Where the base course is placed in more than one layer, the previously constructed layers shall be cleaned of loose and foreign matter by sweeping with power sweepers, power brooms, or hand brooms, as directed. Such adjustments in placing procedures or equipment shall be made as may be directed to obtain true grades, to minimize segregation and degradation, to adjust the water content, and to ensure an acceptable base course.

Placing of material shall only take place when temperatures of air, ground, and material are above 35 degrees F.

3.5.3 Grade Control

The finished and completed base course shall conform to the lines, grades, and cross sections shown. Underlying material(s) shall be excavated and prepared at sufficient depth for the required base course thickness so that the finished base course and the subsequent surface course will meet the designated grades.

3.5.4 Edges of Base Course

The base course(s) shall be placed so that the completed section will be a minimum of 2 feet wider, on all sides, than the next layer that will be placed above it, unless the ABC is being placed in a utility trench. Additionally, place approved fill material along the outer edges of the base course in sufficient quantities to compact to the thickness of the course being constructed, or to the thickness of each layer in a multiple layer course, allowing in each operation at least a 2 foot width of this material to be rolled and compacted simultaneously with rolling and compacting of each layer of base course. If this base course material is to be placed adjacent to another pavement section, then the layers for both of these sections shall be placed and compacted along this edge at the same time.

3.5.5 Compaction

Compact each layer of the base course, as specified, with approved compaction equipment. Maintain water content during the compaction procedure to within plus or minus 2 percent of the optimum water content determined from laboratory tests as specified in this Section. Begin rolling at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Alternate trips of the roller shall be slightly different lengths. Speed of the roller shall be such that displacement of the aggregate does not occur. In all places not accessible to the rollers, the mixture shall be compacted with hand-operated power tampers. Continue compaction until each layer has a degree of compaction that is at least 100 percent of laboratory maximum density through the full depth of the layer. Make such adjustments in compacting or finishing procedures as may be directed to obtain true grades, to minimize segregation and

degradation, to reduce or increase water content, and to ensure a satisfactory base course. Any materials that are found to be unsatisfactory shall be removed and replaced with satisfactory material or reworked, as directed, to meet the requirements of the Specification.

3.5.6 Thickness

Construct the compacted thickness of the base course as indicated. No individual layer shall be thicker than 6 inches nor be thinner than 3 inches in compacted thickness. The total compacted thickness of the base course(s) shall be within 1/2 inch of the thickness indicated. Where the measured thickness is more than 1/2 inch deficient, correct such areas by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/2 inch thicker than indicated, the course shall be considered as conforming to the specified thickness requirements. Average Job thickness shall be the average of all thickness measurements taken for the Job, but shall be within 1/4 inch of the thickness indicated. The total thickness of the base course shall be measured at intervals in such a manner as to ensure one measurement for each 500 square yards of base course. Measurements shall be made in 3 inch diameter test holes penetrating the base course.

3.5.7 Proof Rolling

Proof rolling of the areas indicated shall be in addition to the compaction specified and shall consist of the application of 30 coverages with a heavy pneumatic-tired roller having four or more tires, each loaded to a minimum of 30,000 pounds and inflated to a minimum of 125 psi. In areas designated, apply proof rolling to the top of the underlying material on which the base course is laid and to each layer of base course top of the completed ABC course. Maintain water content of the underlying material at optimum or at the percentage directed from start of compaction to completion of proof rolling of that layer. Water content of each layer of the base course shall be maintained at the optimum percentage directed from start of compaction to completion of proof rolling. Any base course materials or any underlying materials that produce unsatisfactory results by proof rolling shall be removed and replaced with satisfactory materials, recompacted and proof rolled to meet these Specifications.

3.5.8 Finishing

The surface of the top layer of base course shall be finished after final compaction and proof-rolling by cutting any overbuild to grade and rolling with a steel-wheeled roller. Thin layers of material shall not be added to the top layer of base course is 1/2 inch or more below grade, then the top layer should be scarified to a depth of at least 3 inches and new material shall be blended in, compacted and proof rolled to bring grade. Adjustments to rolling and finishing procedures shall be made as directed to minimize segregation and degradation, obtain grades, maintain moisture content, and insure an acceptable base course. Should the surface become rough, corrugated, uneven in texture, or traffic marked prior to completion, the unsatisfactory portion shall be scarified, reworked, and recompacted or it shall be replaced as directed.

3.5.9 Smoothness

The surface of the top layer shall show no deviations in excess of 3/8 inch when tested with a 12 foot straightedge. Take measurements in successive positions parallel to the centerline of the area to be paved.

Measurements shall also be taken perpendicular to the centerline at 50 foot intervals. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting it to meet these Specifications.

3.6 TRAFFIC

Do not allow traffic on the completed base course.

3.7 MAINTENANCE

Maintain the base course in a satisfactory condition until the full pavement section is completed and accepted. Immediately repair any defects and repeat repairs as often as necessary to keep the area intact. Retest any base course that was not paved over prior to the onset of winter to verify that it still complies with the requirements of this Specification. Rework or replace any area of base course that is damaged as necessary to comply with this Specification.

3.8 DISPOSAL OF UNSATISFACTORY MATERIALS

Dispose of any unsuitable materials that have been removed outside the limits of Government-controlled land. No additional payments will be made for materials that have to be replaced.

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SECTION 32 12 13

BITUMINOUS TACK AND PRIME COATS
05/17

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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO T 102 (2009; R 2013) Standard Method of Test for
Spot Test of Asphaltic Materials

ASTM INTERNATIONAL (ASTM)

ASTM D140/D140M (2016) Standard Practice for Sampling
Asphalt Materials

ASTM D2397/D2397M (2017) Standard Specification for Cationic
Emulsified Asphalt

ASTM D2995 (1999; R 2009) Determining Application
Rate of Bituminous Distributors

ASTM D977 (2017) Standard Specification for
Emulsified Asphalt

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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Waybills and Delivery Tickets

Local/Regional Materials

SD-06 Test Reports

Sampling and Testing

1.3 QUALITY ASSURANCE

Certificates of compliance for asphalt materials delivered will be obtained and checked to ensure that Specification Requirements are met.

Quantities of applied material will be determined. Payment will be for amount of residual asphalt applied. Tack coat materials will not be diluted. Prime coat materials when emulsions are used can be diluted on-site with potable water up to 1 part emulsion to 1 part water.

1.4 DELIVERY, STORAGE, AND HANDLING

Inspect the materials delivered to the Site for contamination and damage. Unload and store the materials with a minimum of handling.

1.5 EQUIPMENT, TOOLS AND MACHINES

1.5.1 General Requirements

Equipment, tools, and machines used in the work are subject to approval. Maintain in a satisfactory working condition at all times. Calibrate equipment such as asphalt distributors, scales, batching equipment, spreaders and similar equipment within 12 months of their use. If the calibration expires during Project, recalibrate the equipment before work can continue.

1.5.2 Bituminous Distributor

Provide a self propelled distributor with pneumatic tires of such size and number to prevent rutting, shoving or otherwise damaging the surface being sprayed. Calibrate the distributor in accordance with ASTM D2995. Design and equip the distributor to spray the bituminous material in a uniform coverage at the specified temperature, at readily determined and controlled total liquid rates from 0.03 to 1.0 gallons per square yard, with a pressure range of 25 to 75 psi and with an allowable variation from the specified rate of not more than plus or minus 5 percent, and at variable widths. Include with the distributor equipment a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating of materials to the proper application temperature, a thermometer for reading the temperature of tank contents, and a hand hose attachment suitable for applying bituminous material manually to areas inaccessible to the distributor. The distributor will be capable of circulating and agitating the bituminous material during the heating process.

1.5.3 Heating Equipment for Storage Tanks

Use steam, electric, or hot oil heaters for heating the bituminous material. Provide steam heaters consisting of steam coils and equipment for producing steam, so designed that the steam cannot come in contact with the bituminous material. Fix an armored thermometer to the tank with a temperature range from 40 to 400 degrees F so that the temperature of the bituminous material may be determined at all times.

1.5.4 Power Brooms and Power Blowers

Use power brooms and power blowers suitable for cleaning the surfaces to which the bituminous coat is to be applied.

1.6 ENVIRONMENTAL REQUIREMENTS

Apply bituminous coat only when the surface to receive the bituminous coat is dry. A limited amount of moisture (approximately 0.03 gallon/square yard) can be sprayed on the surface of unbound material when prime coat is

used to improve coverage and penetration of asphalt material. Apply bituminous coat only when the atmospheric temperature in the shade is 50 degrees F or above and when the temperature has not been below 35 degrees F for the 12 hours prior to application, unless otherwise directed.

PART 2 PRODUCTS

2.1 PRIME COAT

Provide asphalt conforming to one of the following grades:

2.1.1 Emulsified Asphalt

Provide emulsified asphalt conforming to ASTM D977, Type SS-1 or SS1h ASTM D2397/D2397M, Type CSS-1 or CSS-1h. Asphalt emulsion can be diluted up to 1 part water to 1 part emulsion for prime coat use. Do not dilute asphalt emulsion for tack coat use.

2.2 TACK COAT

2.2.1 Asphalt Cement

Provide asphalt cement conforming to State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Section M.04.

2.2.2 Emulsified Asphalt

Provide emulsified asphalt conforming to ASTM D977, Type RS-1, MS-1, HFMS-1, SS-1, or SS1h [ASTM D2397/D2397M, Type [CRS-1] [CSS-1] [CSS-1h]]. For prime coats the emulsified asphalt can be diluted with up to 1 part emulsion to 1 part water. No dilution is allowed for tack coat applications. The base asphalt used to manufacture the emulsion is required to show a negative spot when tested in accordance with AASHTO T 102 using standard naphtha.

PART 3 EXECUTION

3.1 PREPARATION OF SURFACE

Immediately before applying the bituminous coat, remove all loose material, dirt, clay, or other objectionable material from the surface to be treated by means of a power broom or blower supplemented with hand brooms. Apply treatment only when the surface is dry and clean.

3.2 APPLICATION RATE

The exact quantities within the range specified, which may be varied to suit field conditions, will be determined by the Construction Administrator.

3.2.1 Tack Coat

Apply bituminous material for the tack coat in quantities of not less than 0.03 gallons nor more than 0.10 gallons per square yard of residual asphalt onto the pavement surface as approved by the Construction Administrator. Do not dilute asphalt emulsion when used as a tack coat.

3.2.2 Prime Coat

Apply bituminous material for the prime coat in quantities of not less than 0.05 gallons nor more than 0.12 gallons per square yard of residual asphalt for asphalt emulsion up to a 1 to 1 dilution rate or for residual asphalt for cutback asphalt.

3.3 APPLICATION TEMPERATURE

3.3.1 Viscosity Relationship

Apply asphalt at a temperature that will provide a viscosity between 10 and 60 seconds, Saybolt Furol, or between 20 and 120 centistokes, kinematic. Furnish the temperature viscosity relation to the Construction Administrator.

3.3.2 Temperature Ranges

The viscosity requirements determine the application temperature to be used. The following is a normal range of application temperatures:

Asphalt Emulsion	
All Grades	70-160 degrees F
Asphalt Cement	
All Grades	275-350 degrees F

Some of these temperatures for rapid cure cutbacks are above the flash point of the material and care should be taken in their heating.

3.4 APPLICATION

3.4.1 General

Following preparation and subsequent inspection of the surface, apply the bituminous prime or tack coat with the bituminous distributor at the specified rate with uniform distribution over the surface to be treated. Properly treat all areas and spots, not capable of being sprayed with the distributor, with the hand spray. Until the succeeding layer of pavement is placed, maintain the surface by protecting the surface against damage and by repairing deficient areas at no additional cost to the Government. If required, spread clean dry sand to effectively blot up any excess bituminous material. No smoking, fires, or flames other than those from the heaters that are a part of the equipment are permitted within 25 feet of heating, distributing, and transferring operations of cutback materials. Prevent all traffic, except for paving equipment used in constructing the surfacing, from using the underlying material, whether primed or not, until the surfacing is completed. The bituminous coat requirements are described herein.

3.4.2 Prime Coat

Apply a prime coat at locations shown on the Drawings required if it will be at least 7 days before the asphalt mixture is constructed on the underlying (base course, etc.) compacted material. The type of liquid asphalt and application rate will be as specified herein. Protect the

underlying layer from any damage (water, traffic, etc.) until the surfacing is placed. If the Contractor places the surfacing within seven days, the choice of protection measures or actions to be taken is at the Contractor's option. Repair (recompact or replace) damage to the underlying material caused by lack of, or inadequate, protection by approved methods at no additional cost to the Government. If the Contractor opts to use the prime coat, apply as soon as possible after consolidation of the underlying material. Apply the bituminous material uniformly over the surface to be treated at a pressure range of 25 to 75 psi; the rate will be as specified above in Paragraph "Application Rate". To obtain uniform application of the prime coat on the surface treated at the junction of previous and subsequent applications, spread building paper on the surface for a sufficient distance back from the ends of each application to start and stop the prime coat on the paper and to ensure that all sprayers will operate at full force on the surface to be treated. Immediately after application remove and destroy the building paper.

3.4.3 Tack Coat

Apply tack coat at the locations shown on the drawings. A tack coat should be applied to every bound surface (asphalt or concrete pavement) that is being overlaid with asphalt mixture and at transverse and longitudinal joints. Apply the tack coat when the surface to be treated is clean and dry. Immediately following the preparation of the surface for treatment, apply the bituminous material by means of the bituminous distributor, within the limits of temperature specified herein and at a rate as specified above in Paragraph "Application Rate". Apply the bituminous material so that uniform distribution is obtained over the entire surface to be treated. Treat lightly coated areas and spots missed by the distributor by spraying with a hand wand or using other approved method. Following the application of bituminous material, allow the surface to cure without being disturbed for period of time necessary to permit setting of the tack coat. Apply the bituminous tack coat only as far in advance of the placing of the overlying layer as required for that day's operation. Maintain and protect the treated surface from damage until the succeeding course of pavement is placed.

3.5 CURING PERIOD

Following application of the bituminous material and prior to application of the succeeding layer of asphalt mixture allow the bituminous coat to cure and water or volatiles to evaporate prior to overlaying. Maintain the tacked surface in good condition until the succeeding layer of pavement is placed, by protecting the surface against damage and by repairing and recoating deficient areas. [Allow the prime coat to cure without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course. Furnish and spread enough sand to effectively blot up excess bituminous material.]

3.6 FIELD QUALITY CONTROL

Obtain certificates of compliance for all asphalt material delivered to the Project. Obtain samples of the bituminous material under the supervision of the Construction Administrator. The sample may be retained and tested by the Government at no cost to the Contractor.

3.7 SAMPLING AND TESTING

Furnish certified copies of the manufacturer's test reports indicating temperature viscosity relationship for cutback asphalt or asphalt cement, compliance with applicable specified requirements, not less than 5 days before the material is required in the work.

3.7.1 Sampling

Unless otherwise specified, sample bituminous material in accordance with ASTM D140/D140M.

3.7.2 Calibration Test

Furnish all equipment, materials, and labor necessary to calibrate the bituminous distributor. Calibrate using the approved Job material and prior to applying the bituminous coat material to the prepared surface. Calibrate the bituminous distributor in accordance with ASTM D2995.

3.7.3 Trial Applications

Before applying the spray application of tack or prime coat, apply three lengths of at least 100 feet for the full width of the distributor bar to evaluate the amount of bituminous material that can be satisfactorily applied.

3.7.3.1 Tack Coat Trial Application Rate

Unless otherwise authorized, apply the trial application rate of bituminous tack coat materials in the amount of 0.05 gallons per square yard. Make other trial applications using various amounts of material as may be deemed necessary.

3.7.3.2 Prime Coat Trial Application Rate

Unless otherwise authorized, apply the trial application rate of bituminous materials in the amount of 0.15 gallon per square yard. Make other trial applications using various amounts of material as may be deemed necessary.

3.7.4 Sampling and Testing During Construction

Perform quality control sampling and testing as required in Paragraph "Field Quality Control".

3.8 TRAFFIC CONTROLS

Keep traffic off surfaces freshly treated with bituminous material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces.

-- End of Section --

SECTION 32 12 15.13

ASPHALT PAVING FOR AIRFIELDS
11/17

PART 1 GENERAL

1.1 FULL PAYMENT

1.1.1 Method of Measurement

Measurement of the quantity of hot-mix asphalt pavement, per ton placed and accepted, shall be made for the purposes of assessing the pay factors stipulated below.

1.1.2 Basis of Payment

The measured quantity of hot-mixed asphalt pavement will be paid for and included in the Lump Sum Contract Price. If less than 100 percent payment is due based on the pay factors stipulated in Paragraph "Quality Assurance", a unit price per ton agreed upon by the Contractor and Construction Administrator prior to the start of construction will be used for purposes of calculating the payment reduction.

1.2 PERCENT PAYMENT

When a lot of material fails to meet the Specification Requirements for 100 percent pay as outlined in the following paragraphs, that lot shall be removed and replaced, or accepted at a reduced price which will be computed by multiplying the unit price by the lot's pay factor. The lot pay factor is determined by taking the lowest computed pay factor based on either laboratory air voids, in-place density, grade or smoothness (each discussed below). At the end of the Project, an average of all lot pay factors will be calculated. If this average lot pay factor exceeds 95.0 percent and no individual lot has a pay factor less than 75.0 percent, then the percent payment for the entire Project will be 100 percent of the unit bid price. If the average lot pay factor is less than 95.0 percent, then each lot will be paid for at the unit price multiplied by the lot's pay factor. For any lots which are less than 2000 short tons, a weighted lot pay factor will be used to calculate the average lot pay factor. When work on a lot is required to be terminated before all sublots are completed, the results from the completed sublots will be analyzed to determine the percent payment for the lot following the same procedures and requirements for full lots but with fewer test results.

1.2.1 Mat and Joint Densities

The average in-place mat and joint densities are expressed as a percentage of the average theoretical maximum density (TMD) for the lot. The average TMD for each lot will be determined as the average TMD of the four random samples per lot. The average in-place mat density and joint density for a lot are determined and compared with Table 1 to calculate a single pay factor per lot based on in-place density, as described below. First, a pay factor for both mat density and joint density are determined from Table 1. The area associated with the joint is then determined and will be considered to be 10 feet wide times the length of completed longitudinal construction joint in the lot. This area will not exceed the

total lot size. The length of joint to be considered will be that length where a new lane has been placed against an adjacent lane of asphalt pavement, either an adjacent freshly paved lane or one paved at any time previously. The area associated with the joint is expressed as a percentage of the total lot area. A weighted pay factor for the joint is determined based on this percentage (see example below). The pay factor for mat density and the weighted pay factor for joint density is compared and the lowest selected. This selected pay factor is the pay factor based on density for the lot. When the TMD on both sides of a longitudinal joint is different, the average of these two TMD will be used as the TMD needed to calculate the percent joint density. Rejected lots shall be removed and replaced. Rejected areas adjacent to longitudinal joints shall be removed 4 inches into the cold (existing) lane. All density results for a lot will be completed and reported within 24 hours after the construction of that lot.

Table 1. Pay Factor Based on In-place Density		
Average Mat Density (4 cores)	Pay Factor, percent	Average Joint Density (4 cores)
94.0 - 96.0	100.0	Above 92.5
93.9	100.0	92.4
93.8 or 96.1	99.9	92.3
93.7	99.8	92.2
93.6 or 96.2	99.6	92.1
93.5	99.4	92.0
93.4 or 96.3	99.1	91.9
93.3	98.7	91.8
93.2 or 96.4	98.3	91.7
93.1	97.8	91.6
93.0 or 96.5	97.3	91.5
92.9	96.3	91.4
92.8 or 96.6	94.1	91.3
92.7	92.2	91.2
92.6 or 96.7	90.3	91.1
92.5	87.9	91.0
92.4 or 96.8	85.7	90.9

Table 1. Pay Factor Based on In-place Density		
Average Mat Density (4 cores)	Pay Factor, percent	Average Joint Density (4 cores)
92.3	83.3	90.8
92.2 or 96.9	80.6	90.7
92.1	78.0	90.6
92.0 or 97.0	75.0	90.5
below 92.0, above 97.0	0.0 (reject)	below 90.5

1.2.2 Pay Factor Based on In-place Density

An example of the computation of a pay factor (in I-P units only) based on in-place density, is as follows: Assume the following test results for field density made on the lot: (1) Average mat density = 93.2 percent (of lab TMD). (2) Average joint density = 91.5 percent (of lab TMD). (3) Total area of lot = 30,000 square feet. (4) Length of completed longitudinal construction joint = 2,000 feet.

- a. Step 1: Determine pay factor based on mat density and on joint density, using Table 1:
 - (1) Mat density of 93.2 percent = 98.3 pay factor.
 - (2) Joint density of 91.5 percent = 97.3 pay factor.
- b. Step 2: Determine ratio of joint area (length of longitudinal joint x 10 feet) to mat area (total paved area in the lot): Multiply the length of completed longitudinal construction joint by the specified 10 feet width and divide by the mat area (total paved area in the lot).
 - (1) $(2,000 \text{ feet} \times 10 \text{ feet}) / 30,000 \text{ square feet} = 0.6667$ ratio of joint area to mat area (ratio).
- c. Step 3: Weighted pay factor (wpcf) for joint is determined as indicated below:
 - (1) $\text{Wpcf} = \text{joint pay factor} + (100 - \text{joint pay factor}) (1 - \text{ratio})$
 $= 97.3 + (100 - 97.3) (1 - 0.6667) = 98.2$ percent.
- d. Step 4: Compare weighted pay factor for joint density to pay factor for mat density and select the smaller:
 - (1) Pay factor for mat density: 98.3 percent. Weighted pay factor for joint density: 98.2 percent.
 - (2) Select the smaller of the two values as pay factor based on density: 98.2 percent.

1.2.3 Payment Adjustment for Smoothness (Final Wearing Surface Only)

Profilograph Testing. Record the location and data from all profilograph

measurements. When the Profile Index of a lot exceeds the tolerance specified in Paragraph "Smoothness Requirements" by 1.0 inch per mile, but less than 2.0 inches per mile, after any reduction of high spots or removal and replacement, the computed pay factor for that lot based on surface smoothness will be 95 percent. When the Profile Index exceeds the tolerance by 2.0 inches per mile, but less than 3.0 inches per mile, the computed pay factor will be 90 percent. When the Profile Index exceeds the tolerance by 3.0 inches per mile, but less than 4.0 inches per mile, the computed pay factor will be 75 percent. Remove and replace the lot when the Profile Index exceeds the tolerance by 4.0 inches per mile or more, at no additional cost to the GovernmentOwner. Regardless of the above, correct any small individual area with surface deviation which exceeds the tolerance given above by more than 5.0 inches per mile or more, by grinding to meet the Specification Requirements above or remove and replace at no additional cost to the GovernmentOwner.

1.2.4 Laboratory Air Voids and Theoretical Maximum Density

Laboratory air voids will be calculated in accordance with ASTM D3203/D3203M by determining the density of each lab compacted specimen using the laboratory-prepared, thoroughly dry method in ASTM D2726/D2726M and determining the theoretical maximum density (TMD) of four of the sublots using ASTM D2041/D2041M. Laboratory air void calculations for each lot will use the average theoretical maximum density values obtained for the lot. The mean absolute deviation of the four laboratory air void contents (one from each subplot) from the JMF air void content will be evaluated and a pay factor determined from Table 2. All laboratory air void tests will be completed and reported within 24 hours after completion of construction of each lot. The TMD is also used for computation of compaction, as required in Paragraph "Mat and Joint Densities" above.

1.2.5 Mean Absolute Deviation

An example of the computation of mean absolute deviation for laboratory air voids is as follows: Assume that the laboratory air voids are determined from 4 random samples of a lot (where 3 specimens were compacted from each sample). The average laboratory air voids for each subplot sample are determined to be 3.5, 3.0, 4.0, and 3.7. Assume that the target air voids from the JMF is 4.0. The mean absolute deviation is then:

$$\begin{aligned} \text{Mean Absolute Deviation} &= (|3.5 - 4.0| + |3.0 - 4.0| + |4.0 - 4.0| + |3.7 - 4.0|)/4 \\ &= (0.5 + 1.0 + 0.0 + 0.3)/4 = (1.8)/4 = 0.45 \end{aligned}$$

The mean absolute deviation for laboratory air voids is determined to be 0.45. It can be seen from Table 2 that the lot's pay factor based on laboratory air voids, is 100 percent.

Table 2. Pay Factor Based on Laboratory Air Voids	
Mean Absolute Deviation of Lab Air Voids from JMF	Pay Factor, Percent
0.60 or less	100

Table 2. Pay Factor Based on Laboratory Air Voids	
Mean Absolute Deviation of Lab Air Voids from JMF	Pay Factor, Percent
0.61 - 0.80	98
0.81 - 1.00	95
1.01 - 1.20	90
Above 1.20	reject (0)

1.2.6 Pay Adjustment Based on Grade

Within 5 working days after completion of a particular lot incorporating the final wearing course, test the final wearing surface of the pavement for conformance with specified plan grade requirements. Perform all testing in the presence of the GovernmentEngineer. Provide a final wearing surface of pavement conforming to the elevations and cross sections shown and not vary more than 0.03 foot for runways or 0.05 foot for taxiways and aprons from the plan grade established and approved at Site of work. Match finished surfaces at juncture with other pavements with finished surfaces of abutting pavements. Deviation from the plan elevation will not be permitted in areas of pavements where closer conformance with planned elevation is required for the proper functioning of drainage and other appurtenant structures involved. The grade will be determined by running lines of levels at intervals of 25 feet, or less, longitudinally and transversely, to determine the elevation of the completed pavement surface. Maintain detailed notes of the results of the testing and provide a copy to the GovernmentEngineer immediately after each day's testing. When more than 5 percent of all measurements made within a lot are outside the 0.03 or 0.05 foot tolerance, the pay factor based on grade for that lot will be 95 percent. In areas where the grade exceeds the tolerance by more than 50 percent, remove the surface lift full depth; and replace the lift with asphalt pavement to meet specification requirements, at no additional cost to the GovernmentOwner. Diamond grinding may be used to remove high spots to meet grade requirements. Skin patching for correcting low areas or planing or milling for correcting high areas will not be permitted.

1.3 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 156	(2013; R 2017) Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures
AASHTO T 304	(2011; R 2015) Standard Method of Test for Uncompacted Void Content of Fine Aggregate

AASHTO T 308	(2016) Standard Method of Test for Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
AASHTO T 329	(2015) Standard Test Method for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
ASPHALT INSTITUTE (AI)	
AI MS-2	(2015) Asphalt Mix Design Methods
ASTM INTERNATIONAL (ASTM)	
ASTM C117	(2017) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	(2015) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C128	(2015) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
ASTM C131/C131M	(2014) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136/C136M	(2014) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C142/C142M	(2017) Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C29/C29M	(2017a) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C566	(2013) Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM C88	(2013) Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM D140/D140M	(2016) Standard Practice for Sampling Asphalt Materials
ASTM D1461	(2017) Standard Test Method for Moisture or Volatile Distillates in Asphalt Mixtures
ASTM D2041/D2041M	(2011) Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures

ASTM D2172/D2172M	(2017) Standard Test Methods for Quantitative Extraction of Asphalt Binder from Asphalt Mixtures
ASTM D2419	(2014) Sand Equivalent Value of Soils and Fine Aggregate
ASTM D242/D242M	(2009; R 2014) Mineral Filler for Bituminous Paving Mixtures
ASTM D2489/D2489M	(2016) Standard Test Method for Estimating Degree of Particle Coating of Asphalt Mixtures
ASTM D2726/D2726M	(2017) Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D3203/D3203M	(2017) Standard Test Method for Percent Air Voids in Compacted Asphalt Mixtures
ASTM D3665	(2012; R 2017) Standard Practice for Random Sampling of Construction Materials
ASTM D3666	(2016) Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4125/D4125M	(2010) Asphalt Content of Bituminous Mixtures by the Nuclear Method
ASTM D4791	(2010) Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867/D4867M	(2009; R 2014) Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5444	(2015) Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	(2013; R 2017) Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6307	(2016) Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6925	(2014) Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyrotory Compactor
ASTM D6926	(2016) Standard Practice for Preparation of Asphalt Mixture Specimens Using

Marshall Apparatus

ASTM D6927	(2015) Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D75/D75M	(2014) Standard Practice for Sampling Aggregates
ASTM D979/D979M	(2015) Sampling Bituminous Paving Mixtures
ASTM E1274	(2003; R 2017) Standard Test Method for Measuring Pavement Roughness Using a Profilograph

1.4 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 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Placement Plan; G

SD-03 Product Data

Diamond Grinding Plan; G

Mix Design; G

Contractor Quality Control; G

SD-04 Samples

Aggregates

Asphalt Cement Binder

Warm-Mix Additive

SD-06 Test Reports

Aggregates; G

QC Monitoring

SD-07 Certificates

Asphalt Cement Binder; G

Testing Laboratory

Warm-Mix Additive

1.5 QUALITY ASSURANCE[AND QUALITY CONTROL]

[The Government Engineer's quality assurance (QA) program for this Project is separate and distinct from the Contractor's quality control (QC) program specified in PART 3. Testing for acceptability of work will be performed by the Government Engineer or by an independent laboratory hired by the Construction Administrator Engineer, except for grade and smoothness testing which shall be performed by the Contractor.][Acquire the services of an independent commercial laboratory to perform acceptance testing.] Acceptance of the plant produced mix and in-place requirements will be on a lot to lot basis. A standard lot for all requirements will be equal to 2000 short tons. Where appropriate, adjustment in payment for individual lots of asphalt pavement will be made based on in-place density, laboratory air voids, grade, and smoothness in accordance with the following paragraphs. Grade and surface smoothness determinations will be made on the lot as a whole. Exceptions or adjustments to this will be made in situations where the mix within one lot is placed as part of both the intermediate and surface courses, thus grade and smoothness measurements for the entire lot cannot be made. In order to evaluate laboratory air voids and in-place (field) density, each lot will be divided into four equal sublots.

1.5.1 Sublot Sampling

One random mixture sample for determining laboratory air voids, theoretical maximum density, and for any additional testing the Government Engineer desires, will be taken from a loaded truck delivering mixture to each sublot, or other appropriate location for each sublot. All samples will be selected randomly, using commonly recognized methods of assuring randomness conforming to ASTM D3665 and employing tables of random numbers or computer programs. Laboratory air voids will be determined from three laboratory compacted specimens of each sublot sample in accordance with ASTM D3203/D3203M. The specimens will be compacted within 2 hours of the time the mixture was loaded into trucks at the asphalt plant. Samples will not be reheated prior to compaction and insulated containers will be used as necessary to maintain the temperature.

1.5.2 Additional Sampling and Testing

The Construction Administrator Engineer reserves the right to direct additional samples and tests for any area which appears to deviate from the Specification Requirements. The cost of any additional testing will be paid for by the GovernmentOwner. Testing in these areas will be treated as a separate lot. Payment will be made for the quantity of asphalt pavement represented by these tests in accordance with the provisions of this Section.

1.5.3 In-place Density

For determining in-place density, obtain one random core (4 inches or 6 inches in diameter) at locations [identified by the Government Engineer]from the mat (interior of the lane and at least 12 inches from longitudinal joint or pavement edge) of each sublot, and one random core taken from the joint (immediately over joint) of each sublot, in accordance with ASTM D979/D979M. Fill all core holes with asphalt pavement and compact using a standard Marshall hammer to a mat density as specified. Tack coat dry core holes before filling. Each random core will be full thickness of the layer being placed. When the random core is less than 1 inch thick, it will not be included in the analysis. In this

case, another random core will be taken. After air drying to meet the requirements for laboratory-prepared, thoroughly dry specimens, cores obtained from the mat and from the joints will be used for in-place density determination in accordance with ASTM D2726/D2726M.

1.5.4 Surface Smoothness

Use a straightedge and profilograph for measuring surface smoothness of runway pavements. Use a straightedge for measuring surface smoothness of all other pavement surfaces. Perform all testing in the presence of the GovernmentEngineer. Maintain detailed notes of the testing results and provide a copy to the GovernmentEngineer immediately after each day's testing. Where drawings show required deviations from a plane surface (for instance crowns, drainage inlets), finish the surface to meet the approval of the Government Engineer.

1.5.4.1 Smoothness Requirements

1.5.4.1.1 Straightedge Testing

Provide finished surfaces of the pavements with no abrupt change of 1/8 inch or more, and all pavements within the tolerances specified in Table 3 when checked with an approved 12 foot straightedge.

Table 3. Straightedge Surface Smoothness--Pavements		
Pavement Category	Direction of Testing	Tolerance, inch
Runways and taxiway	Longitudinal	1/8
	Transverse	1/4
Shoulders (outside edge stripe)	Longitudinal	1/4
	Transverse	1/4
Calibration hardstands and compass swinging bases	Longitudinal	1/8
	Transverse	1/8
All other airfields and helicopter paved areas	Longitudinal	1/4
	Transverse	1/4

1.5.4.1.2 Profilograph Testing

Provide finished surfaces of runways with a Profile Index not greater than 7 inches per mile when tested with an approved California-type profilograph.

1.5.4.2 Testing Method

After the final rolling, but not later than 24 hours after placement, test the surface of the pavement in each entire lot in a manner to reveal surface irregularities exceeding the tolerances specified above. If any

pavement areas are diamond ground, retest these areas immediately after diamond grinding. The maximum area allowed to be corrected by diamond grinding is 10 percent of the total area of the lot. Test the entire area of the pavement with a profilograph. Check a number of random locations along with any observed suspicious locations primarily at transverse and longitudinal joints with the straightedge.

1.5.4.2.1 Straightedge Testing

Hold the straightedge in contact with the pavement surface and measure the maximum distance between the straightedge and the pavement surface. Determine the amount of surface irregularity by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points. Use the straightedge to measure abrupt changes in surface grade.

1.5.4.2.2 Profilograph Testing

Perform profilograph testing using an approved California profilograph and procedures described in ASTM E1274. Provide equipment that utilizes electronic recording and automatic computerized reduction of data to indicate "must-grind" bumps and the Profile Index for the pavement. Use a "blanking band" that is 0.2 inch wide and the "bump template" span 1 inch with an offset of 0.4 inch. Provide profilograph operated by an approved, factory-trained operator on the alignments specified above. Provide a copy of the reduced tapes to the GovernmentEngineer at the end of each day's testing.

1.5.4.2.3 Bumps ("Must Grind" Areas)

Reduce any bumps ("must grind" areas) shown on the profilograph trace which exceed 0.4 inch in height by diamond grinding until they do not exceed 0.3 inch when retested. Taper diamond grinding in all directions to provide smooth transitions to areas not requiring diamond grinding. The following will not be permitted: (1) Skin patching for correcting low areas, (2) Planing or milling for correcting high areas. [At the Contractor's option, pavement areas, including diamond ground areas, can be rechecked with the profilograph in order to record a lower Profile Index.][Perform additional profilograph testing in all areas corrected by diamond grinding.]

1.6 ENVIRONMENTAL REQUIREMENTS

Do not place asphalt pavement upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the GovernmentEngineer, if requested; provided all other requirements, including compaction, are met.

Table 4. Surface Temperature Limitations of Underlying Course	
Mat Thickness, inches	Degrees F
3 or greater	40
Less than 3	45

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Perform the work consisting of pavement courses composed of mineral aggregate and asphalt material heated and mixed in a central mixing plant and placed on a prepared course. Provide hot-mix asphalt (HMA) pavement designed and constructed in accordance with this section conforming to the lines, grades, thicknesses, and typical cross sections shown on the drawings. Construct each course to the depth, section, or elevation required by the drawings and rolled, finished, and approved before the placement of the next course. Submit proposed Placement Plan, indicating lane widths, longitudinal joints, and transverse joints for each course or lift.

2.1.1 Asphalt Mixing Plant

Provide plants used for the preparation of asphalt mixture conforming to the requirements of AASHTO M 156 with the following changes:

2.1.1.1 Truck Scales

Weigh the asphalt mixture on approved scales, or on certified public scales at no additional expense to the Government. Inspect and seal scales at least annually by an approved calibration laboratory.

2.1.1.2 Inspection of Plant

Provide access to the Construction Administrator Engineer at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant; verifying weights, proportions, and material properties; checking the temperatures maintained in the preparation of the mixtures and for taking samples. Provide assistance as requested, for the Government Engineer to procure any desired samples.

2.1.1.3 Storage Bins

The asphalt mixture may be stored in non-insulated storage bins for a period of time not exceeding 3 hours. The asphalt mixture may be stored in insulated storage bins for a period of time not exceeding 8 hours. Provide the mix drawn from bins that meets the same requirements as mix loaded directly into trucks.

2.1.2 Hauling Equipment

Provide trucks used for hauling asphalt mixture that have tight, clean, and smooth metal beds. To prevent the mixture from adhering to them, lightly coat the truck beds with a minimum amount of paraffin oil, lime solution, or other approved material. Do not use petroleum based products as a release agent. Provide each truck with a suitable cover to protect the mixture from adverse weather. When necessary to ensure that the mixture is delivered to the Site at the specified temperature, provide insulated or heated truck beds with covers (tarps) that are securely fastened.

2.1.3 Material Transfer Vehicle (MTV)

Provide Material Transfer Vehicles for placement of the asphalt mixture. To transfer the material from the hauling equipment to the paver, use a

self-propelled, material transfer vehicle with a swing conveyor that delivers material to the paver from outside the paving lane and without making contact with the paver. Provide MTV capable to move back and forth between the hauling equipment and the paver providing material transfer to the paver, while allowing the paver to operate at a constant speed. Provide Material Transfer Vehicle with remixing and storage capability to prevent physical and thermal segregation.

2.1.4 Asphalt Pavers

Provide mechanical spreading and finishing equipment consisting of a self-powered paver, capable of spreading and finishing the mixture to the specified line, grade, and cross section. Provide paver screed capable of laying a uniform mixture to meet the specified thickness, smoothness, and grade without physical or temperature segregation, the full width of the material being placed. Provide a screed equipped with a compaction device to be used during all placement.

2.1.4.1 Receiving Hopper

Provide paver with a receiving hopper of sufficient capacity to permit a uniform spreading operation and a distribution system to place the mixture uniformly in front of the screed without segregation. Provide a screed that effectively produces a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

2.1.4.2 Automatic Grade Controls

If an automatic grade control device is used, provide a paver equipped with a control system capable of automatically maintaining the specified screed elevation that is automatically actuated from either a reference line or through a system of mechanical sensors or sensor-directed mechanisms or devices which maintain the paver screed at a predetermined transverse slope and at the proper elevation to obtain the required surface. Provide transverse slope controller capable of maintaining the screed at the desired slope within plus or minus 0.1 percent. Do not use the transverse slope controller to control grade. Provide controls capable of working in conjunction with any of the following attachments:

- a. Ski-type device of not less than 30 feet in length.
- b. Taut stringline set to grade.
- c. Short ski or shoe for joint matching.
- d. Laser control.

2.1.5 Rollers

Provide rollers in good condition and operated at slow speeds to avoid displacement of the asphalt mixture. Provide sufficient number, type, and weight of rollers to compact the mixture to the required density while it is still in a workable condition. Do not use equipment which causes excessive crushing of the aggregate.

2.1.6 Diamond Grinding

Those performing diamond grinding are required to have a minimum of three years experience in diamond grinding of airfield pavements. In areas not

meeting the specified limits for surface smoothness and plan grade, reduce high areas to attain the required smoothness and grade, except as depth is limited below. Reduce high areas by diamond grinding the asphalt pavement with approved equipment after the asphalt pavement is at a minimum age of 14 days. Perform diamond grinding by sawing with saw blades impregnated with an industrial diamond abrasive. Assemble the saw blades in a cutting head mounted on a machine designed specifically for diamond grinding that produces the required texture and smoothness level without damage to the asphalt pavement or joint faces. Provide diamond grinding equipment with saw blades that are 1/8-inch wide, a minimum of 60 blades per 12 inches of cutting head width, and capable of cutting a path a minimum of 3 feet wide. Diamond grinding equipment that causes raveling, fracturing of aggregate, or disturbance to the underlying material will not be allowed. The maximum area corrected by diamond grinding the surface of the asphalt pavement is 10 percent of the total area of any subplot. The maximum depth of diamond grinding is 1/2 inch. Provide diamond grinding machine equipped to flush and vacuum the pavement surface. Dispose of all debris from diamond grinding operations off Government property. Prior to diamond grinding, submit a Diamond Grinding Plan for review and approval. At a minimum, include the daily reports for the deficient areas, the location and extent of deficiencies, corrective actions, and equipment. Remove and replace all pavement areas requiring plan grade or surface smoothness corrections in excess of the limits specified.

Prior to production diamond grinding operations, perform a test section at the approved location, consisting of a minimum of two adjacent passes with a minimum length of 40 feet to allow evaluation of the finish and transition between adjacent passes. Production diamond grinding operations cannot be performed prior to approval.

2.2 AGGREGATES

Sample aggregates in the presence of a Government Representative. Obtain samples in accordance with ASTM D75/D75M and be representative of the materials to be used for the Project. Provide aggregates consisting of crushed stone, crushed gravel, crushed slag, screenings, natural sand and mineral filler, as required. The portion of material retained on the No. 4 sieve is coarse aggregate. The portion of material passing the No. 4 sieve and retained on the No. 200 sieve is fine aggregate. The portion passing the No. 200 sieve is defined as mineral filler. Submit sufficient materials to produce 200 pounds of blended mixture for mix design verification. Submit all aggregate test results and samples to the Government Engineer at least 14 days prior to start of construction. Perform Job aggregate testing no earlier than 6 months before Contract Award.

2.2.1 Coarse Aggregate

Provide coarse aggregate consisting of sound, tough, durable particles, free from films of material that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Provide coarse aggregate particles meeting the following requirements:

- a. The percentage of loss not be greater than 40 [_____] percent after 500 revolutions when tested in accordance with ASTM C131/C131M.
- b. The sodium sulfate soundness loss not exceeding 12 percent, or the magnesium sulfate soundness loss not exceeding 18 percent after five

cycles when tested in accordance with ASTM C88.

- c. At least 75 percent by weight of coarse aggregate contain at least two or more fractured faces when tested in accordance with ASTM D5821 with fractured faces produced by crushing.
- d. The particle shape essentially cubical and the aggregate containing not more than 20 percent, by weight, of flat particles and elongated particles (3:1 ratio of maximum to minimum) when tested in accordance with ASTM D4791.
- e. Slag consisting of air-cooled, blast furnace slag, with a compacted weight of not less than 75 pounds per cubic foot when tested in accordance with ASTM C29/C29M.
- f. Clay lumps and friable particles not exceeding 0.3 percent, by weight, when tested in accordance with ASTM C142/C142M.

2.2.2 Fine Aggregate

Provide fine aggregate consisting of clean, sound, tough, durable particles. Provide aggregate particles that are free from coatings of clay, silt, or any objectionable material, contain no clay balls, and meet the following requirements:

- a. Quantity of natural sand (non-crushed material) added to the aggregate blend not exceeding 15 percent by weight of total aggregate.
- b. Individual fine aggregate sources with a sand equivalent value greater than 45 when tested in accordance with ASTM D2419.
- c. Fine aggregate portion of the blended aggregate with an uncompacted void content greater than 45.0 percent when tested in accordance with AASHTO T 304 Method A.
- d. Clay lumps and friable particles not exceeding 0.3 percent, by weight, when tested in accordance with ASTM C142/C142M.

2.2.3 Mineral Filler

Provide mineral filler consisting of a non-plastic material meeting the requirements of ASTM D242/D242M.

2.2.4 Aggregate Gradation

Provide a combined aggregate gradation that conforms to gradations specified in Table 5, when tested in accordance with ASTM C136/C136M and ASTM C117, and does not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa, but grades uniformly from coarse to fine. Provide a JMF within the specification limits; however, the gradation can exceed the limits when the allowable deviation from the JMF shown in Tables 8 and 9 are applied.

Table 5. Aggregate Gradations		
Sieve Size, inch	Gradation 1 (Base Course)	Gradation 2 (Surface Course)
	Percent Passing by Mass	Percent Passing by Mass
1	100	---
3/4	90-100	100
1/2	68-88	90-100
3/8	60-82	69-89
No. 4	45-67	53-73
No. 8	32-54	38-60
No. 16	22-44	26-48
No. 30	15-35	18-38
No. 50	9-25	11-27
No. 100	6-18	6-18
No. 200	3-6	3-6

2.3 ASPHALT CEMENT BINDER

Provide asphalt cement binder that conforms to State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Section 4.06. Provide test data indicating grade certification by the supplier at the time of delivery of each load to the mix plant. Submit copies of these certifications to the Government Engineer. The supplier is defined as the last source of any modification to the binder. The Government Engineer may sample and test the binder at the mix plant at any time before or during mix production. [Obtain samples for this verification testing in accordance with ASTM D140/D140M and in the presence of the Government Engineer. Provide these samples to the Government Engineer for the verification testing, which will be performed at the Governments expense. Submit 5 gallon sample of the asphalt cement specified for mix design verification and approval not less than 14 days before start of the test section.]

2.4 MIX DESIGN

Develop the mix design. Perform Job Mix formula (JMF) and aggregates testing no earlier than 6 months before Contract Award. Provide asphalt mixture composed of well-graded aggregate, mineral filler if required, and asphalt material. Provide aggregate fractions sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of Table 5. Do not produce asphalt pavement for payment until a JMF has been approved. Design the asphalt mixture using hand-held hammer procedures contained in AI MS-2 and the criteria shown in Table 6. Prepare samples at various asphalt contents

and compacted in accordance with ASTM D6925. Use laboratory compaction temperatures for Polymer Modified Asphalts as recommended by the asphalt cement manufacturer. If the Tensile Strength Ratio (TSR) of the composite mixture, as determined by ASTM D4867/D4867M is less than 75, reject the aggregates or the asphalt mixture treated with an anti-stripping agent. Add a sufficient amount of anti-stripping agent to produce a TSR of not less than 75. If an antistrip agent is required, provide it at no additional cost to the Government. Provide sufficient materials to produce 200 pound of blended mixture to the Government Engineer for verification of mix design at least 14 days prior to construction of test section.

2.4.1 JMF Requirements

Submit the proposed JMF in writing, for approval, at least 14 days prior to the start of the test section, including as a minimum:

- a. Percent passing each sieve size.
- b. Percent of asphalt cement.
- c. Percent of each aggregate and mineral filler to be used.
- d. Asphalt viscosity grade, penetration grade, or performance grade.
- e. Number of Superpave gyratory compactor gyrations.
- f. Laboratory mixing temperature.
- g. Lab compaction temperature.
- h. Temperature-viscosity relationship of the asphalt cement.
- i. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.
- j. Graphical plots and summary tabulation of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-2. Include summary tabulation that includes individual specimen data for each specimen tested.
- k. Specific gravity and absorption of each aggregate.
- l. Percent natural sand.
- m. Percent particles with two or more fractured faces (in coarse aggregate).
- n. Fine aggregate angularity.
- o. Percent flat or elongated particles (in coarse aggregate).
- p. Tensile Strength Ratio and wet/dry specimen test results.
- q. Antistrip agent (if required).
- r. List of all modifiers.
- s. Percentage and properties (asphalt content aggregate gradation, and aggregate properties) of RAP in accordance with Paragraph "Recycled

Asphalt Pavement", if RAP is used.

Table 6. Marshall Design Criteria	
Test Property	75 Blow Mix
Stability, pounds minimum	2150 ⁽¹⁾
Flow, 0.01 inch	8-16 ⁽²⁾
Air voids, percent	4 ⁽⁴⁾
Percent Voids in mineral aggregate (minimum)	See Table 7
Dust Proportion ⁽³⁾	0.8-1.2
TSR, minimum percent	75
TSR Conditioned Strength (minimum psi)	60
(1) This is a minimum requirement. Provide significantly higher average during construction to ensure compliance with the specifications.	
(2) The flow requirement is not applicable for Polymer Modified Asphalts	
(3) Dust Proportion is calculated as the aggregate content, expressed as a percent of mass, passing the No. 200 sieve, divided by the effective asphalt content, in percent of total mass of the mixture.	
(4) Select the JMF asphalt content corresponding to an air void content of 4 percent. Verify the other properties of Table 6 meet the specification requirements at this asphalt content.	

Table 7. Minimum Percent Voids in Mineral Aggregate (VMA) ⁽¹⁾	
Aggregate (See Table 5)	Minimum VMA, percent
Gradation 1	13
Gradation 2	14
(1) Calculate VMA in accordance with AI MS-2, based on ASTM D2726/D2726M bulk specific gravity for the aggregate.	

2.4.2 Adjustments to JMF

The JMF for each mixture is in effect until a new formula is approved in writing by the Government Engineer. Should a change in sources of any materials be made, perform a new mix design and a new JMF approved before the new material is used. Make minor adjustments within the specification limits to the JMF to optimize mix volumetric properties. Adjustments to the original JMF are limited to plus or minus 4 percent on the No. 4 and coarser sieves; plus or minus 3 percent on the No. 8 to No. 50 sieves; and plus or minus 1 percent on the No. 100 sieve. Adjustments to the JMF are

limited to plus or minus 1.0 percent on the No. 200 sieve. Asphalt content adjustments are limited to plus or minus 0.40 from the original JMF. If adjustments are needed that exceed these limits, develop a new mix design.

2.5 RECYCLED ASPHALT PAVEMENT

Recycled asphalt is not allowed for the Project.

PART 3 EXECUTION

3.1 CONTRACTOR QUALITY CONTROL

3.1.1 General Quality Control Requirements

Submit the Quality Control Plan. Do not produce hot-mix asphalt pavement for payment until the quality control plan has been approved. In the quality control plan, address all elements which affect the quality of the pavement including, but not limited to:

- a. Mix Design and unique JMF identification code.
- b. Aggregate Grading.
- c. Quality of Materials.
- d. Stockpile Management and procedures to prevent contamination.
- e. Proportioning including percent of warm-mix additive.
- f. Mixing and Transportation.
- g. Correlation of mechanical hammer to hand hammer. Determine the number of blows of the mechanical hammer required to provide the same density of the JMF as provided by the hand hammer. Use the average of three specimens per trial blow application.
- h. Mixture Volumetrics.
- i. Moisture Content of Mixtures.
- j. Placing and Finishing.
- k. Joints.
- l. Compaction, including Asphalt Pavement-Portland Cement Concrete joints.
- m. Surface Smoothness.
- n. Truck bed release agent.

3.1.2 Testing Laboratory

Provide a fully equipped asphalt laboratory located at the plant or Job Site that is equipped with heating and air conditioning units to maintain a temperature of 75 plus or minus 5 degrees F. Provide laboratory facilities that are kept clean and all equipment maintained in proper working condition. Provide the Government Engineer with unrestricted access to inspect the laboratory facility, to witness quality control

activities, and to perform any check testing desired. The Government Engineer will advise in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to adversely affect test results, immediately suspend the incorporation of the materials into the work. Incorporation of the materials into the work will not be permitted to resume until the deficiencies are corrected.

3.1.3 Quality Control Testing

Perform all quality control tests applicable to these Specifications and as set forth in the Quality Control Program. Required elements of the testing program include, but are not limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, moisture in the asphalt mixture, laboratory air voids, stability, flow, in-place density, grade, and smoothness. Develop a Quality Control Testing Plan as part of the Quality Control Program.

3.1.3.1 Asphalt Content

A minimum of two tests to determine asphalt content will be performed per lot (a lot is defined in Paragraph "Quality Assurance") by one of the following methods: Extraction method in accordance with ASTM D2172/D2172M, Method A or B, the ignition method in accordance with the AASHTO T 308, ASTM D6307, or the nuclear method in accordance with ASTM D4125/D4125M, provided each method is calibrated for the specific mix being used. For the extraction method, determine the weight of ash, as described in ASTM D2172/D2172M, as part of the first extraction test performed at the beginning of plant production; and as part of every tenth extraction test performed thereafter, for the duration of plant production. Use the last weight of ash value in the calculation of the asphalt content for the mixture.

3.1.3.2 Aggregate Properties

Determine aggregate gradations a minimum of twice per lot from mechanical analysis of recovered aggregate in accordance with ASTM D5444 or ASTM D6307. For batch plants, test aggregates in accordance with ASTM C136/C136M using actual batch weights to determine the combined aggregate gradation of the mixture. Determine the specific gravity of each aggregate size grouping for each 20,000 tons in accordance with ASTM C127 or ASTM C128. Determine fractured faces for gravel sources for each 20,000 tons in accordance with ASTM D5821. Determine the uncompacted void content of manufactured sand for each 20,000 tons in accordance with AASHTO T 304 Method A.

3.1.3.3 Temperatures

Check temperatures at least four times per lot, at necessary locations, to determine the temperature at the dryer, the asphalt cement in the storage tank, the asphalt mixture at the plant, and the asphalt mixture at the Job Site.

3.1.3.4 Aggregate Moisture

Determine the moisture content of aggregate used for production a minimum of once per lot in accordance with ASTM C566.

3.1.3.5 Moisture Content of Mixture

Determine the moisture content of the mixture at least once per lot in accordance with AASHTO T 329.

3.1.3.6 Laboratory Air Voids, VMA, Marshall Stability and Flow

Obtain mixture samples at least four times per lot and compacted into specimens, 75 blows per side with the Marshall hand-held hammer as described in ASTM D6926. After compaction, determine the laboratory air voids and VMA of each specimen[, as well as the Marshall stability and flow, as described in ASTM D6927]. Provide VMA within the limits of Table 7.

3.1.3.7 In-Place Density

Conduct any necessary testing to ensure the specified density is achieved. A nuclear gauge or other non-destructive testing device may be used to monitor pavement density.

3.1.3.8 Grade and Smoothness

Conduct the necessary checks to ensure the grade and smoothness requirements are met in accordance with Paragraph "Quality Assurance".

3.1.3.9 Additional Testing

Perform any additional testing, deemed necessary to control the process.

3.1.3.10 QC Monitoring

Submit all QC test results to the Government Engineer on a daily basis as the tests are performed. The Government Engineer reserves the right to monitor any of the Contractor's quality control testing and to perform duplicate testing as a check to the Contractor's quality control testing.

3.1.4 Sampling

When directed by the Government Engineer, sample and test any material which appears inconsistent with similar material being produced, unless such material is voluntarily removed and replaced or deficiencies corrected. Perform all sampling in accordance with standard procedures specified.

3.1.5 Control Charts

For process control, establish and maintain linear control charts on both individual samples and the running average of last four samples for the parameters listed in Table 8, as a minimum. Post the control charts as directed by the Government Engineer and maintain current at all times. Identify the following on the control charts, the Project number, the test parameter being plotted, the individual sample numbers, the Action and Suspension Limits listed in Table 8 applicable to the test parameter being plotted, and the test results. Also show target values (JMF) on the control charts as indicators of central tendency for the cumulative percent passing, asphalt content, and laboratory air voids parameters. When the test results exceed either applicable Action Limit, take immediate steps to bring the process back in control. When the test results exceed either applicable Suspension Limit, halt production until

the problem is solved. When the Suspension Limit is exceeded for individual values or running average values, the Government Engineer has the option to require removal and replacement of the material represented by the samples or to leave in place and base acceptance on mixture volumetric properties and in place density. Use the control charts as part of the process control system for identifying trends so that potential problems can be corrected before they occur. Make decisions concerning mix modifications based on analysis of the results provided in the control charts. In the Quality Control Plan, indicate the appropriate action to be taken to bring the process into control when certain parameters exceed their Action Limits.

Table 8. Action and Suspension Limits for the Parameters to be Plotted on Individual and Running Average Control Charts				
Parameter to be Plotted	Individual Samples		Running Average of Last Four Samples	
	Action Limit	Suspension Limit	Action Limit	Suspension Limit
No. 4 sieve, Cumulative Percent Passing, deviation from JMF target; plus or minus values	6	8	4	5
No. 30 sieve, Cumulative Percent Passing, deviation from JMF target; plus or minus values	4	6	3	4
No. 200 sieve, Cumulative Percent Passing, deviation from JMF target; plus or minus values	1.4	2.0	1.1	1.5
Asphalt content, percent deviation from JMF target; plus or minus value	0.4	0.5	0.2	0.3
Laboratory Air Voids, percent deviation from JMF target value	No specific action and suspension limits set since this parameter is used to determine percent payment			

Table 8. Action and Suspension Limits for the Parameters to be Plotted on Individual and Running Average Control Charts				
Parameter to be Plotted	Individual Samples		Running Average of Last Four Samples	
	Action Limit	Suspension Limit	Action Limit	Suspension Limit
In-place Mat Density, percent of TMD	No specific action and suspension limits set since this parameter is used to determine percent payment			
In-place Joint Density, percent of TMD	No specific action and suspension limits set since this parameter is used to determine percent payment			
VMA				
Gradation 1	13.3	13.0	13.5	13.0
Gradation 2	14.3	14.0	14.5	14.0

Table 8 cont'd. Marshall Compaction				
Stability, pounds (minimum)				
75 blow JMF	1760	1640	2150	2030
Flow, 0.01 inch				
75 blow JMF	8 min.	7 min.	9 min.	8 min.
	16 max.	17 max.	15 max.	16 max.

3.2 PREPARATION OF ASPHALT BINDER MATERIAL

Heat the asphalt cement material while avoiding local overheating and providing a continuous supply of the asphalt material to the mixer at a uniform temperature. Maintain the temperature of unmodified asphalts to no more than 325 degrees F when added to the aggregates. The temperature of modified asphalts is not to exceed 350 degrees F.

3.3 PREPARATION OF MINERAL AGGREGATE

Heat and dry the aggregate for the mixture prior to mixing. No damage to the aggregates due to the maximum temperature and rate of heating used is allowed. Maintain the temperature no lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

3.4 PREPARATION OF HOT-MIX ASPHALT MIXTURE

Weigh or meter the aggregates and the asphalt cement and introduce into the mixer in the amount specified by the JMF. Limit the temperature of the asphalt mixture to 350 degrees F 270 degrees F when the asphalt cement is added. Mix the combined materials until the aggregate obtains a thorough and uniform coating of asphalt binder (testing in accordance with ASTM D2489/D2489M may be required by the Construction Administrator) and is thoroughly distributed throughout the mixture. The moisture content of all asphalt mixture upon discharge from the plant is not to exceed 0.5

percent by total weight of mixture as measured by ASTM D1461.

3.5 PREPARATION OF THE UNDERLYING SURFACE

Immediately before placing asphalt pavement, clean the underlying course of dust and debris. Apply a prime coat in accordance with the Contract Specifications.

3.6 TEST SECTION

Prior to full production, place a test section for each JMF used. Construct a test section consisting of a maximum of 250 tons and two paver passes wide placed in two lanes, with a longitudinal cold joint. Do not place the second lane of test section until the temperature of pavement edge is less than 175 degrees F. Construct the test section with the same depth as the course which it represents. Ensure the underlying grade or pavement structure upon which the test section is to be constructed is the same or very similar to the underlying layer for the Project. Use the same equipment in construction of the test section as on the remainder of the course represented by the test section. Construct the test section as part of the Project pavement as approved by the Government Engineer.

3.6.1 Sampling and Testing for Test Section

Obtain one random sample at the plant, triplicate specimens compacted, and tested for stability, flow, and laboratory air voids. Test a portion of the same sample for theoretical maximum density (TMD), aggregate gradation, and asphalt content. Test an additional portion of the sample to determine the TSR. Adjust the compactive effort as required to provide TSR specimens with an air void content of 7 plus or minus 1 percent. Obtain four randomly selected cores from the finished pavement mat, and four from the longitudinal joint, and tested for density. Perform random sampling in accordance with procedures contained in ASTM D3665. Construction may continue provided the test results are within the tolerances or exceed the minimum values shown in Table 9. If all test results meet the specified requirements, the test section may remain as part of the Project pavement. If test results exceed the tolerances shown, remove and replace the test section and construct another test sectional no additional cost to the Government Owner.

Table 9. Test Section Requirements for Material and Mixture Properties	
Property	Specification Limit
Aggregate Gradation-Percent Passing (Individual Test Result)	
No. 4 and larger	JMF plus or minus 8
No. 8, No. 16, No. 30, and No. 50	JMF plus or minus 6
No. 100 and No. 200	JMF plus or minus 2.0
Asphalt Content, Percent (Individual Test Result)	JMF plus or minus 0.5

Table 9. Test Section Requirements for Material and Mixture Properties	
Property	Specification Limit
Laboratory Air Voids, Percent (Average of 3 specimens)	JMF plus or minus 1.0
VMA, Percent (Average of 3 specimens)	See Table 7
Tensile Strength Ratio (TSR) (At 7 percent plus/minus 1 percent air void content)	75 percent minimum
Conditioned Strength	60 psi minimum
Mat Density, Percent of TMD (Average of 4 Random Cores)	92.0 - 96.0
Joint Density, Percent of TMD (Average of 4 Random Cores)	90.5 minimum
Table 9. cont'd - Marshall Compaction	
Stability, (Average of 3 specimens)	2150 pounds minimum for 75-blow
Flow, 0.01 inch (Average of 3 specimens)	8 - 16 for 75-blow

3.6.2 Additional Test Sections

If the initial test section proves to be unacceptable, make the necessary adjustments to the JMF, plant operation, placing procedures, and rolling procedures before beginning construction of a second test section. Construct and evaluate additional test sections, as required, for conformance to the Specifications. Full production paving is not allowed until an acceptable test section has been constructed and accepted.

3.7 TESTING LABORATORY

Laboratories used to develop the JMF, perform Contractor Quality Control testing, and Government Engineer quality assurance and acceptance testing are required to meet the requirements of ASTM D3666. Perform all required test methods by an accredited laboratory. [The Government will inspect the laboratory equipment and test procedures prior to the start of hot-mix warm-mix operations for conformance with ASTM D3666. Maintain the laboratory validation for the duration of the Project.] Submit a certification of compliance signed by the manager of the laboratory stating that it meets these requirements to the Government Engineer prior to the start of construction. At a minimum, include the following certifications:

- a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.
- b. A listing of equipment to be used in developing the Job Mix.
- c. A copy of the laboratory's quality control system.

- d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program.

3.8 TRANSPORTING AND PLACING

3.8.1 Transporting

Transport asphalt mixture from the mixing plant to the Site in clean, tight vehicles. Schedule deliveries so that placing and compacting of mixture is uniform with minimum stopping and starting of the paver. Provide adequate artificial lighting for night placements. Hauling over freshly placed material is not permitted until the material has been compacted as specified, and allowed to cool to 140 degrees F.

3.8.2 Placing

Place the mix in lifts of adequate thickness and compacted at a temperature suitable for obtaining density, surface smoothness, and other specified requirements. Upon arrival, place the mixture to the full width by an asphalt paver; strike off in a uniform layer of such depth that, when the work is completed, the required thickness and conform to the grade and contour indicated. Do not broadcast waste mixture onto the mat or recycled into the paver hopper. Collect waste mixture and dispose off-site. Regulate the speed of the paver to eliminate pulling and tearing of the asphalt mat. Begin placement of the mixture along the centerline of a crowned section or on the high side of areas with a one-way slope. Place the mixture in consecutive adjacent strips having a minimum width of 10 feet. Offset the longitudinal joint in one course from the longitudinal joint in the course immediately below by at least 1 foot; however, locate the joint in the surface course at the centerline of the pavement. Offset transverse joints in one course by at least 10 feet from transverse joints in the previous course. Offset transverse joints in adjacent lanes a minimum of 10 feet. On isolated areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture may be spread and luted by hand tools.

3.9 COMPACTION OF MIXTURE

3.9.1 General

- a. After placing, thoroughly and uniformly compact the mixture by rolling. Compact the surface as soon as possible without causing displacement, cracking, or shoving. Determine the sequence of rolling operations and the type of rollers used, except as specified in Paragraph "Asphalt Pavement-Portland Cement Concrete Joints" and with the exception that application of more than three passes with a vibratory roller in the vibrating mode is prohibited. Maintain the speed of the roller, at all times, sufficiently slow to avoid displacement of the asphalt mixture and be effective in compaction. Correct at once any displacement occurring as a result of reversing the direction of the roller, or from any other cause.
- b. Furnish sufficient rollers to handle the output of the plant. Continue rolling until the surface is of uniform texture, true to grade and cross section, and the required field density is obtained. To prevent adhesion of the mixture to the roller, keep the wheels properly moistened, but excessive water is not permitted. In areas

not accessible to the roller, thoroughly compact the mixture with hand tampers. Remove the full depth of any mixture that becomes loose and broken, mixed with dirt, contains check-cracking, or is in any way defective, replace with fresh asphalt mixture and immediately compact to conform to the surrounding area. Perform this work at no expense to the Government. Skin patching is not allowed.

3.9.2 Segregation

The Government Engineer can sample and test any material that looks deficient. When the in-place material appears to be segregated, the Government Engineer has the option to sample the material and have it tested and compared to the aggregate gradation, asphalt content, and in-place density requirements in Table 9. If the material fails to meet these Specification Requirements, remove and replace the extent of the segregated material the full depth of the layer of asphalt mixture at no additional cost to the Government. When segregation occurs in the mat, take appropriate action to correct the process so that additional segregation does not occur.

3.10 JOINTS

Construct joints to ensure a continuous bond between the courses and to obtain the required density. Provide all joints with the same texture as other sections of the course and meet the requirements for smoothness and grade.

3.10.1 Transverse Joints

Do not pass the roller over the unprotected end of the freshly laid mixture, except when necessary to form a transverse joint. When necessary to form a transverse joint, construct by means of placing a bulkhead or by tapering the course. Utilize a dry saw cut on the transverse joint full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. Cutting equipment that uses water as a cooling or cutting agent nor milling equipment is permitted. Remove the cutback material from the project. In both methods, provide a light tack coat of asphalt material to all contact surfaces before placing any fresh mixture against the joint.

3.10.2 Longitudinal Joints

Cut back longitudinal joints which are irregular, damaged, uncompacted, cold (less than 175 degrees F at the time of placing the adjacent lane), or otherwise defective, a maximum of 3 inches from the top edge of the lift with a cutting wheel to expose a clean, sound, near vertical surface for the full depth of the course. Remove all cutback material from the Project. Cutting equipment that uses water as a cooling or cutting agent nor milling equipment is permitted. Provide a light tack coat of asphalt material to all contact surfaces prior to placing any fresh mixture against the joint.

3.10.3 Asphalt Pavement-Portland Cement Concrete Joints

Joints between asphalt pavement and Portland Cement Concrete (PCC) require specific construction procedures for the asphalt pavement. The following criteria are applicable to the first 10 feet or paver width of asphalt pavement adjacent to the PCC.

- a. Place the asphalt pavement side of the joint in a direction parallel to the joint.
- b. Place the asphalt pavement side sufficiently high so that when fully compacted the asphalt pavement is greater than 1/8 inch but less than 1/4 inch higher than the PCC side of the joint.
- c. Compact with steel wheel rollers and at least one rubber tire roller. Compact with a rubber tire roller that weights at least 20 tons with tires inflated to at least 90 psi. Avoid spalling the PCC during placement and compaction of the asphalt pavement. Operate steel wheel rollers in a way that prevents spalling the PCC. Repair any damage to PCC edges or joints as directed by the Government Engineer. If damage to the PCC joint or panel edge exceeds a total of 3 feet, remove and replace the PCC panel at no additional expense to the Government.
- d. After compaction is finished, diamond grind a minimum width of 3 feet of the asphalt pavement so that the asphalt pavement side is less than 1/8 inch higher than the PCC side. Perform diamond grinding in accordance with Subparagraph "Diamond Grinding" above. The asphalt pavement immediately adjacent to the joint is not allowed to be lower than the PCC after the grinding operation. Transition the grinding into the asphalt pavement in a way that ensures good smoothness and provides drainage of water. The joint and adjacent materials when completed is required to meet all of the requirements for grade and smoothness. Measure smoothness across the asphalt pavement-PCC joint using a 12 feet straightedge. The acceptable tolerance is 1/8 inch.
- e. Consider the asphalt pavement next to the PCC as a separate lot for evaluation. Lots are based on individual lifts. Do not commingle cores from different lifts for density evaluation purposes. Take four cores for each lot of material placed adjacent to the joint. The size of lot is 10 feet wide by the length of the joint being paved. Locate the center of each of the four cores 6 inches from the edge of the concrete. Take each core at a random location along the length of the joint. The requirements for joint density for this lot, adjacent to the PCC joint, are the same as that for the mat density specified in Table 1. For asphalt pavement-PCC joints at taxiways abutting runways, aprons, or other taxiways, take two additional randomly located cores along each taxiway intersection.
- f. All procedures, including repair of damaged PCC, are required to be in accordance with the approved Quality Control Plan.

-- End of Section --

SECTION 32 12 17

HOT MIX BITUMINOUS PAVEMENT

04/08

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 156 (2013; R 2017) Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures

ASPHALT INSTITUTE (AI)

AI MS-2 (2015) Asphalt Mix Design Methods

ASTM INTERNATIONAL (ASTM)

ASTM C117 (2017) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing

ASTM C127 (2015) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate

ASTM C128 (2015) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate

ASTM C131/C131M (2014) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

ASTM C136/C136M (2014) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

ASTM C188 (2016) Standard Test Method for Density of Hydraulic Cement

ASTM C29/C29M (2017a) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate

ASTM C88 (2013) Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

ASTM D1073	(2016) Fine Aggregate for Bituminous Paving Mixtures
ASTM D1188	(2007; E 2010) Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens
ASTM D140/D140M	(2016) Standard Practice for Sampling Asphalt Materials
ASTM D2041/D2041M	(2011) Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2172/D2172M	(2017) Standard Test Methods for Quantitative Extraction of Asphalt Binder from Asphalt Mixtures
ASTM D242/D242M	(2009; R 2014) Mineral Filler for Bituminous Paving Mixtures
ASTM D2726/D2726M	(2017) Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D3666	(2016) Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4867/D4867M	(2009; R 2014) Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D546	(2017) Standard Test Method for Sieve Analysis of Mineral Filler for Asphalt Paving Mixtures
ASTM D692/D692M	(2015) Coarse Aggregate for Bituminous Paving Mixtures
ASTM D6927	(2015) Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D70	(2009; E 2009) Specific Gravity and Density of Semi-Solid Bituminous Materials (Pycnometer Method)
ASTM D75/D75M	(2014) Standard Practice for Sampling Aggregates
ASTM D854	(2014) Specific Gravity of Soil Solids by Water Pycnometer
ASTM D979/D979M	(2015) Sampling Bituminous Paving Mixtures

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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-04 Samples

Bituminous Pavement

SD-05 Design Data

Job-Mix Formula

Submit a job-mix formula, prepared specifically for this Project for approval prior to preparing and placing the bituminous mixture. Design mix using procedures contained in Chapter V, "Marshall Method of Mix Design", of AI MS-2. Formulas shall indicate physical properties of the mixes as shown by tests made by a commercial laboratory approved by the Construction Administrator, using materials identical to those to be provided on this Project. Submit formulas with material samples. Job-mix formula for each mixture shall be in effect until modified in writing by the Contractor and approved by the Construction Administrator. Provide a new job-mix formula for each source change. Submittal shall include all tests indicated in "Mix Design" section of this Specification.

Asphalt Cement Binder

Mix Design

SD-06 Test Reports

Specific Gravity Test of Asphalt

Coarse Aggregate Tests

Weight of Slag Test

Percent of Crushed Pieces in Gravel

Fine Aggregate Tests

Specific Gravity of Mineral Filler

Bituminous Mixture Tests

Aggregates Tests

Bituminous Mix Tests

Pavement Courses

Submit in accordance with Paragraph entitled "Mock-Up Test Section."

1.3 QUALITY ASSURANCE

1.3.1 Safety Requirements

Provide adequate and safe stairways with handrails to the mixer platform, and safe and protected ladders or other means for accessibility to plant operations. Guard equipment and exposed steam or other high temperature lines or cover with a suitable type of insulation.

1.3.2 Required Data

Job-mix formula shall show the following:

- a. Source and proportions, percent by weight, of each ingredient of the mixture;
- b. Correct gradation, the percentages passing each size sieve listed in the Specifications for the mixture to be used, for the aggregate and mineral filler from each separate source and from each different size to be used in the mixture and for the composite mixture;
- c. Amount of material passing the No. 200 sieve determined by dry sieving;
- d. Number of blows of hammer compaction per side of molded specimen;
- e. Temperature viscosity relationship of the asphalt cement;
- f. Stability, flow, percent voids in mineral aggregate, percent air voids, unit weight;
- g. Asphalt absorption by the aggregate;
- h. Effective asphalt content as percent by weight of total mix;
- i. Temperature of the mixture immediately upon completion of mixing;
- j. Asphalt performance grade viscosity grade; and
- k. Curves for the wearing course[s].

1.3.3 Charts

Plot and submit, on a grain size chart, the specified aggregate gradation band, the job-mix gradation and the job-mix tolerance band.

1.3.4 Selection of Optimum Asphalt Content

Base selection on percent of total mix and the average of values at the following points on the curves for each mix:

- a. Stability: Peak.
- b. Unit Weight: Peak.
- c. Percent Air Voids: Median.

1.4 DELIVERY, STORAGE, AND HANDLING

Inspect materials delivered to the Site for damage and store with a

minimum of handling. Store aggregates in such a manner as to prevent segregation, contamination, or intermixing of the different aggregate sizes.

1.5 ENVIRONMENTAL CONDITIONS

Place bituminous mixture only during dry weather and on dry surfaces. Place courses only when the surface temperature of the underlying course is greater than 45 degrees F for course thicknesses greater than 1 inch and 55 degrees F for course thicknesses 1 inch or less.

1.6 CONSTRUCTION EQUIPMENT

Calibrated equipment, such as scales, batching equipment, spreaders and similar equipment, shall have been recalibrated by a calibration laboratory approved by the Construction Administrator within 12 months of commencing work.

1.6.1 Mixing Plant

Design, coordinate, and operate the mixing plant to produce a mixture within the job-mix formula tolerances and to meet the requirements of AASHTO M 156, including additional plant requirements specified herein. The plant shall be a batch type, continuous mix type or drum-dryer mixer type, and shall have sufficient capacity to handle the new bituminous construction. Minimum plant capacity shall be 100 tons per hour. The mixing plant and equipment shall remain accessible at all times for inspecting operation, verifying weights, proportions and character of materials, and checking mixture temperatures.

1.6.1.1 Cold Aggregate Feeder

Provide plant with a feeder or feeders capable of delivering the maximum number of aggregate sizes required in their proper proportion. Provide adjustment for total and proportional feed and feeders capable of being locked in any position. When more than one cold elevator is used, feed each elevator as a separate unit and install individual controls integrated with a master control.

1.6.1.2 Dryer

Provide rotary drum-dryer which continuously agitates the mineral aggregate during the heating and drying process. When one dryer does not dry the aggregate to specified moisture requirements, provide additional dryers.

1.6.1.3 Plant Screens and Bins for Batch and Continuous Mix Plants

Use screen to obtain accurate gradation and allow no bin to contain more than 10 percent oversize or undersize. Inspect screens each day prior to commencing work for plugged, worn, or broken screens. Clean plugged screens and replace worn or broken screens with new screens prior to beginning operations. Divide hot aggregate bins into at least three compartments arranged to ensure separate and adequate storage of appropriate fractions of the aggregate.

1.6.1.4 Testing Laboratory

Provide a testing laboratory for control and acceptance testing functions

during periods of mix production, sampling and testing, and whenever materials subject to the provisions of these Specifications are being supplied or tested. The laboratory shall provide adequate equipment, space, and utilities as required for the performance of the specified tests.

1.6.1.5 Surge and Storage Bins

Use for temporary storage of hot bituminous mixtures will be permitted under the following conditions:

- a. When stored in surge bins for a period of time not to exceed 3 hours.
- b. When stored in insulated and heated storage bins for a period of time not to exceed 12 hours. If it is determined by the Construction Administrator that there is an excessive amount of heat loss, segregation, and oxidation of the mixture due to temporary storage, discontinue use of surge bins or storage bins.

1.6.1.6 Drum-Dryer Mixer

Do not use drum-dryer mixer if specified requirements of the bituminous mixture or of the completed bituminous pavement course cannot be met. If drum-dryer mixer is prohibited, use either batch or continuous mix plants meeting the Specifications and producing a satisfactory mix.

1.6.2 Paving Equipment

1.6.2.1 Spreading Equipment

Self-propelled electronically controlled type, unless other equipment is authorized by the Construction Administrator. Equip spreading equipment of the self-propelled electronically controlled type with hoppers, tamping or vibrating devices, distributing screws, electronically adjustable screeds, and equalizing devices. Capable of spreading hot bituminous mixtures without tearing, shoving, or gouging and to produce a finished surface of specified grade and smoothness. Operate spreaders, when laying mixture, at variable speeds between 5 and 45 feet per minute. Design spreader with a quick and efficient steering device; a forward and reverse traveling speed; and automatic devices to adjust to grade and confine the edges of the mixture to true lines. The use of a spreader that leaves indented areas or other objectionable irregularities in the fresh laid mix during operations is prohibited.

1.6.2.2 Rolling Equipment

Self-propelled pneumatic-tired rollers supplemented by three-wheel and tandem type steel wheel rollers. The number, type, and weight of rollers shall be sufficient to compact the mixture to the required density without detrimentally affecting the compacted material. Rollers shall be suitable for rolling hot-mix bituminous pavements and capable of reversing without backlash. Pneumatic-tired rollers shall be capable of being operated both forward and backward without turning on the mat, and without loosening the surface being rolled. Equip rollers with suitable devices and apparatus to keep the rolling surfaces wet and prevent adherence of bituminous mixture. Vibratory rollers especially designed for bituminous concrete compaction may be used provided rollers do not impair stability of pavement structure and underlying layers. Repair depressions in pavement surfaces resulting from use of vibratory rollers. Rollers shall be

self-propelled, single or dual vibrating drums, and steel drive wheels, as applicable; equipped with variable amplitude and separate controls for energy and propulsion.

1.6.2.3 Hand Tampers

Minimum weight of 25 pounds with a tamping face of not more than 50 square inches.

1.6.2.4 Mechanical Hand Tampers

Commercial type, operated by pneumatic pressure or by internal combustion.

PART 2 PRODUCTS

2.1 AGGREGATES

Grade and proportion aggregates and filler so that combined mineral aggregate conforms to specified grading.

2.1.1 Coarse Aggregates

ASTM D692/D692M, except as modified herein. At least 75 percent by weight of aggregate retained on the No. 4 sieve shall have two or more fractured faces. Percentage of wear, Los Angeles test, except for slag, shall not exceed 40 in accordance with ASTM C131/C131M. Weight of slag shall not be less than 70 pounds per cubic foot. Soundness test is required in accordance with ASTM C88; after 5 cycles, loss shall not be more than 12 percent when tested with sodium sulfate or 18 percent when tested with magnesium sulfate.

2.1.2 Fine Aggregate

ASTM D1073, except as modified herein. Fine aggregate shall be produced by crushing stone, slag, or gravel that meets requirements for wear and soundness specified for coarse aggregate. Where necessary to obtain the gradation of aggregate blend or workability, natural sand may be used. Quantity of natural sand to be added shall be approved by the Construction Administrator and shall not exceed 15 percent of weight of coarse and fine aggregate and material passing the No. 200 sieve.

2.1.3 Mineral Filler

Non-plastic material meeting the requirements of ASTM D242/D242M.

2.1.4 Aggregate Gradation

The combined aggregate gradation shall conform to gradations specified in Table I, when tested in accordance with ASTM C136/C136M and ASTM C117, and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa, but grade uniformly from coarse to fine.

Table I. Aggregate Gradations		
	Gradation 1 (Base Course)	Gradation 2 (Surface Course)
Sieve Size, inch	Percent Passing by Mass	Percent Passing by Mass
1	100	---
3/4	76-96	100
1/2	68-88	76-96
3/8	60-82	69-89
No. 4	45-67	53-73
No. 8	32-54	38-60
No. 16	22-44	26-48
No. 30	15-35	18-38
No. 50	9-25	11-27
No. 100	6-18	6-18
No. 200	3-6	3-6

2.2 ASPHALT CEMENT BINDER

Asphalt cement binder shall conform to State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Section 4.06. Test data indicating grade certification shall be provided by the supplier at the time of delivery of each load to the mix plant. Copies of these certifications shall be submitted to the Construction Administrator/Engineer. The supplier is defined as the last source of any modification to the binder. The Construction Administrator/Engineer may sample and test the binder at the mix plant at any time before or during mix production. Samples for this verification testing shall be obtained by the Contractor in accordance with ASTM D140/D140M and in the presence of the Construction Administrator/Engineer. These samples shall be furnished to the Construction Administrator/Engineer for the verification testing, which shall be at no cost to the Contractor. Samples of the asphalt cement specified shall be submitted for approval not less than 14 days before start of the test section.

2.3 MIX DESIGN

The Contractor shall develop the mix design. The asphalt mix shall be composed of a mixture of well-graded aggregate, mineral filler if required, and asphalt material. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF). No hot-mix asphalt for payment shall be produced until a JMF has been approved. The hot-mix asphalt shall be designed using procedures

contained in AI MS-2 and the criteria shown in Table II. If the Tensile Strength Ratio (TSR) of the composite mixture, as determined by ASTM D4867/D4867M is less than 75, the aggregates shall be rejected or the asphalt mixture treated with an approved anti-stripping agent. The amount of anti-stripping agent added shall be sufficient to produce a TSR of not less than 75. If an antistrip agent is required, it shall be provided by the Contractor at no additional cost.

2.3.1 JMF Requirements

The job mix formula shall be submitted in writing by the Contractor for approval at least 14 days prior to the start of the test section and shall include as a minimum:

- a. Percent passing each sieve size.
- b. Percent of asphalt cement.
- c. Percent of each aggregate and mineral filler to be used.
- d. Asphalt viscosity grade, penetration grade, or performance grade.
- e. Number of blows of hammer per side of molded specimen.
- f. Laboratory mixing temperature.
- g. Lab compaction temperature.
- h. Temperature-viscosity relationship of the asphalt cement.
- i. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.
- j. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-2.
- k. Specific gravity and absorption of each aggregate.
- l. Percent natural sand.
- m. Percent particles with two or more fractured faces (in coarse aggregate).
- n. Fine aggregate angularity.
- o. Percent flat or elongated particles (in coarse aggregate).
- p. Tensile Strength Ratio.
- q. Antistrip agent (if required) and amount.
- r. List of all modifiers and amount.
- s. Percentage and properties (asphalt content, binder properties, and aggregate properties) of RAP in accordance with Paragraph "Recycled Hot-Mix Asphalt", if RAP is used.

Table II. Marshall Design Criteria		
Test Property	75 Blow Mix	50 Blow Mix
Stability, pounds minimum	*2150	*1350
Flow, 0.01 inch	8-16	8-18
Air voids, percent	3-5	3-5
Percent Voids in mineral aggregate (minimum)	See Table III	See Table III
TSR, minimum percent	75	75
* This is a minimum requirement. The average during construction shall be significantly higher than this number to ensure compliance with the Specifications.		
Table III. Minimum Percent Voids in Mineral Aggregate (VMA)**		
Aggregate (See Table 2)	Minimum VMA, percent	
Gradation 1	13.0	
Gradation 2	14.0	
** Calculate VMA in accordance with AI MS-2, based on ASTM D2726/D2726M bulk specific gravity for the aggregate.		

2.3.2 Adjustments to JMF

The JMF for each mixture shall be in effect until a new formula is approved in writing by the Construction Administrator. Should a change in sources of any materials be made, a new mix design shall be performed and a new JMF approved before the new material is used. The Contractor will be allowed to adjust the JMF within the limits specified below to optimize mix volumetric properties. Adjustments to the JMF shall be limited to plus or minus 3 percent on the 1/2 inch, No. 4, and No. 8 sieves; plus or minus 1.0 percent on the No. 200 sieve; and plus or minus 0.40 percent binder content. If adjustments are needed that exceed these limits, a new mix design shall be developed. Tolerances given above may permit the aggregate grading to be outside the limits shown in Table I; this is acceptable.

2.4 RECYCLED HOT MIX ASPHALT

Reclaimed Asphalt Pavement (RAP) shall not be used on this Project.

2.5 SOURCE QUALITY CONTROL

Employ a commercial laboratory approved by the Construction Administrator to perform testing. The laboratory used to develop the JMF and the laboratory used to perform all sampling and testing shall meet the requirements of ASTM D3666. A certification signed by the manager of the laboratory stating that it meets these requirements or clearly listing all deficiencies shall be submitted to the Construction Administrator prior to the start of construction. The certification shall contain as a minimum:

- a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.
- b. A listing of equipment to be used in developing the job mix.
- c. A copy of the laboratory's quality control system.
- d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program.

2.5.1 Tests

Perform testing in accordance with the following:

- a. Specific Gravity Test of Asphalt: ASTM D70.
- b. Coarse Aggregate Tests:
 - (1) Bulk Specific Gravity: ASTM C127.
 - (2) Abrasion Loss: ASTM C131/C131M.
 - (3) Soundness Loss: ASTM C88.
- c. Weight of Slag Test: ASTM C29/C29M.
- d. Percent of Crushed Pieces in Gravel: Count by observation and weight.
- e. Fine Aggregate Tests:
 - (1) Bulk Specific Gravity: ASTM C128.
 - (2) Soundness Loss: ASTM C88.
- f. Specific Gravity of Mineral Filler: ASTM C188 or ASTM D854.
- g. Bituminous Mixture Tests:
 - (1) Bulk Specific Gravity: ASTM D1188 or ASTM D2726/D2726M.
 - (2) Theoretical Maximum Specific Gravity: ASTM D2041/D2041M.
 - (3) Tensile Strength Ratio: ASTM D4867/D4867M.

2.5.2 Specimens

ASTM D6927 for the making and testing of bituminous specimens with the following exceptions:

- a. Compaction: Apply 75 blows of the hammer to each flat face of the specimens.
- b. Curves: Plot curves for the leveling, binder, and wearing course[s] to show the effect on the test properties of at least four different percentages of asphalt on the unit weight, stability, flow, air voids, and voids in mineral aggregate; each point on the curves shall represent the average of at least four specimens.
- c. Cooling of Specimen: After compaction is completed, allow the specimen to cool in air to the same temperature approximately as that of the water, 77 degrees F, to be used in the specific gravity determination.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Preparation of Asphalt Binder Material

The asphalt cement material shall be heated avoiding local overheating and providing a continuous supply of the asphalt material to the mixer at a uniform temperature. The temperature of unmodified asphalts shall be no more than 325 degrees F when added to the aggregates. Modified asphalts shall be no more than 350 degrees F when added to the aggregate.

3.1.2 Preparation of Mineral Aggregates

Store different size aggregate in separate stockpiles so that different sizes will not mix. Stockpile different-sized aggregates in uniform layers by use of a clam shell or other approved method so as to prevent segregation. The use of bulldozers in stockpiling of aggregate or in feeding aggregate to the dryer is prohibited. Feed aggregates into the cold elevator by means of separate mechanical feeders so that aggregates are graded within requirements of the job-mix formulas and tolerances specified. Regulate rates of feed of the aggregates so that moisture content and temperature of aggregates are within tolerances specified herein. Dry and heat aggregates to the temperature necessary to achieve the mixture determined by the job mix formula within the job tolerance specified. Provide adequate dry storage for mineral filler.

3.1.3 Preparation of Bituminous Mixture

Accurately weigh aggregates and dry mineral filler and convey into the mixer in the proportionate amounts of each aggregate size required to meet the job-mix formula. In batch mixing, after aggregates and mineral filler have been introduced into the mixer and mixed for not less than 15 seconds, add asphalt by spraying or other approved methods and continue mixing for a period of not less than 20 seconds, or as long as required to obtain a homogeneous mixture. The time required to add or spray asphalt into the mixer will not be added to the total wet-mixing time provided the operation does not exceed 10 seconds and a homogeneous mixture is obtained. When a continuous mixer is employed, mixing time shall be more than 35 seconds to obtain a homogeneous mixture. Additional mixing time, when required, will be as directed by the Construction Administrator. When mixture is prepared in a twin-pugmill mixer, volume of the aggregates, mineral filler, and asphalt shall not extend above tips of mixer blades when blades are in a vertical position. Overheated and carbonized mixtures, or mixtures that foam or show indication of free

moisture, will be rejected. When free moisture is detected in batch or continuous mix plant produced mixtures, waste the mix and withdraw the aggregates in the hot bins immediately and return to the respective stockpiles; for drum-dryer mixer plants, waste the mix, including that in surge or storage bins that is affected by free moisture.

3.1.4 Transportation of Bituminous Mixtures

Transport bituminous material from the mixing plant to the paving site in trucks having tight, clean, smooth beds that have been coated with a minimum amount of concentrated solution of hydrated lime and water or other approved coating to prevent adhesion of the mixture to the truck. Petroleum products will not be permitted for coating truck. If air temperature is less than 60 degrees F or if haul time is greater than 30 minutes, cover each load with canvas or other approved material of ample size to protect the mixture from the loss of heat. Make deliveries so that the spreading and rolling of all the mixture prepared for one day's run can be completed during daylight, unless adequate approved artificial lighting is provided. Deliver mixture to area to be paved so that the temperature at the time of dumping into the spreader is within the range specified herein. Reject loads that are below minimum temperature, that have crusts of cold unworkable material, or that have been wet excessively by rain. Hauling over freshly laid material is prohibited.

3.1.5 Surface Preparation of Underlying Course

Prior to the laying of the asphalt concrete, clean underlying course of foreign or objectionable matter with power blowers or power brooms, supplemented by hand brooms and other cleaning methods where necessary. During the placement of multiple lifts of bituminous concrete, each succeeding lift of bituminous concrete shall have its underlying lift cleaned and provided with a bituminous tack coat if the time period between the placement of each lift of bituminous concrete exceeds 14 days, or the underlying bituminous concrete has become dirty. [Remove grass and other vegetative growth from existing cracks and surfaces.]

3.1.6 Spraying of Contact Surfaces

Spray contact surfaces of previously constructed pavement with a thin coat of bituminous materials to act as an anti-stripping agent. Paint contact surfaces of structures with a thin coat of emulsion or other approved bituminous material prior to placing the bituminous mixture. Tack coat the previously placed primed coats on base courses when surface has become excessively dirty and cannot be cleaned or when primed surface has cured to the extent that it has lost all bonding effect.

3.2 PLACEMENT

3.2.1 Machine Spreading

The range of temperatures of the mixtures at the time of spreading shall be between 250 degrees F and 300 degrees F. Bituminous concrete having temperatures less than minimum spreading temperature when dumped into the spreader will be rejected. Adjust spreader and regulate speed so that the surface of the course is smooth and continuous without tears and pulling, and of such depth that, when compacted, the surface conforms with the cross section, grade, and contour indicated. Unless otherwise directed, begin the placing along the centerline of areas to be paved on a crowned section or on the high side of areas with a one-way slope. Place mixture

in consecutive adjacent strips having a minimum width of 10 feet, except where the edge lanes require strips less than 10 feet to complete the area. Construct longitudinal joints and edges to true line markings. Establish lines parallel to the centerline of the area to be paved, and place string lines coinciding with the established lines for the spreading machine to follow. Provide the number and location of the lines needed to accomplish proper grade control. When specified grade and smoothness requirements can be met for initial lane construction by use of an approved long ski-type device of not less than 30 feet in length and for subsequent lane construction by use of a short ski or shoe, in-place string lines for grade control may be omitted. Place mixture as nearly continuous as possible and adjust the speed of placing as needed to permit proper rolling.

3.2.2 Shoveling, Raking, and Tamping After Machine-Spreading

Shovelers and rakers shall follow the spreading machine. Add or remove hot mixture and rake the mixture as required to obtain a course that when completed will conform to requirements specified herein. Broadcasting or fanning of mixture over areas being compacted is prohibited. When segregation occurs in the mixture during placing, suspend spreading operation until the cause is determined and corrected. Correct irregularities in alignment left by the spreader by trimming directly behind the machine. Immediately after trimming, compact edges of the course by tamping laterally with a metal lute or by other approved methods. Distortion of the course during tamping is prohibited.

3.2.3 Hand-Spreading in Lieu of Machine-Spreading

In areas where the use of machine spreading is impractical, spread mixture by hand. The range of temperatures of the mixtures when dumped onto the area to be paved shall be between 250 and 300 degrees F. Mixtures having temperatures less than minimum spreading temperature when dumped onto the area to be paved will be rejected. Spread hot mixture with rakes in a uniformly loose layer of a thickness that, when compacted, will conform to the required grade, thickness, and smoothness. During hand spreading, place each shovelful of mixture by turning the shovel over in a manner that will prevent segregation. Do not place mixture by throwing or broadcasting from a shovel. Do not dump loads any faster than can be properly handled by the shovelers and rakers.

3.3 COMPACTION OF MIXTURE

Compact mixture by rolling. Begin rolling as soon as placement of mixture will bear rollers. Delays in rolling freshly spread mixture shall not be permitted. Start rolling longitudinally at the extreme sides of the lanes and proceed toward center of pavement, or toward high side of pavement with a one-way slope. Operate rollers so that each trip overlaps the previous adjacent strip by at least 1 foot. Alternate trips of the roller shall be of slightly different lengths. Conduct tests for conformity with the specified crown, grade, and smoothness immediately after initial rolling. Before continuing rolling, correct variations by removing or adding materials as necessary. If required, subject course to diagonal rolling with the steel wheeled roller crossing the lines of the previous rolling while mixture is hot and in a compactible condition. Speed of the rollers shall be slow enough to avoid displacement of hot mixture. Correct displacement of mixture immediately by use of rakes and fresh mixture, or remove and replace mixture as directed. Continue rolling until roller marks are eliminated and course has a density of at least 97

percent but not more than 100 percent of that attained in a laboratory specimen of the same mixture prepared in accordance with ASTM D6927. During rolling, moisten wheels of the rollers enough to prevent adhesion of mixture to wheels, but excessive water is prohibited. Operation of rollers shall be by competent and experienced operators. Provide sufficient rollers for each spreading machine in operation on the Job and to handle plant output. In places not accessible to the rollers, compact mixture thoroughly with hot hand tampers. Skin patching of an area after compaction is prohibited. Remove mixture that becomes mixed with foreign materials or is defective and replace with fresh mixture compacted to the density specified herein. Roller shall pass over unprotected edge of the course only when laying of course is to be discontinued for such length of time as to permit mixture to become cold.

3.4 JOINTS

Joints shall present the same texture and smoothness as other portions of the course, except permissible density at the joint may be up to 2 percent less than the specified course density. Carefully make joints between old and new pavement or within new pavements in a manner to ensure a thorough and continuous bond between old and new sections of the course. Vertical contact surfaces of previously constructed sections that are coated with dust, sand, or other objectionable material shall be painted with a thin uniform coat of emulsion or other approved bituminous material just before placing fresh mixture.

3.4.1 Transverse

Roller shall pass over unprotected end of freshly laid mixture only when laying of course is to be discontinued. Except when an approved bulkhead is used, cut back the edge of previously laid course to expose an even, vertical surface for the full thickness of the course. When required, rake fresh mixture against joints, thoroughly tamp with hot tampers, smooth with hot smoothers, and roll. Transverse joints in adjacent lanes shall be offset a minimum of 2 feet.

3.4.2 Longitudinal Joints

Space 6 inches apart. Do not allow joints to coincide with joints of existing pavement or previously placed courses. Spreader screed shall overlap previously placed lanes 2 to 3 inches and be of such height to permit compaction to produce a smooth dense joint. With a lute, push back mixture placed on the surface of previous lanes to the joint edge. Do not scatter mix. Remove and waste excess material. When edges of longitudinal joints are irregular, honeycombed, or poorly compacted, cut back unsatisfactory sections of joint and expose an even vertical surface for the full thickness of the course. When required, rake fresh mixture against joint, thoroughly tamp with hot tampers, smooth with hot smoothers, and roll while hot.

3.5 FIELD QUALITY CONTROL

3.5.1 Sampling

3.5.1.1 Aggregates At Source

Prior to production and delivery of aggregates, take at least one initial sample in accordance with ASTM D75/D75M at the source. Collect each sample by taking three incremental samples at random from the source

material to make a composite sample of not less than 50 pounds. Repeat the sampling when the material source changes or when testing reveals unacceptable deficiencies or variations from the specified grading of materials.

3.5.1.2 Cold Feed Aggregate Sampling

Take two samples daily from the belt conveying materials from the cold feed. Collect materials in three increments at random to make a representative composite sample of not less than 50 pounds. Take samples in accordance with ASTM D75/D75M.

3.5.1.3 Coarse and Fine Aggregates

Take a 50 pound sample from the cold feed at least once daily for sieve analyses and specific gravity tests. Additional samples may be required to perform more frequent tests when analyses show deficiencies, or unacceptable variances or deviations. The method of sampling is as specified herein for aggregates.

3.5.1.4 Mineral Filler

ASTM D546. Take samples large enough to provide ample material for testing.

3.5.1.5 Pavement and Mixture

Take plant samples for the determination of mix properties and field samples for thickness and density of the completed pavements. Furnish tools, labor, and material for samples, and satisfactory replacement of pavement. Take samples and tests at not less than frequency specified hereinafter and at the beginning of plant operations; for each day's work as a minimum; each change in the mix or equipment; and as often as directed. Accomplish sampling in accordance with ASTM D979/D979M.

3.5.2 Testing

3.5.2.1 Aggregates Tests

- a. Gradation: ASTM C136/C136M.
- b. Mineral Filler Content: ASTM D546.
- c. Abrasion: ASTM C131/C131M for wear (Los Angeles test). Perform one test initially prior to incorporation into the work and each time the source is changed.

3.5.2.2 Bituminous Mix Tests

Test one sample for each 500 tons, or fraction thereof, of the uncompacted mix for extraction in accordance with ASTM D2172/D2172M; perform a sieve analysis on each extraction sample in accordance with ASTM C136/C136M and ASTM C117. Test one sample for each 500 tons or fraction thereof for stability and flow in accordance with ASTM D6927. Test one sample for each material blend for Tensile Strength Ratio in accordance with ASTM D4867/D4867M.

3.5.2.3 Pavement Courses

Perform the following tests:

- a. Density: For each 1000 tons of bituminous mixture placed, determine the representative laboratory density by averaging the density of four laboratory specimens prepared in accordance with ASTM D6927. Samples for laboratory specimens shall be taken from trucks delivering mixture to the Site; record in a manner approved by the Construction Administrator the Project Areas represented by the laboratory densities. From each representative area recorded, determine field density of pavement by averaging densities of 4 inch diameter cores obtained from binder and wearing course[s]; take one core for each 2000 square yards or fraction thereof of course placed. Determine density of laboratory prepared specimens and cored samples in accordance with ASTM D1188 or ASTM D2726/D2726M, as applicable. Separate pavement layers by sawing or other approved means. Maximum allowable deficiency at any point, excluding joints, shall not be more than 2 percent less than the specified density for any course. The average density of each course, excluding joints, shall be not less than the specified density. Joint densities shall not be more than 2 percent less than specified course densities and are not included when calculating average course densities. When the deficiency exceeds the specified tolerances, correct each such representative area or areas by removing the deficient pavement and replacing with new pavement.
- b. Thickness: Determine thickness of binder and wearing courses from samples taken for the field density test. The maximum allowable deficiency at any point shall not be more than 1/4 inch less than the thickness for the indicated course. Average thickness of course or of combined courses shall be not less than the indicated thickness. Where a deficiency exceeds the specified tolerances, correct each such representative area or areas by removing the deficient pavement and replacing with new pavement.
- c. Smoothness: Straightedge test the compacted surface of binder and wearing course[s] as work progresses. Apply straightedge parallel with and at right angles to the centerline after final rolling. Unevenness of binder course shall not vary more than 1/4 inch in 10 feet; variations in the wearing course shall not vary more than 1/8 inch in 10 feet. Correct each portion of the pavement showing irregularities greater than that specified.
- d. Finish Surface Texture of Wearing Course: Visually check final surface texture for uniformity and reasonable compactness and tightness. Final wearing course with a surface texture having undesirable irregularities such as segregation, cavities, pulls or tears, checking, excessive exposure of coarse aggregates, sand streaks, indentations, ripples, or lack of uniformity shall be removed and replaced with new materials.

3.6 PROTECTION

Do not permit vehicular and aircraft traffic, including heavy equipment, on pavement until surface temperature has cooled to at least 120 degrees F. Measure surface temperature by approved surface thermometers or other satisfactory methods.

-- End of Section --

SECTION 32 13 11

CONCRETE PAVEMENT FOR AIRFIELDS AND OTHER HEAVY-DUTY PAVEMENTS
11/15

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 182 (2005; R 2017) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 201.1R (2008) Guide for Conducting a Visual Inspection of Concrete in Service

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 305R (2010) Guide to Hot Weather Concreting

ACI 306R (2016) Guide to Cold Weather Concreting

ASTM INTERNATIONAL (ASTM)

ASTM A615/A615M (2016) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

ASTM A775/A775M (2016) Standard Specification for Epoxy-Coated Steel Reinforcing Bars

ASTM A996/A996M (2016) Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement

ASTM C1017/C1017M (2013; E 2015) Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete

ASTM C1064/C1064M (2011) Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete

ASTM C1077	(2016) Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C117	(2017) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C123/C123M	(2014) Standard Test Method for Lightweight Particles in Aggregate
ASTM C1260	(2014) Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C131/C131M	(2014) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136/C136M	(2014) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C138/C138M	(2017a) Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C142/C142M	(2017) Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C143/C143M	(2015) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150/C150M	(2017) Standard Specification for Portland Cement
ASTM C1567	(2013) Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C1602/C1602M	(2012) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete
ASTM C1646/C1646M	(2016) Making and Curing Test Specimens for Evaluating Frost Resistance of Coarse Aggregate in Air-Entrained Concrete by Rapid Freezing and Thawing
ASTM C172/C172M	(2017) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C174/C174M	(2016) Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C192/C192M	(2016a) Standard Practice for Making and

	Curing Concrete Test Specimens in the Laboratory
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 C294	(2012) Standard Descriptive Nomenclature for Constituents of Concrete Aggregates
ASTM C295/C295M	(2012) Petrographic Examination of Aggregates for Concrete
ASTM C31/C31M	(2018a) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33/C33M	(2016) Standard Specification for Concrete Aggregates
ASTM C494/C494M	(2016) Standard Specification for Chemical Admixtures for Concrete
ASTM C618	(2012a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666/C666M	(2015) Resistance of Concrete to Rapid Freezing and Thawing
ASTM C78/C78M	(2016) Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C88	(2013) Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C881/C881M	(2015) Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C94/C94M	(2017a) Standard Specification for Ready-Mixed Concrete
ASTM C989/C989M	(2017) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM D1751	(2004; E 2013; R 2013) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D2995	(1999; R 2009) Determining Application Rate of Bituminous Distributors

ASTM D3665	(2012) Random Sampling of Construction Materials
ASTM D4791	(2010) Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D75/D75M	(2014) Standard Practice for Sampling Aggregates
ASTM E1274	(2003; R 2017) Standard Test Method for Measuring Pavement Roughness Using a Profilograph

NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA QC 3	(2011) Quality Control Manual: Section 3, Plant Certifications Checklist: Certification of Ready Mixed Concrete Production Facilities
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U.S. AIR FORCE (USAF)

AF ETL 97-5	(1997) Proportioning Concrete Mixtures with Graded Aggregates for Rigid Airfield Pavements
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U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 130	(2001) Standard Recommended Practice for Estimating Scratch Hardness of Coarse Aggregate Particles
COE CRD-C 143	(1962) Specifications for Meters for Automatic Indication of Moisture in Fine Aggregate
COE CRD-C 300	(1990) Specifications for Membrane-Forming Compounds for Curing Concrete
COE CRD-C 521	(1981) Standard Test Method for Frequency and Amplitude of Vibrators for Concrete
COE CRD-C 55	(1992) Test Method for Within-Batch Uniformity of Freshly Mixed Concrete
COE CRD-C 662	(2009) Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials, Lithium Nitrate Admixture and Aggregate (Accelerated Mortar-Bar Method)

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL

PROCEDURES:

SD-03 Product Data

Diamond Grinding Plan; G

Dowels; G

Dowel Bar Assemblies; G

Equipment

Proposed Techniques; G

SD-05 Design Data

Preliminary Proposed Proportioning; G

Proportioning Studies; G

SD-06 Test Reports

Batch Plant Manufacturer's Inspection Report; G

Slipform Paver Manufacturer's Inspection Report; G

Sampling and Testing; G

Diamond Grinding of PCC Surfaces; G

Mixer Performance (Uniformity) Testing; G

Repair Recommendations Plan; G

SD-07 Certificates

Contractor Quality Control Staff; G

Laboratory Accreditation and Validation

Commercial Laboratory; G

NRMCA Certificate of Conformance

1.3 QUALITY CONTROL

1.3.1 Contractor Quality Control Staff

Reference Section 01 45 00.00 10 QUALITY CONTROL for Contractor personnel qualification requirements. Submit American Concrete Institute certification for Contractor Quality Control staff. Qualifications and resumes for petrographer, surveyor, concrete batch plant operator, and profilograph operator. All Contractor Quality Control personnel assigned to concrete construction are required to be American Concrete Institute (ACI) certified in the following grade:

- a. The minimum requirements for the CQC System Manager consist of being a graduate engineer or a graduate of construction management, with a minimum of 5 years airfield construction experience and a minimum of 1

year experience as a CQC System Manager on an airfield construction project.

- b. CQC personnel responsible for inspection of concrete paving operations: ACI Concrete Transportation Inspector. The ACI Concrete Transportation Inspector is required to be present at the paving site during all paving operations, with the exception of the initial saw cutting operation. The QC manager is required to be present during initial saw cutting operations.
- c. CQC staff is required to oversee all aspects of sawing operations (sawing, flushing, vacuuming, checking for random cracking, lighting).
- d. Lead Foreman or Journeyman of the Concrete Placing, Finishing, and Curing Crews: ACI Concrete Flatwork Technician/Finisher.
- e. Batch Plant Manufacturer's Representative: A representative from the batch plant manufacturer is required to be on-site to inspect and make necessary adjustments to all components of the batch plant including but not limited to aggregate bin weighing operations, water metering, cement and fly ash weighing devices. All necessary inspections and adjustments by the manufacturer representative is required to be performed prior to uniformity testing. Submit a written Batch Plant Manufacturer's Inspection Report signed by the representative noting all inspection items and corrections and stating the batch plant is capable of producing the volume of concrete as required herein.
- f. Field Testing Technicians: ACI Concrete Field Testing Technician, Grade I.
- g. Slipform Paving Equipment Manufacturer's Representative: A representative of the slipform paving equipment manufacturer is required to be on-site to inspect and make corrections to the paving equipment to ensure proper operations. Perform a complete and full hydraulic flow test of the vibrator system prior to the test section being placed. Submit a written Slipform Paver Manufacturer's Inspection Report signed by the manufacturer's representative noting all inspections, corrections, and flow tests have been performed and the paver is in a condition to perform the required work.
- h. Laboratory Testing Technicians: ACI Concrete Strength Testing Technician and Laboratory Testing Technician, Grade I or II.

1.3.2 Other Staff

Submit for approval, the qualifications and resumes for the following staff:

- a. Petrographer: Bachelor of Science degree in geology or petrography, trained in petrographic examination of concrete aggregate according to ASTM C294 and ASTM C295/C295M and trained in identification of the specific deleterious materials and tests identified in this Specification. Detail the education, training, and experience related to the Project-specific test methods and deleterious materials in the Resume and submit at least 20 days before petrographic and deleterious materials examination is to commence.
- b. Licensed Surveyor: Perform all survey work under the supervision of a Licensed Surveyor.

- c. Concrete Batch Plant Operator: National Ready Mix Concrete Association (NRMCA) Plant Manager certification.
- d. Profilograph Operator: Certification by equipment manufacturer or a state Department of Transportation.

1.3.3 Laboratory Accreditation and Validation

Provide laboratory and testing facilities. Submit accreditation of the commercial laboratory by an independent evaluation authority, indicating conformance to ASTM C1077, including all applicable test procedures. The laboratories performing the tests are required to be accredited in accordance with ASTM C1077, including ASTM C78/C78M and ASTM C1260. Provide current accreditation and include the required and optional test methods, as specified. In addition, all Contractor quality control testing laboratories performing acceptance testing require USACE validation by the Material Testing Center (MTC) for both parent laboratory and on-site laboratory. Validation on all laboratories is required to remain current throughout the duration of the Paving Project. Contact the MTC manager listed at <http://www.erdc.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/9254/ArticleID/102422> for costs and scheduling. Provide on-site temperature-controlled concrete curing facilities.

1.3.3.1 Aggregate Testing and Mix Proportioning

Aggregate testing and mixture proportioning studies are required to be performed by a commercial laboratory.

1.3.3.2 Acceptance Testing

Provide all materials, labor, and facilities required for molding, curing, testing, and protecting test specimens at the paving site and in the laboratory. Provide steel molds for molding the beam specimens. Provide and maintain boxes or other facilities suitable for storing and curing the specimens at the paving site while in the mold within the temperature range stipulated by ASTM C31/C31M. Provide flexural loading equipment in accordance with ASTM C78/C78M.

1.3.3.3 Contractor Quality Control

All sampling and testing is required to be performed by an approved, on-site, independent, commercial laboratory, or for cementitious materials and admixtures, the manufacturer's laboratory.

1.3.3.4 Laboratory Inspection

The Government will inspect all laboratories requiring validation for equipment and test procedures prior to the start of any concreting operations for conformance to ASTM C1077. Schedule and provide payment for laboratory inspections. Additional payment or a time extension due to failure to acquire the required laboratory validation is not allowed. The laboratory is to maintain this certification for the duration of the Project.

1.3.4 Preconstruction Testing of Materials

All sampling and testing is required to be performed. Use an approved

commercial laboratory or, for cementitious materials and chemical admixtures, a laboratory maintained by the manufacturer of the material. Materials are not allowed to be used until notice of acceptance has been given. Additional payment or extension of time due to failure of any material to meet Project Requirements, or for any additional sampling or testing required is not allowed. Additional tests may be performed by the Government; such Government testing does not relieve any required testing responsibilities.

1.3.4.1 Aggregates

Sample aggregates in the presence of a Government Representative. Obtain samples in accordance with ASTM D75/D75M and be representative of the materials to be used for the Project. Submit test results a minimum of 7 days before commencing mixture proportioning studies.

1.3.4.2 Chemical Admixtures, Curing Compounds and Epoxies

At least 30 days before the material is used, submit certified copies of test results for the specific lots or batches to be used on the Project. Provide test results less than 6 months old prior to use in the Work. Retest chemical admixtures that have been in storage at the Project Site for longer than 6 months or that have been subjected to freezing, and rejected if test results do not meet manufacturer requirements.

1.3.4.3 Cementitious Materials

Cement, slag cement, will be accepted on the basis of manufacturer's certification of compliance, accompanied by mill test reports showing that the material in each shipment meets the requirements of the Specification under which it is provided. Provide mill test reports no more than 1 month old, prior to use in the Work. Do not use cementitious materials until notice of acceptance has been given. Cementitious materials may be subjected to testing by the Government from samples obtained at the mill, at transfer points, or at the Project Site. If tests prove that a cementitious material that has been delivered is unsatisfactory, promptly remove it from the Project Site. Retest cementitious material that has not been used within 6 months after testing, and reject if test results do not meet manufacturer requirements.

1.3.5 Testing During Construction

During construction, sample and test aggregates, cementitious materials, and concrete as specified herein. The Government will sample and test concrete and ingredient materials as considered appropriate. Provide facilities and labor as may be necessary for procurement of representative test samples. Testing by the Government does not relieve the specified testing requirements.

1.3.6 Test Section

Up to 10 days, but not more than 60 days, prior to construction of the concrete pavement, construct a test section as part of the production paving area at an outer edge as directed by the engineer. Construct test section of the same depth as the course which it represents. The underlying grade or pavement structure upon which the test section is to be constructed is required to be the same as the remainder of the course represented by the test section. The equipment used in construction of the test section is required to be the same equipment to be used on the

remainder of the course represented by the test section. Use the test section to develop and demonstrate the proposed techniques of mixing, hauling, placing, consolidating, finishing, curing, initial saw cutting, start-up procedures, testing methods, plant operations, and the preparation of the construction joints. Perform variations in mixture proportions, other than water, if directed. Operate and calibrate the mixing plant prior to start of placing the test section. Use the same equipment, materials, and construction techniques on the test section proposed for use in all subsequent work. Perform base course preparation, concrete production, placing, consolidating, curing, construction of joints, and all testing in accordance with applicable provisions of this Specification. Three days after completion of the test section, provide eight cores at least 6 inches in diameter by full depth cut from points selected in the test section by the Government. The cores will be evaluated for surface paste, uniformity of aggregate distribution, segregation, voids, and thickness. Construct the test section meeting all Specification Requirements and being acceptable in all aspects, including surface texture, thickness, grade, and longitudinal and transverse joint alignment. Failure to construct an acceptable test section necessitates construction of additional test sections at no additional cost to the Government. Remove test sections allowed to be constructed as part of the production pavement which do not meet Specification Requirements at no expense to the Government. If slipform paving is performed and is unable to construct an acceptable test section, repair or replace the slipform paving equipment, or paving completed using fixed-forms and equipment compatible with them and allowed by the Specification. Do not commence production paving until the results on aggregates and concrete, including evaluation of the cores, and all pavement measurements for edge slump, joint face deformation, actual plan grade, surface smoothness, and thickness have been submitted and approved.

1.3.7 Acceptability of Work

The materials and the pavement itself will be accepted on the basis of production testing. The Government may make check tests to validate the results of the production testing. If the results of the production testing vary by less than 2.0 percent of the Government's test results, the results of the production testing will be used. If the results of the Government and production tests vary by 2.0 percent, but less than 4.0 percent, the average of the two will be considered the value to be used. If these vary by 4.0 percent or more, carefully evaluate each sampling and testing procedure and obtain another series of Government and production tests on duplicate samples of material. If these vary by 4.0 percent or more, use the results of the tests made by the Government and the Government will continue check testing of this item on a continuous basis until the two sets of tests agree within less than 4.0 percent on a regular basis. Testing performed by the Government does not relieve the specified testing requirements.

1.3.8 Acceptance Requirements

1.3.8.1 Pavement Lots

A lot is that quantity of construction to be evaluated for acceptance with Specification Requirements. A lot is equal to one shift of production not to exceed 1000 cubic yards. In order to evaluate thickness, divide each lot into four equal sublots. A subplot is equal to one shift of production not to exceed 250 cubic yards. Grade determinations will be made on the lot as a whole. Surface smoothness determinations will be made on every

0.1 mile segment in each lot. Select sample locations on a random basis in accordance with ASTM D3665. When operational conditions cause a lot to be terminated before the specified four sublots have been completed, use the following procedure to adjust the lot size and number of tests for the lot. Where three sublots have been completed, they constitute a lot. Where one or two sublots have been completed, incorporate them into the next lot (except for the last lot), and the total number of sublots used and acceptance criteria adjusted accordingly.

1.3.8.2 Evaluation

Provide all sampling and testing required for acceptance and payment adjustment, including batch tickets with all required acceptance testing. Individuals performing sampling, testing, and inspection duties are required to meet the Qualifications. The Government reserves the right to direct additional samples and tests for any area which appears to deviate from the Specification Requirements. Testing in these areas are in addition to the subplot or lot testing, and the requirements for these areas are the same as those for a subplot or lot. Provide facilities for and, where directed, personnel to assist in obtaining samples for any Government testing.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Bulk Cementitious Materials

Provide all cementitious materials in bulk at a temperature, as delivered to storage at the Site, not exceeding 150 degrees F. Provide sufficient cementitious materials in storage to sustain continuous operation of the concrete mixing plant while the pavement is being placed. Provide separate facilities to prevent any intermixing during unloading, transporting, storing, and handling of each type of cementitious material.

1.4.2 Aggregate Materials

Store aggregate at the Site of the batching and mixing plant avoiding breakage, segregation, intermixing, or contamination by foreign materials. Store each size of aggregate from each source separately in free-draining stockpiles. Provide a minimum 24 inch thick sacrificial layer left undisturbed for each aggregate stored on ground. Provide free-draining storage for fine aggregate and the smallest size coarse aggregate for at least 24 hours immediately prior to use. Maintain sufficient aggregate at the Site at all times to permit continuous uninterrupted operation of the mixing plant at the time concrete pavement is being placed. Do not allow tracked equipment on coarse aggregate stockpiles.

1.4.3 Other Materials

Store reinforcing bars and accessories above the ground on supports. Store all materials to avoid contamination and deterioration.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

This Section is intended to stand alone for construction of concrete pavement. However, where the construction covered herein interfaces with other sections, construct each interface to conform to the requirements of

both this Section and the other Section, including tolerances for both.

2.1.1.1 Surface Smoothness

Use the profilograph method for all longitudinal testing, except for paving lanes less than 200 feet in length. Use the straightedge method for transverse testing, for longitudinal testing where the length of each pavement lane is less than 200 feet, and at the ends of the paving limits for the Project. Smoothness requirements do not apply over crowns, drainage structures, or similar penetration. Maintain detailed notes of the testing results and provide a copy to the Government after each day's testing.

2.1.1.1.1 Straightedge Testing

Provide the finished surfaces of the pavements with no abrupt change of 1/4 inch or more, and all pavements within the limits specified when checked with an approved 12 foot straightedge. Provide runways and taxiways with a variation from the specified straight edge not greater than 1/8 inch in the longitudinal direction and not greater than 1/4 inch in the transverse direction. Provide all other airfield areas with a variation from a straight edge not greater than 1/4 inch in either the longitudinal or transverse direction.

2.1.1.1.2 Profilograph Testing

Provide the finished surfaces of the pavements with no abrupt change of 1/4 inch or more, and each 0.1 mile segment of each pavement lot with a Profile Index not greater than specified when tested with an approved California-type profilograph. Provide runways and taxiways with a Profile index not greater than 7 inches per mile in the longitudinal direction. Provide runway and taxiway transverse smoothness measured with the straightedge method and the straightedge requirements apply. Provide all other airfield areas with a Profile Index not greater than 9 inches per mile in the longitudinal direction.

2.1.1.1.3 Bumps ("Must Grind" Areas)

Reduce any bumps ("must grind" areas) shown on the profilograph trace which exceed 0.4 inch in height by diamond grinding in accordance with Subparagraph "Diamond Grinding of PCC Surfaces" below until they do not exceed 0.3 inch when retested. Taper such diamond grinding in all directions to provide smooth transitions to areas not requiring diamond grinding.

2.1.1.1.4 Testing Method

After the concrete has hardened sufficiently to permit walking thereon, but not later than 48 hours after placement, test the entire surface of the pavement in each lot in such a manner as to reveal all surface irregularities exceeding the tolerances specified above. If any pavement areas are diamond ground, retest these areas immediately after diamond grinding. Test the entire area of the pavement in both a longitudinal and a transverse direction on parallel lines. Perform the transverse lines 15 feet or less apart, as directed. Perform the longitudinal lines at the centerline of each paving lane shown on the Drawings, regardless of whether multiple lanes are allowed to be paved at the same time, and at the 1/8th point in from each side of the lane. Also test other areas having obvious deviations. Perform longitudinal testing lines continuous

across all joints. Perform transverse testing lines for pilot lanes carried to construction joint lines and for fill-in lanes carried 24 inches across construction joints, and the readings in this area applied to the fill-in lane. Perform straightedge testing of the longitudinal edges of slipformed pilot lanes before paving fill-in lanes as specified below.

2.1.1.4.1 Straightedge Testing

Hold the straightedge in contact with the surface and moved ahead one-half the length of the straightedge for each successive measurement. Determine the amount of surface irregularity by placing the freestanding (unleveled) straightedge on the pavement surface and measuring the maximum gap between the straightedge and the pavement surface. Determine measurements along the entire length of the straight edge.

2.1.1.4.2 Profilograph Testing

Perform profilograph testing using approved California profilograph and procedures described in ASTM E1274. Utilize electronic recording and automatic computerized reduction of data equipment to indicate "must-grind" bumps and the Profile Index for each 0.1 mile segment of the pavement lot. Accommodate grade breaks on aprons by breaking the profile segment into short sections and repositioning the blanking band on each section. Provide the "blanking band" of 0.2 inch wide and the "bump template" span 1 inch with an offset of 0.4 inch. Count the profilograph testing of the last 30 feet of a paving lane in the longitudinal direction from each day's paving operation on the following day's continuation lane. Compute the profile index for each pass of the profilograph (3 per lane) in each 0.1 mile segment. The profile index for each segment is the average of the profile indices for each pass in each segment. Scale and proportion profilographs of unequal lengths to an equivalent 0.1 mile as outlined in the ASTM E1274. Provide a copy of the reduced tapes to the Government at the end of each day's testing.

2.1.2 Edge Slump and Joint Face Deformation

2.1.2.1 Edge Slump

When slip-form paving is used, provide a maximum of 15.0 percent of the total free edge of each pavement panel with a maximum edge slump of 1/4 inch and none of the free edge of the pavement lot with an edge slump exceeding 3/8 inch. (A pavement panel is defined as a lane width by the length between two adjacent transverse contraction joints. The total free edge of the pavement is the cumulative total linear measurement of pavement panel edge originally constructed as non-adjacent to any existing pavement; for example, 100 feet of pilot lane originally constructed as a separate lane, would have 200 feet of free edge; 100 feet of fill-in lane would have no free edge). The area affected by the downward movement of the concrete along the pavement edge is a maximum of 18 inches back from the edge.

2.1.2.2 Joint Face Deformation

In addition to the edge slump limits specified above, provide a vertical joint face with a surface within the maximum limits shown below:

Offset from Straightedge Applied Longitudinally to Pavement Surface (a)	Offset from Straightedge Applied Longitudinally to Vertical Face (b)	Offset from Straightedge Applied Top to Bottom Against the Joint Face (c)	Abrupt Offset in Any Direction (d)	Offset of Joint Face from True Vertical (e)
Airfield Pavement				
1/8 inch	1/4 inch	3/8 inch	1/8 inch	1 inch per 12 inches
All Other Pavement				
1/4 inch	All other items same as airfield pavement			
(a) Measurement is taken by placing the straightedge longitudinally on the pavement surface 1 inch from the free edge.				
(b) Measurement is taken by applying the straightedge longitudinally along the vertical joint face.				
(c) Measurement places a 3/8 inch spacer attached to a straightedge and spaced approximately equal to the thickness of the concrete being measured. The offset from straightedge with spacers is measured by placing the spacers against the top and bottom of the vertical concrete face.				
(d) An abrupt offset in the joint face occurring along a short distance. Check for abrupt offsets at any location that an abrupt offset appears to be a possible issue.				
(e) Measurement of the offset from the joint face to a level in the true vertical position against the joint face.				

2.1.2.3 Slump Determination

Test the pavement surface to determine edge slump immediately after the concrete has hardened sufficiently to permit walking thereon. Perform testing with a minimum 12 foot straightedge to reveal irregularities exceeding the edge slump tolerance specified above. Determine the vertical edge slump at each free edge of each slipformed paving lane constructed. Place the straightedge transverse to the direction of paving and the end of the straightedge located at the edge of the paving lane. Record measurements at 5 to 10 foot spacings, as directed, commencing at the header where paving was started. Initially record measurements at 5 foot intervals in each lane. When no deficiencies are present after 5 measurements, the interval may be increased. The maximum interval is 10 feet. When any deficiencies exist, return the interval to 5 feet. In addition to the transverse edge slump determination above, at the same time, record the longitudinal surface smoothness of the joint on a continuous line 1 inch back from the joint line using the 12 foot straightedge advanced one-half its length for each reading. Perform other tests of the exposed joint face to ensure that a uniform, true vertical joint face is attained. Properly reference all recorded measurements in accordance with paving lane identification and stationing, and a report submitted within 24 hours after measurement is made. Identify areas requiring replacement within the report.

2.1.2.4 Excessive Edge Slump

When edge slump exceeding the limits specified above is encountered on either side of the paving lane, record additional straightedge measurements to define the linear limits of the excessive slump. Remove and replace concrete slabs having excessive edge slump or joint deformation to the next transverse joint in conformance with Paragraph "Repair, Removal, and Replacement of Newly Constructed Slabs". Discontinue use of slip-form paving equipment and procedures that fail to consistently provide edges within the specified tolerances on edge slump and joint face deformation construct by means of standard paving procedures using fixed forms.

2.1.3 Plan Grade

Within 5 days after paving of each lot, test the finished surface of the pavement area by running lines of levels at intervals corresponding with every longitudinal and transverse joint to determine the elevation at each joint intersection. Record the results of this survey and provide a copy to the Government at the completion of the survey of each lot. Provide finished surfaces of all airfield pavements that vary less than 1/2 inch above or below the plan grade line or elevation indicated. The above deviations from the approved grade line and elevation are not permitted in areas where closer conformance with the planned grade and elevation is required for the proper functioning of appurtenant structures. Provide finished surfaces of new abutting pavements that coincide at their juncture. Provide horizontal control of the finished surfaces of all airfield pavements that vary not more than 1/2 inch from the plan alignment indicated.

2.1.4 Flexural Strength

Submit certified copies of laboratory test reports and sources for cement, supplementary cementitious materials (SCM), aggregates, admixtures, curing compound, epoxy, and proprietary patching materials proposed for use on this Project. Perform all aggregate tests no earlier than 6 months prior to Contract Award. Each lot of pavement will be evaluated for acceptance in accordance with the following procedures.

2.1.4.1 Sampling and Testing

For acceptance, obtain one composite sample of concrete from each subplot in accordance with ASTM C172/C172M from one batch or truckload. Fabricate and cure test beams 6 by 6 inches in accordance with ASTM C31/C31M; and tested in accordance with ASTM C78/C78M.

2.1.4.2 Computations

Average the eight 14-day strength tests for the lot. Use the average strength in accordance with Paragraph "Concrete Strength for Final Acceptance" in PART 2.

2.1.5 Thickness

Each lot of pavement will be evaluated for acceptance and payment adjustment in accordance with the following procedure. Drill two cores, between 4 and 6 inches in diameter, from the pavement, per subplot (8 per lot). Drill the cores within 3 days after lot placement, filling the core holes with an approved non-shrink concrete, respraying the cored areas

with curing compound, and for measuring the cores. Inspect each core for voids, thickness of paste on the surface, and depth of reinforcement (if required). Provide the results with the thickness measurement data. Record eight measurements of thickness around the circumference of each core and one in the center, in accordance with ASTM C174/C174M. Average the pavement thickness from the 8 cores for the lot and evaluate as described in Paragraph "Payment Adjustment for Thickness" above.

2.1.6 Diamond Grinding of PCC Surfaces

Those performing diamond grinding are required to have a minimum of three years experience in diamond grinding of airfield pavements. In areas not meeting the specified limits for surface smoothness and plan grade, reduce high areas to attain the required smoothness and grade, except as depth is limited below. Reduce high areas by diamond grinding the hardened concrete with an approved equipment after the concrete is at a minimum age of 14 days. Perform diamond grinding by sawing with an industrial diamond abrasive which is impregnated in the saw blades. Assemble the saw blades in a cutting head mounted on a machine designed specifically for diamond grinding that produces the required texture and smoothness level without damage to the concrete pavement or joint faces. Provide diamond grinding equipment with saw blades that are 1/8-inch wide, a minimum of 60 blades per 12 inches of cutting head width, and capable of cutting a path a minimum of 3 feet wide. Diamond grinding equipment that causes ravels, aggregate fractures, spalls, or disturbance to the joints is not permitted. The maximum area corrected by diamond grinding the surface of the hardened concrete is 10 percent of the total area of any subplot. The maximum depth of diamond grinding is 1/4 inch. Provide diamond grinding machine equipped to flush and vacuum the pavement surface. Dispose of all debris from diamond grinding operations off Government property. Prior to diamond grinding, submit a Diamond Grinding Plan for review and approval. At a minimum, include the daily reports for the deficient areas, the location and extent of deficiencies, corrective actions, and equipment. Remove and replace all pavement areas requiring plan grade or surface smoothness corrections in excess of the limits specified above in conformance with Paragraph "Repair, Removal, and Replacement of Newly Constructed Slabs". Retexture pavement areas given a wire comb or tined texture, areas exceeding 25 square feet that have been corrected by diamond grinding by transverse grooving using an approved grooving machine of standard manufacture. Provide grooves that are 1/4 inch deep by 1/4 inch wide on 1-1/2 inch centers and carried into, and tapered to zero depth within the non-corrected surface, or match any existing grooves in the adjacent pavement. All areas in which diamond grinding has been performed are subject to the thickness tolerances specified in Paragraph "Thickness", above.

Prior to production diamond grinding operations, perform a test section at the approved location. Perform a test section that consists of a minimum of two adjacent passes with a minimum length of 40 feet to allow evaluation of the finish, transition between adjacent passes, and the results of crossing a transverse joint. Production diamond grinding operations are not to be performed prior to approval.

2.2 CEMENTITIOUS MATERIALS

Provide cementitious materials consisting of Portland cement or only Portland cement in combination with supplementary cementitious materials (SCM), that conform to appropriate Specifications listed below. New submittals are required when the cementitious materials sources or types

change.

2.2.1 Portland Cement

Provide Portland cement conforming to ASTM C150/C150M, Type I or II, low alkali.

2.2.2 Pozzolan

2.2.2.1 Fly Ash

Provide fly ash that conforms to ASTM C618, Class F, including the optional requirements for uniformity and effectiveness in controlling Alkali-Silica reaction with a loss on ignition not exceeding 6 percent. Provide Class F fly ash for use in mitigating Alkali-Silica Reactivity with a total equivalent alkali content less than 3 percent.

2.2.2.2 Ultra Fine Fly Ash and Ultra Fine Pozzolan

Provide Ultra Fine Fly Ash (UFFA) and Ultra Fine Pozzolan (UFP) that conforms to ASTM C618, Class F, and the following additional requirements:

- a. The strength activity index at 28 days of age of at least 95 percent of the control specimens.
- b. The average particle size not exceeding 6 microns.

2.2.3 Slag Cement

Provide slag cement (ground-granulated blast-furnace slag) that conforms to ASTM C989/C989M, Grade 100 or Grade 120.

2.2.4 Supplementary Cementitious Materials (SCM) Content

Use of one of the SCMs listed below is optional, unless the SCM is required to mitigate ASR.

TABLE 2 SUPPLEMENTARY CEMENTITIOUS MATERIALS CONTENT		
Supplementary Cementitious Material	Minimum Content (percent)	Maximum Content (percent)
Class N Pozzolan and Class F Fly Ash		
SiO ₂ + Al ₂ O ₃ + Fe ₂ O ₃ > 70 percent	25	35
SiO ₂ + Al ₂ O ₃ + Fe ₂ O ₃ > 80 percent	20	35
SiO ₂ + Al ₂ O ₃ + Fe ₂ O ₃ > 90 percent	15	35
UFFA and UFP	7	16
Slag Cement	40	50
Silica Fume	7	10

2.3 AGGREGATES

2.3.1 Aggregate Sources

2.3.1.1 Durability of Coarse Aggregate

Provide aggregate with a satisfactory service record in freezing and thawing of at least 5 years successful service in three concrete paving projects. Include a condition survey of the existing concrete and a review of the concrete-making materials, including coarse aggregates, cement, and mineral admixtures in the service record. Consider the previous aggregate source and test results, cement mill certificate data, mineral admixture chemical and physical composition, and the mix design (cement factor and water-cementitious material ratio) in the review. Provide service record performed by an independent third party professional engineer, petrographer, or concrete materials engineer along with their resume. Include photographs and a written report addressing D-cracks and popouts in accordance with ACI 201.1R in the service record. Provide coarse aggregate with a durability factor of 80 or more when subjected to freezing and thawing of specimens prepared in accordance with ASTM C1646/C1646M and tested in accordance with ASTM C666/C666M, Procedure A, when a coarse aggregate size group or source proposed for use does not have a satisfactory demonstrable service record. Test all coarse aggregate size groups and sources proposed for use individually.

2.3.1.2 Alkali-Silica Reactivity

Evaluate and test fine and coarse aggregates to be used in all concrete for alkali-aggregate reactivity. Test all size groups and sources proposed for use.

- a. Evaluate the fine and coarse aggregates separately, using ASTM C1260. Reject individual aggregates with test results that indicate an expansion of greater than 0.08 percent after 28 days of immersion in 1N NaOH solution, or perform additional testing as follows: Utilize the proposed low alkali Portland cement, blended cement, and SCM, or Lithium Nitrate in combination with each individual aggregate. If only SCMs are being evaluated, test in accordance with ASTM C1567. If Lithium Nitrate is being evaluated, with or without SCMs, test in accordance with COE CRD-C 662. Determine the quantity that meets all the requirements of these Specifications and that lowers the expansion equal to or less than 0.08 percent after 28 days of immersion in a 1N NaOH solution. Base the mixture proportioning on the highest percentage of SCM required to mitigate ASR-reactivity.
- b. If any of the above options does not lower the expansion to less than 0.08 percent after 28 days of immersion in a 1N NaOH solution, reject the aggregate(s) and submit new aggregate sources for retesting. Submit the results of testing for evaluation and acceptance.

2.3.1.3 Combined Aggregate Gradation

In addition to the grading requirements specified for coarse aggregate and for fine aggregate, provide the combined aggregate grading meeting the following requirements:

- a. Provide materials selected and the proportions used such that when the Coarseness Factor (CF) and the Workability Factor (WF) are plotted on a diagram as described in d. below, the point and its associated

production tolerance thus determined falls within the parallelogram described therein. Refer to AF ETL 97-5 for combined aggregate plot area recommendations for the intended placement technique(s).

- b. Determine the Coarseness Factor (CF) from the following equation:

$$CF = \frac{(\text{cumulative percent retained on the } 3/8 \text{ inch sieve})(100)}{(\text{cumulative percent retained on the No. 8 sieve})}$$

- c. The Workability Factor (WF) is defined as the percent passing the No. 8 sieve based on the combined gradation. Adjust the WF, prorated upwards only, by 2.5 percentage points for each 94 pounds of cementitious material per cubic yard greater than 564 pounds per cubic yard.
- d. Plot a diagram using a rectangular scale with WF on the Y-axis with units from 20 (bottom) to 45 (top), and with CF on the X-axis with units from 80 (left side) to 30 (right side). On this diagram, plot a parallelogram with corners at the following coordinates (CF-75, WF-28), (CF-75, WF-40), (CF-45, WF-32.5), and (CF-45, WF-44.5). If the point determined by the intersection of the computed CF and WF does not fall within the above parallelogram, revise the grading of each size of aggregate used and the proportions selected as necessary.
- e. Plot the associated production tolerance limits, identified in Table 6, around the CF and adjusted WF point.

2.3.2 Coarse Aggregate

2.3.2.1 Material Composition

Provide coarse aggregate consisting of crushed or uncrushed gravel, crushed stone, or a combination thereof. Provide aggregate used for paving compass calibration hardstands free of materials having undesirable magnetic properties, including magnetite in granite, high-iron minerals in traprock, and pyrite in limestone. Provide aggregates, as delivered to the mixers, consisting of clean, hard, uncoated particles meeting the requirements of ASTM C33/C33M except as specified herein. Provide coarse aggregate that has been washed sufficient to remove dust and other coatings. Provide coarse aggregate with no more than 40 percent loss when subjected to the Los Angeles abrasion test in accordance with ASTM C131/C131M. Provide coarse aggregates with a maximum sodium sulfate soundness loss of 12 percent, or with a magnesium sulfate soundness loss of 18 percent after five cycles when tested in accordance with ASTM C88.

2.3.2.2 Particle Shape Characteristics

Provide particles of the coarse aggregate that are generally spherical or cubical in shape. The quantity of flat particles and elongated particles in any size group coarser than the 3/8 inch sieve are not allowed to exceed 20 percent by weight as determined by the Flat Particle Test and the Elongated Particle Test of ASTM D4791. A flat particle is defined as one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3.

2.3.2.3 Size and Grading

Provide coarse aggregate with a nominal maximum size of 1.5 inches. Grade and provide the individual aggregates in two size groups meeting the

individual grading requirements of ASTM C33/C33M, Size No. 4 (1.5 to 0.75 inch) and Size No. 67 (0.75 inch to No. 4) to meet the coarseness and workability factor criteria for the proposed combined gradation. A third aggregate size group may be required to meet the above mentioned coarseness and workability criteria of Paragraph "Combined Aggregate Gradation".

2.3.2.4 Deleterious Materials - Airfield Pavements

The amount of deleterious material in each size group of coarse aggregate is not allowed to exceed the limits shown in Table 5 below, determined in accordance with the test methods shown.

LIMITS OF DELETERIOUS MATERIALS IN COARSE AGGREGATE FOR AIRFIELD PAVEMENTS	
Percentage by Mass	
Materials (h)	Severe Weather
Clay lumps and friable particles (ASTM C142/C142M)	2.0
Shale (a) (ASTM C295/C295M)	0.1
Material finer than No. 200 sieve (ASTM C117)	1.0
Lightweight particles (ASTM C123/C123M)	1.0
Clay ironside (d) (ASTM C295/C295M)	0.1
Chert and cherty stone (less than 2.40 Sp. Gr.) (e) (ASTM C123/C123M and ASTM C295/C295M)	0.1
Claystone, mudstone, and siltstone (f) (ASTM C295/C295M)	0.1
Shaly and argillaceous limestone (g) (ASTM C295/C295M)	0.2
Other soft particles (COE CRD-C 130)	2.0
Total of all deleterious substances, exclusive of material finer than No. 200 sieve	1.0
(a) Shale is defined as a fine-grained, thinly laminated or fissile sedimentary rock. It is commonly composed of clay or silt or both. It has been indurated by compaction or by cementation, but not so much as to have become slate.	
(b) Limit for material finer than No. 200 sieve is allowed to be increased to 1.5 percent for crushed aggregates if the fine material consists of crusher dust that is essentially free from clay or shale. Use XRD or other appropriate techniques as determined by petrographer to quantify amount and justify increase.	
(c) Test with a separation medium with a density of Sp. Gr. of 2.0. This limit does not apply to coarse aggregate manufactured from blast-furnace slag unless contamination is evident.	

LIMITS OF DELETERIOUS MATERIALS IN COARSE AGGREGATE FOR AIRFIELD PAVEMENTS	
Percentage by Mass	
Materials (h)	Severe Weather
Clay lumps and friable particles (ASTM C142/C142M)	2.0
Shale (a) (ASTM C295/C295M)	0.1
Material finer than No. 200 sieve (ASTM C117)	1.0
(d) Clay ironstone is defined as an impure variety of iron carbonate, iron oxide, hydrous iron oxide, or combinations thereof, commonly mixed with clay, silt, or sand. It commonly occurs as dull, earthy particles, homogeneous concretionary masses, or hard-shell particles with soft interiors. Other names commonly used for clay ironstone are "chocolate bars" and limonite concretions.	
(e) Chert is defined as a rock composed of quartz, chalcedony or opal, or any mixture of these forms of silica. It is variable in color. The texture is so fine that the individual mineral grains are too small to be distinguished by the unaided eye. Its hardness is such that it scratches glass but is not scratched by a knife blade. It may contain impurities such as clay, carbonates, iron oxides, and other minerals. Cherty stone is defined as any type of rock (generally limestone) that contains chert as lenses and nodules, or irregular masses partially or completely replacing the original stone.	
(f) Claystone, mudstone, or siltstone, is defined as a massive fine-grained sedimentary rock that consists predominantly of indurated clay or silt without laminations or fissility. It may be indurated either by compaction or by cementation.	
(g) Shaly limestone is defined as limestone in which shale occurs as one or more thin beds or laminae. These laminae may be regular or very irregular and may be spaced from a few inches down to minute fractions of an inch. Argillaceous limestone is defined as a limestone in which clay minerals occur disseminated in the stone in the amount of 10 to 50 percent by weight of the rock; when these make up from 50 to 90 percent, the rock is known as calcareous (or dolomitic) shale (or claystone, mudstone, or siltstone).	
(h) Perform testing in accordance with the references test methods, except use	

2.3.2.5 Testing Sequence for Deleterious Materials in Coarse Aggregate - Airfields Only

No extension of time or additional payment due to any delays caused by the testing, evaluation, or personnel requirements is allowed. The minimum test sample size of the coarse aggregate is 200 pounds for the 3/4 inch coarse aggregate. Provide facilities for the ready procurement of representative test samples. The testing procedure on each sample of coarse aggregate for compliance with limits on deleterious materials is as follows:

Step 1: Wash each full sample of coarse aggregate for material finer than the No. 200 sieve. Discard material finer than the No. 200 sieve.

Step 2: Test remaining full sample for clay lumps and friable particles and remove.

Step 3: Test remaining full sample for chert and cherty stone with SSD density of less than 2.40 specific gravity. Remove lightweight chert and cherty stone. Restore other materials less than 2.40 specific gravity to the sample.

Step 4: Test remaining full sample for lightweight particles (Sp. Gr. 2.0) and remove.

Step 5: Test remaining sample for clay-ironstone, shale, claystone, mudstone, siltstone, shaly and argillaceous limestone, and remove.

Step 6: Test approximately one-fifth of remaining full sample for other soft particles.

2.3.3 Fine Aggregate

2.3.3.1 Composition

Provide fine aggregate consisting of natural sand, manufactured sand, or a combination of the two, and composed of clean, hard, durable particles meeting the requirements of ASTM C33/C33M. Provide aggregate used for paving compass calibration hardstands free of materials having undesirable magnetic properties, including magnetite in granite, high-iron minerals in traprock, and pyrite in limestone. Stockpile and batch each type of fine aggregate separately. Provide fine aggregate with particles that are generally spherical or cubical in shape.

2.3.3.2 Grading

Provide fine aggregate, as delivered to the mixer, with a grading that conforms to the requirements of ASTM C33/C33M and having a fineness modulus of not less than 2.50 nor more than 3.40.

2.3.3.3 Deleterious Material

The minimum test sample size for fine aggregate proposed for use in airfield paving is 10 pounds. The amount of deleterious material in the fine aggregate is not to exceed the following limits by mass:

Material	Percentage by Mass
Clay lumps and friable particles ASTM C142/C142M	1.0
Material finer than No. 200 sieve ASTM C117	3.0
Lightweight particles ASTM C123/C123M using a medium with a density of Sp. Gr. of 2.0	0.5
Total of all above	3.0

2.4 CHEMICAL ADMIXTURES

2.4.1 General Requirements

Chemical admixtures may only be used when the specific admixture type and manufacturer is the same material used in the mixture proportioning studies. Provide air-entraining admixture conforming to ASTM C260/C260M. An accelerating admixture conforming to ASTM C494/C494M, Type C, may be used only when specified in Paragraph "Mixture Proportions" below provided it is not used to reduce the amount of cementitious material. Calcium chloride and admixtures containing calcium chloride are not allowed. Provide retarding or water-reducing admixture that meet the requirements of ASTM C494/C494M, Type A, B, or D, except that the 6-month and 1-year compressive strength tests are waived. ASTM C494/C494M, Type F and G high range water reducing admixtures and Type S specific performance admixtures are not allowed. ASTM C1017/C1017M flowable admixtures are not allowed.

2.4.2 Lithium Nitrate

Provide lithium admixture that consists of a nominal 30 percent aqueous solution of Lithium Nitrate, with a density of 10 pounds per gallon, with the approximate chemical form as shown below:

Constituent	Limit (Percent by Mass)
LiNO ₃ (Lithium Nitrate)	30 plus or minus 0.5
SO ₄ ⁻² (Sulfate Ion)	0.1 (max)
Cl ⁻ (Chloride Ion)	0.2 (max)
Na ⁺ (Sodium Ion)	0.1 (max)
K ⁺ (Potassium Ion)	0.1 (max)

Provide the services of a manufacturer's technical representative experienced in dispensing, mixing, proportioning, placement procedures, and curing of concrete containing lithium nitrate, at no expense to the Government. This representative is required to be present on the Project prior to and during at least the first two days of placement using lithium nitrate.

2.4.3 High Range Water Reducing Admixture (HRWRA)

Provide a high-range water-reducing admixture that meets the requirements of ASTM C494/C494M, Type F or G, that is free from chlorides, alkalis, and is of the synthesized, sulfonated complex polymer type. Add the HRWRA to the concrete as a single component at the batch plant. Add the admixture to the concrete mixture only when its use is approved or directed, and only when it has been used in mixture proportioning studies to arrive at approved mixture proportions. Submit certified copies of the independent laboratory test results required for compliance with ASTM C494/C494M.

2.5 MEMBRANE FORMING CURING COMPOUND

Provide membrane forming curing compound that conforms to COE CRD-C 300 and is white pigmented.

2.6 WATER

Provide water for mixing and curing that is fresh, clean, potable, and free of injurious amounts of oil, acid, salt, or alkali, except that non-potable water, or water from concrete production operations, may be used if it meets the requirements of ASTM C1602/C1602M.

2.7 JOINT MATERIALS

2.7.1 Expansion Joint Material

Provide preformed expansion joint filler material conforming to ASTM D1751.

Provide expansion joint filler that is 3/4 inch thick, unless otherwise indicated, and provided in a single full depth piece.

2.7.2 Slip Joint Material

Provide slip joint material that is 1/4 inch thick expansion joint filler, unless otherwise indicated, conforming to Paragraph "Expansion Joint Material".

2.8 DOWELS

2.8.1 Dowels

Provide dowels in single piece bars fabricated or cut to length at the shop or mill before delivery to the Site. Dowels are to be free of loose, flaky rust and loose scale and be clean and straight. Dowels may be sheared to length provided that the deformation from true shape caused by shearing does not exceed 0.04 inch on the diameter of the dowel and does not extend more than 0.04 inch from the end of the dowel. Dowels are required to be plain (non-deformed) steel bars conforming to ASTM A615/A615M, Grade 40 or 60; ASTM A996/A996M, Grade 50 or 60. Dowel bars are required to be epoxy coated in conformance with ASTM A775/A775M, to include the ends. Provide grout retention rings that are fully circular metal or plastic devices capable of supporting the dowel until the epoxy hardens. Dowel sleeves or inserts are not permitted.

2.8.2 Dowel Bar Assemblies

Provide dowel bar assemblies that consist of a framework of metal bars or wires arranged to provide rigid support for the dowels throughout the paving operation, with a minimum of four continuous bars or wires extending along the joint line. Provide dowels that are welded to the assembly or held firmly by mechanical locking arrangements that prevent them from rising, sliding out, or becoming distorted during paving operations.

2.9 EPOXY RESIN

Provide epoxy-resin materials that consist of two-component materials conforming to the requirements of ASTM C881/C881M, Class as appropriate for each application temperature to be encountered, except that in addition, the materials meet the following requirements:

- a. Material for use for embedding dowels and anchor bolts be Type IV, Grade 3.

- b. Material for use as patching materials for complete filling of spalls and other voids and for use in preparing epoxy resin mortar be Type III, Grade as approved.
- c. Material for use for injecting cracks be Type IV, Grade 1.
- d. Material for bonding freshly mixed Portland cement concrete or mortar or freshly mixed epoxy resin concrete or mortar to hardened concrete be Type V, Grade as approved.

2.10 EQUIPMENT

All plant, equipment, tools, and machines used in the work are required to be maintained in satisfactory working conditions at all times. Submit the following:

- a. Details and data on the batching and mixing plant prior to plant assembly including manufacturer's literature showing that the equipment meets all requirements specified herein.
- b. Obtain National Ready Mixed Concrete Association (NRMCA) certification of the concrete plant, at no expense to the Government. Provide inspection report of the concrete plant by an engineer approved by the NRMCA. A list of NRMCA approved engineers is available on the NRMCA website at <http://www.nrmca.org>. Submit a copy of the NRMCA QC Manual Section 3 Concrete Plant Certification Checklist, NRMCA Certificate of Conformance, and Calibration documentation on all measuring and weighing devices prior to uniformity testing.
- c. A description of the equipment proposed for transporting concrete mixture from the central mixing plant to the paving equipment.
- d. A description of the equipment proposed for the machine and hand placing, consolidating and curing of the concrete mixture. Manufacturer's literature on the paver and finisher, together with the manufacturer's written instructions on adjustments and operating procedures necessary to assure a tight, smooth surface on the concrete pavement. The literature is required to show that the equipment meets all details of these Specifications. [Include detailed information on automatic laser controlled systems if proposed for use.]

2.10.1 Batching and Mixing Plant

2.10.1.1 Location

Locate the batching and mixing plant off Government premises no more than 15 minutes haul time from the placing site. Water and electrical power are not available on the Project Site. Provide operable telephonic or radio communication between the plant and the placing site at all times concreting is taking place.

2.10.1.2 Type and Capacity

Provide a batching and mixing plant consisting of a stationary-type central mix plant, including permanent installations and portable or relocatable plants installed on stable foundations. Provide a plant designed and operated to produce concrete within the specified tolerances, with a minimum capacity of 250 cubic yards per hour, that conforms to the requirements of NRMCA QC 3 including provisions addressing:

- a. Material Storage and Handling.
- b. Batching Equipment.
- c. Central Mixer.
- d. Ticketing System.
- e. Delivery System.

2.10.1.3 Tolerances

Materials	Percentage of Required Mass
Cementitious Materials	plus or minus 1
Aggregate	plus or minus 2
Water	plus or minus 1
Admixture	plus or minus 3

For volumetric batching equipment for water and admixtures, the above numeric tolerances apply to the required volume of material being batched. Dilute concentrated admixtures uniformly, if necessary, to provide sufficient volume per batch to ensure that the batchers consistently operate within the above tolerance.

2.10.1.4 Moisture Control

Provide a plant capable of ready adjustment to compensate for the varying moisture contents of the aggregates and to change the quantities of the materials being batched. Provide an electric moisture meter complying with the provisions of COE CRD-C 143 for measuring of moisture in the fine aggregate. Provide a sensing element arranged so that measurement is made near the batcher charging gate of the fine aggregate bin or in the fine aggregate batcher.

2.10.2 Concrete Mixers

Provide stationary or truck mixers that are capable of combining the materials into a uniform mixture and of discharging this mixture without segregation. Do not charge the mixers in excess of the capacity recommended by the manufacturer. Operate the mixers at the drum or mixing blade speed designated by the manufacturer. Maintain the mixers in satisfactory operating condition, with the mixer drums kept free of hardened concrete. Replace mixer blades or paddles when worn down more than 10 percent of their depth when compared with the manufacturer's dimension for new blades or paddles.

2.10.2.1 Stationary

Stationary mixers are required to be drum or pan mixers. Provide mixers with an acceptable device to lock the discharge mechanism until the required mixing time has elapsed.

2.10.2.2 Mixing Time and Uniformity for Stationary Mixers

For stationary mixers, before uniformity data are available, the minimum mixing time for each batch after all solid materials are in the mixer, provided that all of the mixing water is introduced before one-fourth of the mixing time has elapsed, is 1 minute for mixers having a capacity of 1 cubic yard. For mixers of greater capacity, increase this minimum time by 20 seconds for each additional 1.33 cubic yard or fraction thereof. After results of uniformity tests are available, the mixing time may be reduced to the minimum time required to meet uniformity requirements; but if uniformity requirements are not being met, increase the mixing time as directed. Perform mixer performance tests at new mixing times immediately after any change in mixing time or volume. Conduct the Regular Test sequence for initial determination of the mixing time or as directed. When regular testing is performed, the concrete is required to meet the limits of any five of the six uniformity requirements listed in Table 1 below.

2.10.2.3 Abbreviated Test

Conduct the Abbreviated Test sequence for production concrete verification at the frequency specified in Table 6. When abbreviated testing is performed, the concrete is required to meet only those requirements listed for abbreviated testing. Use the Projects approved mix design proportions for uniformity testing. For regular testing perform all six tests on three batches of concrete. The range for regular testing is the average of the ranges of the three batches. Abbreviated testing consists of performing the three required tests on a single batch of concrete. The range for abbreviated testing is the range for one batch. If more than one mixer is used and all are identical in terms of make, type, capacity, condition, speed of rotation, the results of tests on one of the mixers apply to the others, subject to the approval. Perform all mixer performance (uniformity) testing in accordance with COE CRD-C 55 and with Paragraph "Testing and Inspection for Contractor Quality Control During Construction" in PART 3.

TABLE 1 UNIFORMITY REQUIREMENTS--STATIONARY MIXERS		
Parameter	Regular Tests Allowable Maximum Range for Average of 3 Batches	Abbreviated Tests Allowable Maximum Range for 1 Batch
Unit weight of air-free mortar	2.0 pounds per cubic foot	2.0 pounds per cubic foot
Air content	1.0 percent	--
Slump	1.0 inch	1.0 inch
Coarse aggregate	6.0 percent	6.0 percent
Compressive strength at 7 days	10.0 percent	10.0 percent
Water content	1.5 percent	

2.10.2.4 Truck

Truck mixers are not allowed for mixing or transporting slipformed paving

concrete. Provide only truck mixers designed for mixing or transporting paving concrete with extra large blading and rear opening specifically for low-slump paving concrete. Provide truck mixers, the mixing of concrete therein, and concrete uniformity and testing thereof that conform to the requirements of ASTM C94/C94M. Determine the number of revolutions between 70 to 100 for truck-mixed concrete and the number of revolutions for shrink-mixed concrete by uniformity tests as specified in ASTM C94/C94M and in requirements for mixer performance stated in Paragraph "Testing and Inspection for Contractor Quality Control During Construction" in PART 3. If requirements for the uniformity of concrete are not met with 100 revolutions of mixing after all ingredients including water are in the truck mixer drum, discontinue use of the mixer until the condition is corrected. Water is not allowed to be added after the initial introduction of mixing water except, when on arrival at the Job Site, the slump is less than specified and the water-cement ratio is less than that given as a maximum in the approved mixture. Additional water may be added to bring the slump within the specified range provided the approved water-cement ratio is not exceeded. Inject water into the head of the mixer (end opposite the discharge opening) drum under pressure, and turn the drum or blades a minimum of 30 additional revolutions at mixing speed. The addition of water to the batch at any later time is not allowed. Perform mixer performance (uniformity) tests for truck mixers in accordance with ASTM C94/C94M.

2.10.3 Transporting Equipment

Transport slipform concrete to the paving site in non-agitating equipment conforming to ASTM C94/C94M or in approved agitators. Transport fixed form concrete in approved truck mixers designed with extra large blading and rear opening specifically for low slump concrete. Provide transporting equipment designed and operated to deliver and discharge the required concrete mixture completely without segregation.

2.10.4 Transfer and Spreading Equipment

Provide equipment for transferring concrete from the transporting equipment to the paving lane in front of the paver that is specially manufactured, self-propelled transfer equipment which accepts the concrete outside the paving lane, transfers, and spreads it evenly across the paving lane in front of the paver and strike off the surface evenly to a depth which permits the paver to operate efficiently.

2.10.5 Paver-Finisher

Provide paver-finisher consisting of a heavy-duty, self-propelled machine designed specifically for paving and finishing high quality pavement, with a minimum weight of 2200 pounds per foot of lane width, and powered by an engine having a minimum 6.0 horsepower per foot of lane width. The paver-finisher is required to spread, consolidate, and shape the plastic concrete to the desired cross section in one pass. The mechanisms for forming the pavement are required to be easily adjustable in width and thickness and for required crown. In addition to other spreaders required by paragraph above, the paver-finisher equipped with a full width knock-down auger or paddle mechanism, capable of operating in both directions, which evenly spreads the fresh concrete in front of the screed or extrusion plate.

2.10.5.1 Vibrators

Provide gang mounted immersion vibrators at the front of the paver on a frame equipped with suitable controls so that all vibrators can be operated at any desired depth within the slab or completely withdrawn from the concrete, as required. Provide vibrators that are automatically controlled to immediately stop as forward motion of the paver ceases. Equip the paver-finisher with an electronic vibrator monitoring device displaying the operating frequency of each individual internal vibrator with a readout display visible to the paver operator that operates continuously while paving, and displays all vibrator frequencies with manual or automatic sequencing among all individual vibrators. Discontinue paving if the vibrator monitoring system fails to operate properly during the paving operation. Provide the spacing of the immersion vibrators across the paving lane as necessary to properly consolidate the concrete, with a maximum clear distance between vibrators of 30 inches and outside vibrators a maximum of 12 inches from the lane edge. Operate spud vibrators at a minimum frequency of 8000 impulses per minute and a minimum amplitude of 0.03 inch, as determined by COE CRD-C 521.

2.10.5.2 Screed or Extrusion Plate

Equip the paver-finisher with a transversely oscillating screed or an extrusion plate to shape, compact, and smooth the surface and finish the surface that no significant amount of hand finishing, except use of cutting straightedges, is required. Provide a screed or extrusion plate constructed to adjust for crown in the pavement. Provide adjustment for variation in lane width or thickness and to prevent more than 8 inches of the screed or extrusion plate extending over previously placed concrete on either end when paving fill-in lanes. Repair or replace machines that cause displacement of properly installed forms or cause ruts or indentations in the prepared underlying materials and machines that cause frequent delays due to mechanical failures as directed.

2.10.5.3 Longitudinal Mechanical Float

A longitudinal mechanical float may be used. If used, provide a float that is specially designed and manufactured to smooth and finish the pavement surface without working excess paste to the surface that is rigidly attached to the rear of the paver-finisher or to a separate self-propelled frame spanning the paving lane. Provide float plate at least 5 feet long by 8 inches wide and automatically be oscillated in the longitudinal direction while slowly moving from edge to edge of the paving lane, with the float plate in contact with the surface at all times.

2.10.5.4 Other Types of Finishing Equipment

Clary screeds, other rotating tube floats, or bridge deck finishers are not allowed on mainline paving, but may be allowed on irregular or odd-shaped slabs, and near buildings or trench drains, subject to approval. Provide bridge deck finishers with a minimum operating weight of 7500 pounds that have a transversely operating carriage containing a knock-down auger and a minimum of two immersion vibrators. Only use vibrating screeds or pans for isolated slabs where hand finishing is permitted as specified, and only where specifically approved.

2.10.5.5 Fixed Forms

Provide paver-finisher equipped with wheels designed to ride the forms,

keep it aligned with the forms, and spread the load so as to prevent deformation of the forms. Provide paver-finishers traveling on guide rails located outside the paving lane that are equipped with wheels when traveling on new or existing concrete to remain. Alternatively, a modified slipform paver that straddles the forms may be used. Provide a modified slipform paver which has the side conforming plates removed or rendered ineffective and travels over or along pre-placed fixed forms.

2.10.5.6 Slipform

The slipform paver-finisher is required to be automatically controlled and crawler mounted with padded tracks so as to be completely stable under all operating conditions and provide a finish to the surface and edges so that no edge slump beyond allowable tolerance occurs. Provide suitable moving side forms that are adjustable and produce smooth, even edges, perpendicular to the top surface and meeting Specification Requirements for alignment and freedom from edge slump.

2.10.6 Curing Equipment

Provide equipment for applying membrane-forming curing compound mounted on a self-propelled frame that spans the paving lane. Constantly agitate the curing compound reservoir mechanically (not air) during operation and provide a means for completely draining the reservoir. Provide a spraying system that consists of a mechanically powered pump which maintains constant pressure during operation, an operable pressure gauge, and either a series of spray nozzles evenly spaced across the lane to provide uniformly overlapping coverage or a single spray nozzle which is mounted on a carriage which automatically traverses the lane width at a speed correlated with the forward movement of the overall frame. Protect all spray nozzles with wind screens. Calibrate the spraying system in accordance with ASTM D2995, Method A, for the rate of application required in Paragraph "Membrane Curing". Provide hand-operated sprayers allowed by that paragraph with compressed air supplied by a mechanical air compressor. Immediately replace curing equipment if it fails to apply an even coating of compound at the specified rate.

2.10.7 Texturing Equipment

Provide texturing equipment as specified below. Before use, demonstrate the texturing equipment on a test section, and modify the equipment as necessary to produce the texture directed.

2.10.7.1 Burlap Drag

Securely attach a burlap drag to a separate wheel mounted frame spanning the paving lane or to one of the other similar pieces of equipment. Provide length of the material between 24 to 36 inches dragging flat on the pavement surface. Provide burlap drag with a width at least equal to the width of the slab. Provide clean, reasonably new burlap material, completely saturated with water before attachment to the frame, always resaturated before start of use, and kept clean and saturated during use. Provide burlap conforming to AASHTO M 182, Class 3 or 4.

2.10.7.2 Broom

Apply surface texture using an approved mechanical stiff bristle broom drag of a type that provides a uniformly scored surface transverse to the pavement center line. Provide broom capable of traversing the full width

of the pavement in a single pass at a uniform speed and with a uniform pressure that results in scores uniform in appearance and approximately 1/16 inch in depth but not more than 1/8 inch in depth.

2.10.8 Sawing Equipment

Provide equipment for sawing joints and for other similar sawing of concrete consisting of standard diamond-type concrete saws mounted on a wheeled chassis which can be easily guided to follow the required alignment. Provide diamond tipped blades. If demonstrated to operate properly, abrasive blades may be used. Provide spares as required to maintain the required sawing rate. Provide wheel saws used in the removal of concrete with large diameter tungsten carbide tipped blades mounted on a heavy-duty chassis which produce a saw kerf at least 1-1/2 inches wide. Provide saws capable of sawing to the full depth required. Early-entry saws may be used, subject to demonstration and approval. No change to the initial sawcut depth is permitted.

2.10.9 Straightedge

Provide and maintain at the Job Site, in good condition, a minimum 12 foot straightedge for each paving train for testing the hardened Portland cement concrete surfaces. Provide straightedges constructed of aluminum or magnesium alloy and blades of box or box-girder cross section with flat bottom, adequately reinforced to insure rigidity and accuracy. Provide straightedges with handles for operation on the pavement.

2.10.10 Work Bridge

Provide a self-propelled working bridge capable of spanning the required paving lane width where workmen can efficiently and adequately reach the pavement surface.

2.11 SPECIFIED CONCRETE STRENGTH AND OTHER PROPERTIES

2.11.1 Specified Flexural Strength

Specified flexural strength, R, for concrete is 650 psi at 28 days, as determined by tests made in accordance with ASTM C78/C78M of beams fabricated and cured in accordance with ASTM C192/C192M.

2.11.2 Water-Cementitious Materials Ratio

Maximum allowable water-cementitious material ratio is 0.45. The water-cementitious material ratio is the equivalent water-cement ratio as determined by conversion from the weight ratio of water to cement plus SCM by the mass equivalency method described in ACI 211.1.

2.11.3 Air Content

Provide concrete that is air-entrained with a total air content of 6.0 plus or minus 1.5 percentage points, at the point of placement. Determine air content in accordance with ASTM C231/C231M.

2.11.4 Slump

The maximum allowable slump of the concrete at the point of placement is 2 inches for pavement constructed with fixed forms. For slipformed pavement, at the start of the Project, select a slump which produces

in-place pavement meeting the specified tolerances for control of edge slump. The selected slump is applicable to both pilot and fill-in lanes.

2.11.5 Concrete Temperature

The temperature of the concrete as delivered is required to conform to the requirements of Paragraphs "Paving In Hot Weather" and "Paving In Cold Weather" in PART 3. Determine the temperature of concrete in accordance with ASTM C1064/C1064M.

2.11.6 Concrete Strength for Final Acceptance

The strength of the concrete will be considered acceptable when the equivalent [90-day] [28-day] flexural strengths for each lot are above the 'Specified Flexural Strength' as determined by correlation with 14-day flexural strength tests specified in Paragraph "Mixture Proportioning for Flexural Strength" below, and no individual set (2 specimens per subplot) in the lot are 25 psi or more below the equivalent 'Specified Flexural Strength'. If any lot or subplot, respectively, fails to meet the above criteria, remove and replace the lot or subplot at no additional cost to the Government. This is in addition to and does not replace the average strength required for day-to-day CQC operations as specified in Paragraph "Average CQC Flexural Strength Required For Mixtures", below.

2.12 MIXTURE PROPORTIONS

2.12.1 Composition

Provide concrete composed of cementitious material, water, fine and coarse aggregates, and admixtures. Include supplementary Cementitious Materials (SCM) choice and usage in accordance with Paragraph "Supplementary Cementitious Materials (SCM) Content". Provide a minimum total cementitious materials content of 517 pounds per cubic yard. Acceptable admixtures consist of air entraining admixture and may also include, as approved, water reducing and/or accelerating admixtures.

2.12.2 Proportioning Studies

Perform trial design batches, mixture proportioning studies, and testing, at no expense to the Government. Submit for approval the Preliminary Proposed Proportioning to include items a., b., and i., below a minimum of 7 days prior to beginning the mixture proportioning study. Submit the results of the mixture proportioning studies signed and stamped by the registered professional engineer having technical responsibility for the mix design study, and submitted at least 30 days prior to commencing concrete placing operations. Include a statement summarizing the maximum nominal coarse aggregate size and the weights and volumes of each ingredient proportioned on a 1 cubic yard basis. Base aggregate quantities on the mass in a saturated surface dry condition. Provide test results demonstrating that the proposed mixture proportions produce concrete of the qualities indicated. Base methodology for trial mixtures having proportions, slumps, and air content suitable for the work as described in ACI 211.1, modified as necessary to accommodate flexural strength. Submit test results including:

- a. Coarse and fine aggregate gradations and plots.
- b. Combined aggregate gradation and coarseness vs. workability plots.

- c. Coarse aggregate quality test results, include deleterious materials.
- d. Fine aggregate quality test results.
- e. Mill certificates for cement and supplemental cementitious materials.
- f. Certified test results for air entraining, water reducing, retarding, non-chloride accelerating[, and Lithium Nitrate] admixtures.
- g. Specified flexural strength, slump, and air content.
- h. Documentation of required average CQC flexural strength, Ra.
- i. Recommended proportions and volumes for proposed mixture and each of three trial water-cementitious materials ratios.
- j. Individual beam breaks.
- k. Flexural strength summaries and plots.
- l. Correlation ratios for acceptance testing and CQC testing.
- m. Historical record of test results, documenting production standard deviation (if available).
- n. Narrative discussing methodology on how the mix design was developed.
- o. Alternative aggregate blending to be used during the test section if necessary to meet the required surface and consolidation requirements.

2.12.2.1 Water-Cementitious Materials Ratio

Perform at least three different water-cementitious materials ratios, which produce a range of strength encompassing that required on the Project. The maximum allowable water-cementitious material ratio required in Paragraph "Specified Flexural Strength", above is the equivalent water-cementitious materials ratio. The maximum water-cementitious materials ratio of the approved mix design becomes the maximum water-cementitious materials ratio for the Project, and in no case exceeds 0.45.

2.12.2.2 Trial Mixture Studies

Perform separate sets of trial mixture studies made for each combination of cementitious materials and each combination of admixtures proposed for use. No combination of either are to be used until proven by such studies, except that, if approved in writing and otherwise permitted by these Specifications, an accelerating or retarding admixture may be used without separate trial mixture study. Perform separate trial mixture studies for each placing method (slip form, fixed form, or hand placement) proposed. Report the temperature of concrete in each trial batch. Design each mixture to promote easy and suitable concrete placement, consolidation and finishing, and to prevent segregation and excessive bleeding. Proportion laboratory trial mixtures for maximum permitted slump and air content.

2.12.2.3 Mixture Proportioning for Flexural Strength

Follow the step by step procedure below:

- a. Fabricate all beams for each mixture from the same batch or blend of batches. Fabricate and cure all beams in accordance with ASTM C192/C192M, using 6 by 6 inch steel beam forms.
- b. Cure test beams from each mixture for 3, 7, 14, and 90-day flexural tests; 6 beams to be tested per age.
- c. Test beams in accordance with ASTM C78/C78M.
- d. Using the average strength for each w/c at each age, plot all results from each of the three mixtures on separate graphs for w/c versus:
 - (1) 3-day flexural strength.
 - (2) 7-day flexural strength.
 - (3) 14-day flexural strength.
 - (4) 90-day flexural strength
- e. From these graphs select a w/c that produces a mixture giving a 90-day flexural strength equal to the required strength determined in accordance with the next paragraph.
- f. Using the above selected w/c, select from the graphs the expected 3, 7, and 14-day flexural strengths.
- g. From the above expected strengths for the selected mixture, determine the Ratio of the 7-day flexural strength of the selected mixture to the 90-day flexural strength of the mixture (for CQC control).
- h. From the above expected strengths for the selected mixture, determine the Ratio of the 14-day flexural strength of the selected mixture to the 90-day flexural strength of the mixture (for acceptance).
- i. If there is a change in materials, perform additional mixture design studies using the new materials and new Correlation Ratios determined.
- j. No concrete pavement placement is allowed until the mixture proportions are approved. The approved water-cementitious materials ratio is restricted to the maximum value specified in Paragraph "Specified Flexural Strength", above and not be increased without written approval.

2.12.3 Average CQC Flexural Strength Required for Mixtures

In order to ensure meeting the strength requirements specified in Paragraph "Specified Concrete Strength and Other Properties" above, during production, the mixture proportions selected during mixture proportioning studies and used during construction requires an average CQC flexural strength exceeding the specified strength, R, by the amount indicated below. This required average CQC flexural strength, Ra, is used only for CQC operations as specified in Paragraph "Testing and Inspection for Contractor Quality Control During Construction" in PART 3 and as specified in the previous paragraph. During production, adjust the required Ra, as appropriate and as approved, based on the standard deviation of average 90-day strengths being attained during paving.

2.12.3.1 From Previous Test Records

Where a concrete production facility has previous test records current to within 18 months, establish a standard deviation in accordance with the applicable provisions of ACI 214R. Include test records from which a standard deviation is calculated that represent materials, quality control procedures, and conditions similar to those expected, that represent concrete produced to meet a specified flexural strength or strengths within 150 psi of the 90-day flexural strength specified for the proposed work, and that consist of at least 30 consecutive tests. Perform verification testing to document the current strength. A strength test is the average of the strengths of two specimens made from the same sample of concrete and tested at 90 days. Required average CQC flexural strength, R_a , used as the basis for selection of concrete proportions is the value from the equation that follows, using the standard deviation as determined above:

a. $R_a = R + 1.34S$:

- (1) Where: S = standard deviation.
- (2) R = specified flexural strength.
- (3) R_a = required average flexural strength.

Where a concrete production facility does not have test records meeting the requirements above but does have a record based on 15 to 29 consecutive tests, establish a standard deviation as the product of the calculated standard deviation and a modification factor from the following table:

NUMBER OF TESTS	MODIFICATION FACTOR FOR STANDARD DEVIATION
15	1.16
20	1.08
25	1.03
30 or more	1.00

2.12.3.2 Without Previous Test Records

When a concrete production facility does not have sufficient field strength test records for calculation of the standard deviation, determine the required average strength, R_a , by adding 15 percent to the specified flexural strength, R .

PART 3 EXECUTION

3.1 PREPARATION FOR PAVING

Before commencing paving, perform the following. If used, place cleaned, coated, and adequately supported forms. Have any reinforcing steel needed at the paving site; all transporting and transfer equipment ready for use, clean, and free of hardened concrete and foreign material; equipment for spreading, consolidating, screeding, finishing, and texturing concrete at the paving site, clean and in proper working order; and all equipment and material for curing and for protecting concrete from weather or mechanical

damage at the paving site, in proper working condition, and in sufficient amount for the entire placement.

3.1.1 Weather Precaution

When windy conditions during paving appear probable, have equipment and material at the paving site to provide windbreaks, shading, fogging, or other action to prevent plastic shrinkage cracking or other damaging drying of the concrete.

3.1.2 Proposed Techniques

Submit placing and protection methods; paving sequence; jointing pattern; data on curing equipment and profilographs; demolition of existing pavements, as specified; pavement diamond grinding equipment and procedures. Submit for approval the following items:

- a. A description of the placing and protection methods proposed when concrete is to be placed in or exposed to hot, cold, or rainy weather conditions.
- b. A detailed paving sequence plan and proposed paving pattern showing all planned construction joints; transverse and longitudinal dowel bar spacing; and identifying pilot lanes and hand placement areas. Deviations from the jointing pattern shown on the Drawings are not allowed without written approval of the Construction Administrator.
- c. Plan and equipment proposed to control alignment of sawn joints within the specified tolerances.
- d. Data on the curing equipment, media, and methods to be used.
- e. Data on profilograph and methods to measure pavement smoothness.
- f. Pavement demolition work plan, presenting the proposed methods and equipment to remove existing pavement and protect pavement to remain in place.

3.2 CONDITIONING OF UNDERLYING MATERIAL

3.2.1 General Procedures

Verify the underlying material, upon which concrete is to be placed is clean, damp, and free from debris, waste concrete or cement, frost, ice, and standing or running water. Prior to setting forms or placement of concrete, verify the underlying material is well drained and have been satisfactorily graded by string-line controlled, automated, trimming machine and uniformly compacted in accordance with the applicable Section of these Specifications. Test the surface of the underlying material to crown, elevation, and density in advance of setting forms or of concrete placement using slip-form techniques. Trim high areas to proper elevation. Fill and compact low areas to a condition similar to that of surrounding grade, or filled with concrete monolithically with the pavement. Low areas filled with concrete are not to be cored for thickness to avoid biasing the average thickness used for evaluation and payment adjustment. Rework and compact any underlying material disturbed by construction operations to specified density immediately in front of the paver. If a slipform paver is used, continue the same underlying material under the paving lane beyond the edge of the lane a sufficient

distance that is thoroughly compacted and true to grade to provide a suitable trackline for the slipform paver and firm support for the edge of the paving lane.

3.2.2 Traffic on Underlying Material

After the underlying material has been prepared for concrete placement, equipment is not permitted thereon. Subject to specific approval, crossing of the prepared underlying material at specified intervals for construction purposes may be permitted, provided rutting or indentations do not occur. Rework and repair the surface before concrete is placed. Transporting equipment is not to be allowed to operate on the prepared and compacted underlying material in front of the paver-finisher.

3.3 WEATHER LIMITATIONS

3.3.1 Placement and Protection During Inclement Weather

Do not commence placing operations when heavy rain or other damaging weather conditions appear imminent. At all times when placing concrete, maintain on-site sufficient waterproof cover and means to rapidly place it over all unhardened concrete or concrete that might be damaged by rain. Suspend placement of concrete whenever rain, high winds, or other damaging weather commences to damage the surface or texture of the placed unhardened concrete, washes cement out of the concrete, or changes the water content of the surface concrete. Immediately cover and protect all unhardened concrete from the rain or other damaging weather. Completely remove any slab damaged by rain or other weather full depth, by full slab width, to the nearest original joint, and replaced as specified in Paragraph "Repair, Removal, and Replacement of Newly Constructed Slabs" below, at no expense to the Government.

3.3.2 Paving in Hot Weather

When the ambient temperature during paving is expected to exceed 90 degrees F, properly place and finish the concrete in accordance with procedures previously submitted, approved, and as specified herein. Provide concrete that does not exceed the temperature shown in the table below when measured in accordance with ASTM C1064/C1064M at the time of delivery. Cooling of the mixing water or aggregates or placing in the cooler part of the day may be required to obtain an adequate placing temperature. Cool steel forms and reinforcing as needed to maintain steel temperatures below 120 degrees F. Cool or protect transporting and placing equipment if necessary to maintain proper concrete placing temperature. Keep the finished surfaces of the newly laid pavement damp by applying a fog spray (mist) with approved spraying equipment until the pavement is covered by the curing medium.

Maximum Allowable Concrete Placing Temperature	
Relative Humidity, Percent, During Time of Concrete Placement	Maximum Allowable Concrete Temperature in Degrees F
Greater than 60	90
40-60	85

Maximum Allowable Concrete Placing Temperature	
Relative Humidity, Percent, During Time of Concrete Placement	Maximum Allowable Concrete Temperature in Degrees F
Less than 40	80

3.3.3 Prevention of Plastic Shrinkage Cracking

During weather with low humidity, and particularly with high temperature and appreciable wind, develop and institute measures to prevent plastic shrinkage cracks from developing. If plastic shrinkage cracking occurs, halt further placement of concrete until protective measures are in place to prevent further cracking. Periods of high potential for plastic shrinkage cracking can be anticipated by use of ACI 305R. In addition to the protective measures specified in the previous paragraph, the concrete placement may be further protected by erecting shades and windbreaks and by applying fog sprays of water, the addition of monomolecular films, or wet covering. Apply monomolecular films after finishing is complete, do not use in the finishing process. Immediately commence curing procedures when such water treatment is stopped. Repair plastic shrinkage cracks in accordance with Paragraph "Repair, Removal, and Replacement of Newly Constructed Slabs". Never trowel over or fill plastic shrinkage cracks with slurry.

3.3.4 Paving in Cold Weather

Cold weather paving is required to conform to ACI 306R. Use special protection measures, as specified herein, if freezing temperatures are anticipated or occur before the expiration of the specified curing period. Do not begin placement of concrete unless the ambient temperature is at least 35 degrees F and rising. Thereafter, halt placement of concrete whenever the ambient temperature drops below 40 degrees F. When the ambient temperature is less than 50 degrees F, the temperature of the concrete when placed is required to be not less than 50 degrees F nor more than 75 degrees F. Provide heating of the mixing water or aggregates as required to regulate the concrete placing temperature. Materials entering the mixer are required to be free from ice, snow, or frozen lumps. Do not incorporate salt, chemicals or other materials in the concrete to prevent freezing. [If allowed under Paragraph "Mixture Proportions" in PART 2, an accelerating admixture may be used when the ambient temperature is below 50 degrees F.] Provide covering and other means for maintaining the concrete at a temperature of at least 50 degrees F for not less than 72 hours after placing, and at a temperature above freezing for the remainder of the curing period. Remove pavement slabs, full depth by full width, damaged by freezing or falling below freezing temperature to the nearest planned joint, and replace as specified in Paragraph "Repair, Removal, and Replacement of Newly Constructed Slabs", at no expense to the Government.

3.4 CONCRETE PRODUCTION

Provide batching, mixing, and transporting equipment with a capacity sufficient to maintain a continuous, uniform forward movement of the paver of not less than 2.5 feet per minute. Deposit concrete transported in non-agitating equipment in front of the paver within 45 minutes from the time cement has been charged into the mixing drum, except that if the ambient temperature is above 90 degrees F, the time is reduced to 30

minutes. Deposit concrete transported in truck mixers in front of the paver within 90 minutes from the time cement has been charged into the mixer drum of the plant or truck mixer. If the ambient temperature is above 90 degrees F, the time is reduced to 60 minutes. Accompany every load of concrete delivered to the paving site with a batch ticket from the operator of the batching plant. Provide batch ticket information required by ASTM C94/C94M on approved forms. In addition provide design quantities in mass or volume for all materials, batching tolerances of all materials, and design and actual water cementitious materials ratio on each batch delivered, [the water meter and revolution meter reading on truck mixers]and the time of day. Provide batch tickets for each truck delivered as part of the lot acceptance package to the placing foreman to maintain on file and deliver them to the Government weekly.

3.4.1 Batching and Mixing Concrete

Maintain scale pivots and bearings clean and free of rust. Remove any equipment which fails to perform as specified immediately from use until properly repaired and adjusted, or replaced.

3.4.2 Transporting and Transfer - Spreading Operations

Operate non-agitating equipment only on smooth roads and for haul time less than 15 minutes. Deposit concrete as close as possible to its final position in the paving lane. Operate all equipment to discharge and transfer concrete without segregation. Dumping of concrete in discrete piles is not permitted. No transfer or spreading operation which requires the use of front-end loaders, dozers, or similar equipment to distribute the concrete are permitted.

3.5 PAVING

3.5.1 General Requirements

Construct pavement with paving and finishing equipment utilizing rigid fixed forms or by use of slipform paving equipment. Provide paving and finishing equipment and procedures capable of constructing paving lanes of the required width at a rate of at least 2.5 feet of paving lane per minute on a routine basis. Control paving equipment and its operation, and coordinated with all other operations, such that the paver-finisher has a continuous forward movement at a reasonably uniform speed from beginning to end of each paving lane, except for inadvertent equipment breakdown. Backing the paver and refinishing a lane is not permitted. Remove and replace concrete refinished in this manner. Failure to achieve a continuous forward motion requires halting operations, regrouping, and modifying operations to achieve this requirement. Personnel are not permitted to walk or operate in the plastic concrete at any time. Where an open-graded granular base is required under the concrete, select paving equipment and procedures which operate properly on the base course without causing displacement or other damage.

3.5.2 Consolidation

Consolidate concrete with the specified type of lane-spanning, gang-mounted, mechanical, immersion type vibrating equipment mounted in front of the paver, supplemented, in rare instances as specified, by hand-operated vibrators. Insert vibrators into the concrete to a depth that provides the best full-depth consolidation but not closer to the underlying material than 2 inches. Excessive vibration is not permitted.

Discontinue paving operations if vibrators cause visible tracking in the paving lane, until equipment and operations have been modified to prevent it. Vibrate concrete in small, odd-shaped slabs or in isolated locations inaccessible to the gang-mounted vibration equipment with an approved hand-operated immersion vibrator operated from a bridge spanning the area. Do not use vibrators to transport or spread the concrete. Do not operate hand-operated vibrators in the concrete at one location for more than 20 seconds. Insert hand-operated vibrators between 6 to 15 inches on centers. For each paving train, provide at least one additional vibrator spud, or sufficient parts for rapid replacement and repair of vibrators at the paving site at all times. Any evidence of inadequate consolidation (honeycomb along the edges, large air pockets, or any other evidence) requires the immediate stopping of the paving operation and approved adjustment of the equipment or procedures.

3.5.3 Operation

When the paver approaches a header at the end of a paving lane, maintain a sufficient amount of concrete ahead of the paver to provide a roll of concrete which spills over the header. Provide a sufficient amount of extra concrete to prevent any slurry that is formed and carried along ahead of the paver from being deposited adjacent to the header. Maintain the spud vibrators in front of the paver at the desired depth as close to the header as possible before they are lifted. Provide additional consolidation adjacent to the headers by hand-manipulated vibrators. When the paver is operated between or adjacent to previously constructed pavement (fill-in lanes), provide provisions to prevent damage to the previously constructed pavement. Electronically control screeds or extrusion plates from the previously placed pavement so as to prevent them from applying pressure to the existing pavement and to prevent abrasion of the pavement surface. Maintain the overlapping area of existing pavement surface completely free of any loose or bonded foreign material as the paver-finisher operates across it. When the paver travels on existing pavement, maintain approved provisions to prevent damage to the existing pavement. Pavers using transversely oscillating screeds are not allowed to form fill-in lanes that have widths less than a full width for which the paver was designed or adjusted.

3.5.4 Required Results

Adjust and operate the paver-finisher, its gang-mounted vibrators and operating procedures coordinated with the concrete mixture being used, to produce a thoroughly consolidated slab throughout that is true to line and grade within specified tolerances. Provide a paver-finishing operation that produces a surface finish free of irregularities, tears, voids of any kind, and any other discontinuities in a single pass across the pavement; multiple passes are not permitted. Provide equipment and its operation that produce a finished surface requiring no hand finishing other than the use of cutting straightedges, except in very infrequent instances. Stop paving if any equipment or operation fails to produce the above results. Prior to recommencing paving, properly adjust or replace the equipment, modify the operation, or modify the mixture proportions, in order to produce the required results. No water, other than fog sprays (mist) as specified in Paragraph "Prevention of Plastic Shrinkage Cracking" above, is allowed to be applied to the concrete or the concrete surface during paving and finishing.

3.5.5 Fixed Form Paving

Provide paving equipment for fixed-form paving and the operation that conforms to the requirements of Paragraph "Equipment", and all requirements specified herein.

3.5.5.1 Forms for Fixed-Form Paving

- a. Provide straight forms made of steel and in sections not less than 10 feet in length that are clean and free of rust or other contaminants. Seal any holes or perforations in forms prior to paving unless otherwise permitted. Maintain forms in place and passable by all equipment necessary to complete the entire paving operation without need to remove horizontal form supports. Provide flexible or curved forms of proper radius for curves of 100-foot radius or less. Provide wood forms for curves and fillets made of well-seasoned, surfaced plank or plywood, straight, and free from warp or bend that have adequate strength and are rigidly braced. Provide forms with a depth equal to the pavement thickness at the edge. Where the Project requires several different slab thicknesses, forms may be built up by bolting or welding a tubular metal section or by bolting wood planks to the bottom of the form to completely cover the underside of the base of the form and provide an increase in depth of not more than 25 percent. Provide forms with the base width of the one-piece or built-up form not less than eight-tenths of the vertical height of the form, except provide forms 8 inches or less in vertical height with a base width not less than the vertical height of the form. Provide forms with maximum vertical deviation of top of any side form, including joints, not varying from a true plane more than 1/8 inch in 10 feet, and the upstanding leg not varying more than 1/4 inch.
- b. Provide form sections that are tightly locked and free from play or movement in any direction. Provide forms with adequate devices for secure settings so that when in place they withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment.
- c. Set forms for full bearing on foundation for entire length and width and in alignment with edge of finished pavement. Support forms during entire operation of placing, compaction, and finishing so that forms do not deviate vertically more than 0.01 foot from required grade and elevations indicated. Check conformity to the alignment and grade elevations shown on the Drawings and make necessary corrections immediately prior to placing the concrete. Clean and oil the forms each time before concrete is placed. Concrete placement is not allowed until setting of forms has been checked and approved by the CQC team.
- d. Do not anchor guide rails for fixed form pavers into new concrete or existing concrete to remain.

3.5.5.2 Form Removal

Keep forms in place at least 12 hours after the concrete has been placed. When conditions are such that the early strength gain of the concrete is delayed, leave the forms in place for a longer time, as directed. Remove forms by procedures that do not damage the concrete. Do not use bars or heavy metal tools directly against the concrete in removing the forms. Promptly repair any concrete found to be defective after form removal,

using procedures specified or as directed.

3.5.6 Slipform Paving

3.5.6.1 General

Provide paving equipment for slipform paving and the operation thereof that conforms to the requirement of Paragraph "Equipment", and all requirements specified herein. Provide a slipform paver capable of shaping the concrete to the specified and indicated cross section, meeting all tolerances, with a surface finish and edges that require only a very minimum isolated amount of hand finishing, in one pass. If the paving operation does not meet the above requirements and the specified tolerances, immediately stop the operation, and regroup and replace or modify any equipment as necessary, modify paving procedures or modify the concrete mix, in order to resolve the problem. Provide a slipform paver that is automatically electronically controlled from a taut wire guideline for horizontal alignment and on both sides from a taut wire guideline for vertical alignment, except that electronic control from a ski operating on a previously constructed adjoining lane is required where applicable for either or both sides. Automatic, electronic controls are required for vertical alignment on both sides of the lane. Control from a slope-adjustment control or control operating from the underlying material is not allowed. Properly adjust side forms on slipform pavers so that the finished edge of the paving lane meets all specified tolerances. Install dowels in longitudinal construction joints as specified below. The installation of these dowels by dowel inserters attached to the paver or by any other means of inserting the dowels into the plastic concrete is not permitted.

3.5.6.2 Guideline for Slipform Paving

Accurately and securely install guidelines well in advance of concrete placement. Provide supports at necessary intervals to eliminate all sag in the guideline when properly tightened. Provide guideline consisting of high strength wire set with sufficient tension to remove all sag between supports. Provide supports that are securely staked to the underlying material or other provisions made to ensure that the supports are not displaced when the guideline is tightened or when the guideline or supports are accidentally touched by workmen or equipment during construction. Provide appliances for attaching the guideline to the supports that are capable of easy adjustment in both the horizontal and vertical directions. When it is necessary to leave gaps in the guideline to permit equipment to use or cross underlying material, provide provisions for quickly and accurately replacing the guideline without any delay to the forward progress of the paver. Provide supports on either side of the gap that are secured in such a manner as to avoid disturbing the remainder of the guideline when the portion across the gap is positioned and tightened. Check the guideline across the gap and adjacent to the gap for a distance of 200 feet for horizontal and vertical alignment after the guideline across the gap is tightened. Provide vertical and horizontal positioning of the guideline such that the finished pavement conforms to the alignment and grade elevations shown on the drawings within the specified tolerances for grade and smoothness. The specified tolerances are intended to cover only the normal deviations in the finished pavement that may occur under good supervision and do not apply to setting of the guideline. Set the guideline true to line and grade.

3.5.6.3 Stringless Technology

If the use of any type of stringless technology is proposed, submit a detailed description of the system and perform a trial field demonstration at least one week prior to start of paving. Approval of the control system will be based on the results of the demonstration and on continuing satisfactory operation during paving.

3.5.7 Placing Reinforcing Steel

Provide the type and amount of steel reinforcement indicated.

3.5.7.1 Pavement Thickness Greater Than 12 inches

For pavement thickness of 12 inches or more, install the reinforcement steel by the strike-off method wherein a layer of concrete is deposited on the underlying material, consolidated, and struck to the indicated elevation of the steel reinforcement. Place the reinforcement upon the pre-struck surface, followed by placement of the remaining concrete and finishing in the required manner. When placement of the second lift causes the steel to be displaced horizontally from its original position, provide provisions for increasing the thickness of the first lift and depressing the reinforcement into the unhardened concrete to the required elevation. Limit the increase in thickness only as necessary to permit correct horizontal alignment to be maintained. Remove and replace any portions of the bottom layer of concrete that have been placed more than 30 minutes without being covered with the top layer with newly mixed concrete without additional cost to the Government.

3.5.7.2 Pavement Thickness Less Than 12 Inches

For pavements less than 12 inches thick, position the reinforcement on suitable chairs or continuous mesh support devices securely fastened to the subgrade prior to concrete placement. Consolidate concrete after the steel has been placed. Regardless of placement procedure, provide reinforcing steel free from coatings which could impair bond between the steel and concrete, with reinforcement laps as indicated. Regardless of the equipment or procedures used for installing reinforcement, ensure that the entire depth of concrete is adequately consolidated.

3.5.8 Placing Dowels

Ensure the method used to install and hold dowels in position result in dowel alignment within the maximum allowed horizontal and vertical tolerance of 1/8 inch per foot after the pavement has been completed. Except as otherwise specified below, maintain the horizontal spacing of dowels within a tolerance of plus or minus 5/8 inch. Locate the dowel vertically on the face of the slab within a tolerance of plus or minus 1/2 inch). Measure the vertical alignment of the dowels parallel to the designated top surface of the pavement, except for those across the crown or other grade change joints. Measure dowels across crowns and other joints at grade changes to a level surface. Check horizontal alignment perpendicular to the joint edge with a framing square. Do not place dowels closer than 0.6 times the dowel bar length to the planned joint line. If the last regularly spaced longitudinal dowel is closer than that dimension, move it away from the joint to a location 0.6 times the dowel bar length, but not closer than 6 inches to its nearest neighbor. Resolve dowel interference at a transverse joint-longitudinal joint intersection by deleting the closest transverse dowel. Do not position the end of a

longitudinal dowel closer than 12 inches from the end of the nearest transverse dowel. Install dowels as specified in the following subparagraphs.

3.5.8.1 Contraction Joints

Securely hold dowels in longitudinal and transverse contraction joints within the paving lane in place, as indicated, by means of rigid metal frames or basket assemblies of an approved type. Securely hold the basket assemblies in the proper location by means of suitable pins or anchors. Do not cut or crimp the dowel basket tie wires.

3.5.8.2 Construction Joints-Fixed Form Paving

Install dowels by the bonded-in-place method or the drill-and-dowel method. Installation by removing and replacing in preformed holes is not permitted. Prepare and place dowels across joints where indicated, correctly aligned, and securely held in the proper horizontal and vertical position during placing and finishing operations, by means of devices fastened to the forms. Provide the spacing of dowels in construction joints as indicated, except that, where the planned spacing cannot be maintained because of form length or interference with form braces, provide closer spacing with additional dowels.

3.5.8.3 Dowels Installed in Hardened Concrete

Install dowels in hardened concrete by bonding the dowels into holes drilled into the hardened concrete. Before drilling commences, cure the concrete for 7 days or until it has reached a minimum flexural strength of 450 psi. Drill holes 1/8 inch greater in diameter than the dowels into the hardened concrete using rotary-core drills. Rotary-percussion drills are permitted, provided that excessive spalling does not occur to the concrete joint face. Excessive spalling is defined as spalling deeper than 1/4 inch from the joint face or 1/2 inch radially from the outside of the drilled hole. Continuing damage requires modification of the equipment and operation. Drill depth of dowel hole within a tolerance of plus or minus 1/2 inch of the dimension shown on the Drawings. Upon completion of the drilling operation, blow out the dowel hole with oil-free, compressed air. Bond dowels in the drilled holes using epoxy resin. Inject epoxy resin at the back of the hole before installing the dowel and extruded to the collar during insertion of the dowel so as to completely fill the void around the dowel. Application by buttering the dowel is not permitted. Hold the dowels in alignment at the collar of the hole, after insertion and before the grout hardens, by means of a suitable metal or plastic grout retention ring fitted around the dowel. Provide dowels required between new and existing concrete in holes drilled in the existing concrete, all as specified above.

3.5.8.4 Lubricating Dowel Bars

Wipe the portion of each dowel intended to move within the concrete clean and coat with a thin, even film of lubricating oil or light grease before the concrete is placed.

3.6 FINISHING

Provide finishing operations as a continuing part of placing operations starting immediately behind the strike-off of the paver. Provide initial finishing by the transverse screed or extrusion plate. Provide the

sequence of operations consisting of transverse finishing, longitudinal machine floating if used, straightedge finishing, texturing, and then edging of joints. Provide finishing by the machine method. Provide a work bridge as necessary for consolidation and hand finishing operations. Use the hand method only on isolated areas of odd slab widths or shapes and in the event of a breakdown of the mechanical finishing equipment. Keep supplemental hand finishing for machine finished pavement to an absolute minimum. Immediately stop any machine finishing operation which requires appreciable hand finishing, other than a moderate amount of straightedge finishing. Prior to recommencing machine finishing, properly adjust or replace the equipment. Immediately halt any operations which produce more than 1/8 inch of mortar-rich surface (defined as deficient in plus U.S. No. 4 sieve size aggregate) and the equipment, mixture, or procedures modified as necessary. Compensate for surging behind the screeds or extrusion plate and settlement during hardening and take care to ensure that paving and finishing machines are properly adjusted so that the finished surface of the concrete (not just the cutting edges of the screeds) is at the required line and grade. Maintain finishing equipment and tools clean and in an approved condition. Water is not allowed to be added to the surface of the slab with the finishing equipment or tools, or in any other way, except for fog (mist) sprays specified to prevent plastic shrinkage cracking.

3.6.1 Machine Finishing With Fixed Forms

Replace machines that cause displacement of the forms. Only one pass of the finishing machine is allowed over each area of pavement. If the equipment and procedures do not produce a surface of uniform texture, true to grade, in one pass, immediately stop the operation and the equipment, mixture, and procedures adjusted as necessary.

3.6.2 Machine Finishing with Slipform Pavers

Operate the slipform paver so that only a very minimum of additional finishing work is required to produce pavement surfaces and edges meeting the specified tolerances. Immediately modify or replace any equipment or procedure that fails to meet these specified requirements as necessary. A self-propelled, non-rotating pipe float may be used while the concrete is still plastic, to remove minor irregularities and score marks. Only one pass of the pipe float is allowed. If there is concrete slurry or fluid paste on the surface that runs over the edge of the pavement, immediately stop the paving operation and the equipment, mixture, or operation modified to prevent formation of such slurry. Immediately remove any slurry which does run down the vertical edges by hand, using stiff brushes or scrapers. Slurry, concrete, or concrete mortar is not allowed to build up along the edges of the pavement to compensate for excessive edge slump, either while the concrete is plastic or after it hardens.

3.6.3 Surface Correction and Testing

After all other finishing is completed but while the concrete is still plastic, eliminate minor irregularities and score marks in the pavement surface by means of cutting straightedges. Provide cutting straightedges with a minimum length of 12 feet that are operated from the sides of the pavement or from bridges. Provide cutting straightedges operated from the side of the pavement equipped with a handle 3 feet longer than one-half the width of the pavement. Test the surface for trueness with a straightedge held in successive positions parallel and at right angles to the center line of the pavement, and the whole area covered as necessary

to detect variations. Advance the straightedge along the pavement in successive stages of not more than one-half the length of the straightedge. Immediately fill depressions with freshly mixed concrete, strike off, consolidate with an internal vibrator, and refinish. Strike off projections above the required elevation and refinish. Continue the straightedge testing and finishing until the entire surface of the concrete is free from observable departure from the straightedge and conforms to the surface requirements specified in Paragraph "Surface Smoothness". This straightedging is not allowed to be used as a replacement for the straightedge testing of Paragraph "Surface Smoothness" in PART 1. Use long-handled, flat bull floats very sparingly and only as necessary to correct minor, scattered surface defects. If frequent use of bull floats is necessary, stop the paving operation and the equipment, mixture or procedures adjusted to eliminate the surface defects. Keep finishing with hand floats and trowels to the absolute minimum necessary. Take extreme care to prevent over finishing joints and edges. Produce the surface finish of the pavement essentially by the finishing machine and not by subsequent hand finishing operations. All hand finishing operations are subject to approval.

3.6.4 Hand Finishing

Use hand finishing operations only as specified below. Provide a work bridge to be used as necessary for consolidation and placement operations to avoid standing in concrete.

3.6.4.1 Equipment and Template

In addition to approved mechanical internal vibrators for consolidating the concrete, provide a strike-off and tamping template and a longitudinal float for hand finishing. Provide a template at least 1 foot longer than the width of pavement being finished, of an approved design, and sufficiently rigid to retain its shape, that is constructed of metal or other suitable material shod with metal. Provide a longitudinal float at least 10 feet long, of approved design, is rigid and substantially braced, and maintain a plane surface on the bottom. Grate tampers (jitterbugs) are not allowed.

3.6.4.2 Finishing and Floating

As soon as placed and vibrated, strike off the concrete and screeded to the crown and cross section and to such elevation above grade that when consolidated and finished, the surface of the pavement is at the required elevation. In addition to previously specified complete coverage with handheld immersion vibrators, tamp the entire surface with the strike-off and tamping template, and the tamping operation continued until the required compaction and reduction of internal and surface voids are accomplished. Immediately following the final tamping of the surface, float the pavement longitudinally from bridges resting on the side forms and spanning but not touching the concrete. If necessary, place additional concrete, consolidated and screeded, and the float operated until a satisfactory surface has been produced. Do not advance the floating operation more than half the length of the float and then continued over the new and previously floated surfaces.

3.6.5 Texturing

Before the surface sheen has disappeared and before the concrete hardens or curing compound is applied, texture the surface of the pavement as

described herein. After curing is complete, thoroughly power broom all textured surfaces to remove all debris.

3.6.5.1 Burlap Drag Surface

Apply surface texture by dragging the surface of the pavement, in the direction of the concrete placement, with an approved burlap drag. Operate the drag with the fabric moist, and the fabric maintained clean or changed as required to keep clean. Perform the dragging so as to produce a uniform finished surface having a fine sandy texture without disfiguring marks.

3.6.6 Edging

Before texturing has been completed, carefully finish the edge of the slabs along the forms, along the edges of slipformed lanes, and at the joints with an edging tool to form a smooth rounded surface of 1/8 inch radius. Eliminate tool marks, and provide edges that are smooth and true to line. Water is not allowed to be added to the surface during edging. Take extreme care to prevent overworking the concrete.

3.6.7 Outlets in Pavement

Construct recesses for the tie-down anchors, lighting fixtures, and other outlets in the pavement to conform to the details and dimensions shown. Carefully finish the concrete in these areas to provide a surface of the same texture as the surrounding area that is within the requirements for plan grade and surface smoothness.

3.7 CURING

3.7.1 Protection of Concrete

Continuously protect concrete against loss of moisture and rapid temperature changes for at least 7 days from the completion of finishing operations. Have all equipment needed for adequate curing and protection of the concrete on hand and ready for use before actual concrete placement begins. If any selected method of curing does not afford the proper curing and protection against concrete cracking, remove or replace the damaged pavement, and provide another method of curing as directed. Accomplish curing by one of the following methods except use only moist curing for the first 24 hours.

3.7.2 Membrane Curing

Apply a uniform coating of white-pigmented, membrane-forming, curing compound to the entire exposed surface of the concrete as soon as the free water has disappeared from the surface after finishing. Apply immediately along the formed edge faces after the forms are removed. Do not allow the concrete to dry before the application of the membrane. If any drying has occurred, moisten the surface of the concrete with a fine spray of water, and the curing compound applied as soon as the free water disappears. Apply the curing compound to the finished surfaces by means of an approved automatic spraying machine. Apply the curing compound with an overlapping coverage that provides a two-coat application at a coverage of 400 square feet per gallon, plus or minus 5.0 percent for each coat. A one-coat application is allowed provided it is applied in a uniform application and coverage of 200 square feet per gallon, plus or minus 5.0 percent is obtained. The application of curing compound by hand-operated, mechanical

powered pressure sprayers is permitted only on odd widths or shapes of slabs and on concrete surfaces exposed by the removal of forms. When the application is made by hand-operated sprayers, apply a second coat in a direction approximately at right angles to the direction of the first coat. If pinholes, abrasions, or other discontinuities exist, apply an additional coat to the affected areas within 30 minutes. Respray curing compound to concrete surfaces that are subjected to heavy rainfall within 3 hours after the curing compound has been applied by the method and at the coverage specified above. Respray curing compound to areas where the curing compound is damaged by subsequent construction operations within the curing period immediately. Adequately protect concrete surfaces to which membrane-curing compounds have been applied during the entire curing period from pedestrian and vehicular traffic, except as required for joint-sawing operations and surface tests, and from any other possible damage to the continuity of the membrane.

3.7.3 Moist Curing

Maintain concrete to be moist-cured continuously wet for the entire curing period, or until curing compound is applied, commencing immediately after finishing. If forms are removed before the end of the curing period, provide curing on unformed surfaces, using suitable materials. Cure surfaces by ponding, by continuous sprinkling, by continuously saturated burlap or cotton mats, or by continuously saturated plastic coated burlap. Provide burlap and mats that are clean and free from any contamination and completely saturated before being placed on the concrete. Lap sheets to provide full coverage. Provide an approved work system to ensure that moist curing is continuous 24 hours per day and that the entire surface is wet.

3.8 JOINTS

3.8.1 General Requirements for Joints

Construct joints that conform to the locations and details indicated and are perpendicular to the finished grade of the pavement. Provide joints that are straight and continuous from edge to edge or end to end of the pavement with no abrupt offset and no gradual deviation greater than 1/2 inch. Where any joint fails to meet these tolerances, remove and replace the slabs adjacent to the joint at no additional cost to the Government. Change from the jointing pattern shown on the drawings is not allowed without written approval. Seal joints immediately following curing of the concrete or as soon thereafter as weather conditions permit as specified in Section 32 13 73 COMPRESSION JOINT SEALS FOR CONCRETE PAVEMENTS.

3.8.2 Longitudinal Construction Joints

Install dowels in the longitudinal construction joints, or thicken the edges as indicated. Install dowels as specified above. After the end of the curing period, saw longitudinal construction joints to provide a groove at the top for sealant conforming to the details and dimensions indicated.

3.8.3 Transverse Construction Joints

Install transverse construction joints at the end of each day's placing operations and at any other points within a paving lane when concrete placement is interrupted for 30 minutes or longer. Install the transverse construction joint at a planned transverse joint. Provide transverse

construction joints by utilizing headers or by paving through the joint, then full-depth sawcutting the excess concrete. Construct pavement with the paver as close to the header as possible, with the paver run out completely past the header. Provide transverse construction joints at a planned transverse joint constructed as shown or, if not shown otherwise, dowelled in accordance with Paragraph "Dowels Installed in Hardened Concrete", or Paragraph "Fixed Form Paving" above.

3.8.4 Expansion Joints

Provide expansion joints where indicated, and about any structures and features that project through or into the pavement, using joint filler of the type, thickness, and width indicated, and installed to form a complete, uniform separation between the structure and the pavement or between two pavements. Attach the filler to the original concrete placement with adhesive and mechanical fasteners and extend the full slab depth. After placement and curing of the adjacent slab, sawcut the sealant reservoir depth from the filler. Tightly fit adjacent sections of filler together, with the filler extending across the full width of the paving lane or other complete distance in order to prevent entrance of concrete into the expansion space. Finish edges of the concrete at the joint face with an edger with a radius of 1/8 inch.

3.8.5 Slip Joints

Install slip joints where indicated using the specified materials. Attach preformed joint filler material to the face of the original concrete placement with adhesive and mechanical fasteners. Construct a 3/4 inch deep reservoir for joint sealant at the top of the joint. Finish edges of the joint face with an edger with a radius of 1/8 inch.

3.8.6 Contraction Joints

Construct transverse and longitudinal contraction joints by sawing an initial groove in the concrete with a 1/8 inch blade to the indicated depth. During sawing of joints, and again 24 hours later, the CQC team is required to inspect all exposed lane edges for development of cracks below the saw cut, and immediately report results. If there are more than six consecutive uncracked joints after 48 hours, saw succeeding joints 25 percent deeper than originally indicated at no additional cost to the Government. The time of initial sawing varies depending on existing and anticipated weather conditions and be such as to prevent uncontrolled cracking of the pavement. Commence sawing of the joints as soon as the concrete has hardened sufficiently to permit cutting the concrete without chipping, spalling, or tearing. The sawed faces of joints will be inspected for undercutting or washing of the concrete due to the early sawing, and sawing delayed if undercutting is sufficiently deep to cause structural weakness or excessive roughness in the joint. Continue the sawing operation as required during both day and night regardless of weather conditions. Saw the joints at the required spacing consecutively in the sequence of the concrete placement. Provide adequate lighting for night work. Illumination using vehicle headlights is not permitted. Provide a chalk line or other suitable guide to mark the alignment of the joint. Before sawing a joint, examine the concrete closely for cracks, and do not saw the joint if a crack has occurred near the planned joint location. Discontinue sawing when a crack develops ahead of the saw cut. Immediately after the joint is sawed, thoroughly flush the saw cut and adjacent concrete surface with water and vacuumed until all waste from sawing is removed from the joint and adjacent concrete surface. Respray

the surface with curing compound as soon as free water disappears. Take necessary precautions to insure that the concrete is properly protected from damage and cured at sawed joints. Tightly seal the top of the joint opening and the joint groove at exposed edges with cord backer rod before the concrete in the region of the joint is resprayed with curing compound, and be maintained until removed immediately before sawing the joint sealant reservoir. Seal the exposed saw cuts on the faces of pilot lanes with bituminous mastic or masking tape. After expiration of the curing period, widen the upper portion of the groove by sawing with ganged diamond saw blades to the width and depth indicated for the joint sealer. Center the reservoir over the initial sawcut.

3.8.7 Thickened Edge Joints

Construct thickened edge joints as indicated on the Drawings. Grade the underlying material in the transition area as shown and meet the requirements for smoothness and compaction specified for all other areas of the underlying material.

3.9 REPAIR, REMOVAL, AND REPLACEMENT OF NEWLY CONSTRUCTED SLABS

3.9.1 General Criteria

Repair or remove and replace new pavement slabs that have spalled edges or contain cracks, as specified at no cost to the Government. Removal of partial slabs is not permitted. Remove and replace slabs containing more than 15.0 percent of each of the longitudinal joint edge spalled. Prior to fill-in lane placement, saw full depth to remove the spalled face of pilot lane slabs exceeding this quantity, regardless of spall size. Remove all other slabs as directed. The Government will determine whether cracks extend full depth of the pavement and may require cores to be drilled on the crack to determine depth of cracking. Such cores are to be drilled with a minimum diameter of 6 inches, and be backfilled with an approved non-shrink concrete. Perform drilling of cores and refilling holes at no expense to the Government. Prior to any repairs, submit a Repair Recommendations Plan detailing areas exceeding the specified limits as well as repair recommendations required to bring these areas within specified tolerances.

3.9.2 Slabs with Cracks

Clean cracks that do not exceed 2 inches in depth; then pressure injected full depth with epoxy resin, Type IV, Grade 1. Remove slabs containing cracks deeper than 2 inches.

3.9.3 Removal and Replacement of Full Slabs

Where it is necessary to remove full slabs, remove in accordance with Paragraph "Removal of Existing Pavement Slab" below. Remove and replace full depth, by full width of the slab, and the limit of removal normal to the paving lane and extend to each original joint. Install dowels of the size and spacing as specified for other joints in similar pavement by epoxy grouting them into holes drilled into the existing concrete using procedures as specified in Paragraph "Placing Dowels", above. Cut off original damaged dowels flush with the joint face. Paint protruding portions of dowels and lightly oil. Provide dowels for all four edges of the new slab. Place concrete as specified for original construction. Prior to placement of new concrete, recompact and shape the underlying material as specified in the appropriate section of these specifications,

and clean the surfaces of all four joint faces of all loose material and contaminants and coated with a double application of membrane forming curing compound as bond breaker. Take care to prevent any curing compound from contacting dowels. Prepare and seal the resulting joints around the new slab as specified for original construction.

3.9.4 Repairing Spalls Along Joints

Repair spalls along joints to be sealed to a depth to restore the full joint-face support prior to placing adjacent pavement. Where directed, repair spalls along joints of new slabs, along edges of adjacent existing concrete, and along parallel cracks by first making a vertical saw cut at least 3 inches outside the spalled area and to a depth of at least 2 inches. Provide saw cuts consisting of straight lines forming rectangular areas without sawing beyond the intersecting saw cut. Chip out the concrete between the saw cut and the joint, or crack, to remove all unsound concrete and into at least 1/2 inch of visually sound concrete. Thoroughly clean the cavity thus formed with high pressure water jets supplemented with oil-free compressed air to remove all loose material. Immediately before filling the cavity, apply a prime coat to the dry cleaned surface of all sides and bottom of the cavity, except any joint face. Apply the prime coat in a thin coating and scrubbed into the surface with a stiff-bristle brush. Provide prime coat for Portland cement repairs consisting of a neat cement grout and for epoxy resin repairs consisting of epoxy resin, Type III, Grade 1. Fill the prepared cavity with: Portland cement concrete or latex modified mortar for larger cavities, those more than 1/3 cubic foot in size after removal operations; Portland cement mortar for cavities between 0.03 cubic foot and 1/3 cubic foot; and epoxy resin mortar or epoxy resin or latex modified mortar for those cavities less than 0.03 cubic foot in size. Provide Portland cement concretes and mortars that consist of very low slump mixtures, 1/2 inch slump or less, proportioned, mixed, placed, consolidated by tamping, and cured, all as directed. Provide epoxy resin mortars made with Type III, Grade 1, epoxy resin, using proportions and mixing and placing procedures as recommended by the manufacturer and approved. Proprietary patching materials may be used, subject to approval. Place the epoxy resin materials in the cavity in layers with a maximum thickness of 2 inches. Provide adequate time between placement of additional layers such that the temperature of the epoxy resin material does not exceed 140 degrees F at any time during hardening. Provide mechanical vibrators and hand tampers to consolidate the concrete or mortar. Remove any repair material on the surrounding surfaces of the existing concrete before it hardens. Where the spalled area abuts a joint, provide an insert or other bond-breaking medium to prevent bond at the joint face. Saw a reservoir for the joint sealant to the dimensions required for other joints. Thoroughly clean the reservoir and then sealed with the sealer specified for the joints.

3.9.5 Repair of Weak Surfaces

Weak surfaces are defined as mortar-rich, rain-damaged, uncured, or containing exposed voids or deleterious materials. Diamond grind slabs containing weak surfaces less than 1/4 inch thick to remove the weak surface. Diamond grind in accordance with Paragraph "Diamond Grinding of PCC Surfaces" in PART 1. All diamond ground areas are required to meet the thickness, smoothness and grade criteria specified in PART 1 GENERAL. Remove and replace slabs containing weak surfaces greater than 1/4 inch thick.

3.9.6 Repair of Pilot Lane Vertical Faces

Repair excessive edge slump and joint face deformation in accordance with Paragraph "Edge Slump and Joint Face Deformation" in PART 1. Repair inadequate consolidation (honeycombing or air voids) by saw cutting the face full depth along the entire lane length with a diamond blade. Obtain cores, as directed, to determine the depth of removal.

3.10 EXISTING CONCRETE PAVEMENT REMOVAL AND REPAIR

Remove existing concrete pavement at locations indicated on the Drawings. Prior to commencing pavement removal operations, inventory the pavement distresses (cracks, spalls, and corner breaks) along the pavement edge to remain. After pavement removal, survey the remaining edge again to quantify any damage caused by removal operations. Perform both surveys in the presence of the Government. Perform repairs as indicated and as specified herein. Carefully control all operations to prevent damage to the concrete pavement and to the underlying material to remain in place. Perform all saw cuts perpendicular to the slab surface, forming rectangular areas. Perform all existing concrete pavement repairs prior to paving adjacent lanes.

3.10.1 Removal of Existing Pavement Slab

When existing concrete pavement is to be removed and adjacent concrete is to be left in place, perform the first full depth saw cut on the joint between the removal area and adjoining pavement to stay in place with a standard diamond-type concrete saw. Next, perform a full depth saw cut parallel to the joint that is at least 24 inches from the joint and at least 6 inches from the end of any dowels with a diamond saw as specified in Paragraph "Sawing Equipment". Remove all pavement beyond this last saw cut in accordance with the approved demolition work plan. Remove all pavement between this last saw cut and the joint line by carefully pulling pieces and blocks away from the joint face with suitable equipment and then picking them up for removal. In lieu of this method, this strip of concrete may be carefully broken up and removed using hand-held jackhammers, 30 pounds or less, or other approved light-duty equipment which does not cause stress to propagate across the joint saw cut and cause distress in the pavement which is to remain in place. In lieu of the above specified removal method, the slab may be sawcut full depth to divide it into several pieces and each piece lifted out and removed. Use suitable equipment to provide a truly vertical lift, and safe lifting devices used for attachment to the slab.

3.10.2 Edge Repair

Protect the edge of existing concrete pavement against which new pavement abuts from damage at all times. Remove and replace slabs which are damaged during construction as directed at no cost to the Government. Repair of previously existing damage areas is considered a subsidiary part of concrete pavement construction. Saw off all exposed keys and keyways full depth.

3.10.2.1 Spall Repair

Not more than 15.0 percent of each slab's edge is allowed to be spalled. Provide a full depth saw cut on the exposed face to remove the spalled face of damaged slabs with spalls exceeding this quantity, regardless of spall size. Provide repair materials and procedures as previously

specified in Paragraph "Repairing Spalls Along Joints".

3.10.2.2 Underbreak and Underlying Material

Repair all underbreak by removal and replacement of the damaged slabs in accordance with Paragraph "Removal and Replacement of Full Slabs" above. Protect the underlying material adjacent to the edge of and under the existing pavement which is to remain in place from damage or disturbance during removal operations and until placement of new concrete, and be shaped as shown on the drawings or as directed. Maintain sufficient underlying material in place outside the joint line to completely prevent disturbance of material under the pavement which is to remain in place. Remove and replace any slab with underlying material that is disturbed or loses its compaction.

3.11 PAVEMENT PROTECTION

Protect the pavement against all damage prior to final acceptance of the work by the Government. Placement of aggregates, rubble, or other similar construction materials on airfield pavements is not allowed. Exclude traffic from the new pavement by erecting and maintaining barricades and signs until the concrete is at least 14 days old, or for a longer period if so directed. As a construction expedient in paving intermediate lanes between newly paved pilot lanes, operation of the hauling and paving equipment is permitted on the new pavement after the pavement has been cured for 7 days and the joints have been sealed or otherwise protected, the concrete has attained a minimum field cured flexural strength of 550 psi and approved means are provided to prevent damage to the slab edge. Continuously maintain all new and existing pavement carrying construction traffic or equipment completely clean, and spillage of concrete or other materials cleaned up immediately upon occurrence. Take special care in areas where traffic uses or crosses active airfield pavement. Power broom other existing pavements at least daily when traffic operates. For fill-in lanes, provide equipment that does not damage or spall the edges or joints of the previously constructed pavement.

3.12 TESTING AND INSPECTION FOR CONTRACTOR QUALITY CONTROL DURING CONSTRUCTION

3.12.1 Testing and Inspection by Contractor

During construction, perform sampling and testing of aggregates, cementitious materials (cement, slag cement, and pozzolan), and concrete to determine compliance with the Specifications. Provide facilities and labor as may be necessary for procurement of representative test samples. Furnish sampling platforms and belt templates to obtain representative samples of aggregates from charging belts at the concrete plant. Obtain samples of concrete at the point of delivery to the paver. Testing by the Government in no way relieves the specified testing requirements. Perform the inspection and tests described below, and based upon the results of these inspections and tests, take the action required and submit reports as required. Perform this testing regardless of any other testing performed by the Government, either for pay adjustment purposes or for any other reason.

3.12.2 Testing and Inspection Requirements

Perform CQC sampling, testing, inspection, and reporting in accordance with the following Table.

TABLE 6 TESTING AND INSPECTION REQUIREMENTS			
Frequency	Test Method	Control Limit	Corrective Action
<u>Fine Aggregate Gradation and Fineness Modulus</u>			
2 per lot	ASTM C136/C136M sample at belt	9 of 10 tests must vary less than 0.15 from average	Retest, resolve, retest
		Outside limits on any sieve	Retest
		2nd gradation failure	Stop, resolve, retest
1 per 10 gradations	ASTM C117	Outside limits on any sieve	Retest
		2nd gradation failure	Stop, repair, retest
<u>Coarse Aggregate Gradation (each aggregate size)</u>			
2 per lot	ASTM C136/C136M sample at belt	Outside limits on any sieve	Retest
		2nd gradation failure	report to COR, correct
		2 consecutive averages of 5 tests outside limits	report to COR, stop ops, repair, retest
1 per 10 gradations	ASTM C117	Outside limits on any sieve	Retest
		2nd gradation failure	report to COR, correct
		2 consecutive averages of 5 tests outside limits	report to COR, stop ops, repair, reverify all operations
<u>Workability Factor and Coarseness Factor Computation</u>			
Same as C.A. and F.A.	see Paragraph "Aggregates"	Use individual C.A. and F.A. gradations. Combine using batch ticket percentages. Tolerances: Plus or minus 3 points on WF; plus or minus 5 points on CF from approved adjusted mix design values	Check batching tolerances, recalibrate scales
		2 consecutive averages of 5 tests outside limits	report to COR, stop ops, retest
<u>Aggregate Deleterious, Quality, and ASR Tests</u>			

TABLE 6 TESTING AND INSPECTION REQUIREMENTS			
Frequency	Test Method	Control Limit	Corrective Action
First test no later than time of uniformity testing and then every [30][60] days of concrete production	see Paragraph "Aggregates"		Stop production, retest, replace aggregate. Increase testing interval to 90 days if previous 2 tests pass
<u>Plant - Scales, Weighing Accuracy</u>			
Monthly	NRMCA QC 3		Stop plant ops, repair, recalibrate
<u>Plant - Batching and Recording Accuracy</u>			
Weekly	Record/Report	Record required/recorded/actual batch mass	Stop plant ops, repair, recalibrate
<u>Plant - Batch Plant Control</u>			
Every lot	Record/Report		Record type and amount of each material per lot
<u>Plant - Mixer Uniformity - Stationary Mixers</u>			
Every 4 months during paving	COE CRD-C 55	After initial approval, use abbreviated method	Increase mixing time, change batching sequence, reduce batch size to bring into compliance. Retest
<u>Plant - Mixer Uniformity - Truck Mixers</u>			
Every 4 months during paving	ASTM C94/C94M	Random selection of truck.	Increase mixing time, change batching sequence, reduce batch size to bring into compliance. Retest
<u>Concrete Mixture - Air Content</u>			
When test specimens prepared plus 2 random	ASTM C231/C231M sample at point of discharge within the paving lane	Individual test control chart: Warning plus or minus 1.0	Adjust AEA, retest
		Individual test control chart: Action plus or minus 1.5	Halt operations, repair, retest
		Range between 2 consecutive tests: Warning plus 2.0	Recalibrate AEA dispenser
		Range between 2 consecutive tests: Action plus 3.0	Halt operations, repair, retest

TABLE 6 TESTING AND INSPECTION REQUIREMENTS			
Frequency	Test Method	Control Limit	Corrective Action
<u>Concrete Mixture - Unit Weight and Yield</u>			
Same as Air Content	ASTM C138/C138M sample at point of discharge within the paving lane	Individual test basis: Warning Yield minus 0 or plus 1 percent	Check batching tolerances
		Individual test basis: Action Yield minus 0 or plus 5 percent	Halt operations
<u>Concrete Mixture - Slump</u>			
When test specimens prepared plus 4 random	ASTM C143/C143M sample at point of discharge within the paving lane	Individual test control chart: Upper Warning minus 1/2 inch below max	Adjust batch masses within max W/C ratio
		Individual test control chart: Upper Action at maximum allowable slump	Stop operations, adjust, retest
		Range between each consecutive test: 1-1/2 inches	Stop operations, repair, retest
<u>Concrete Mixture - Temperature</u>			
When test specimens prepared	ASTM C1064/C1064M sample at point of discharge within the paving lane	See Paragraph "Weather Limitations"	
<u>Concrete Mixture - Strength</u>			
8 per lot	ASTM C31/C31M sample at point of discharge within the paving lane	See Paragraph "Concrete Strength Testing for CQC" Perform fabrication of strength specimens and initial cure outside the paving lane and within 1,000 feet of the sampling point.	
<u>Paving - Inspection Before Paving</u>			
Prior to each paving operation	Report	Inspect underlying materials, construction joint faces, forms, reinforcing, dowels, and embedded items	
<u>Paving - Inspection During Paving</u>			

TABLE 6 TESTING AND INSPECTION REQUIREMENTS			
Frequency	Test Method	Control Limit	Corrective Action
During paving operation		Monitor and control paving operation, including placement, consolidation, finishing, texturing, curing, and joint sawing.	
<u>Paving - Vibrators</u>			
Weekly during paving	COE CRD-C 521	Test frequency (in concrete), and amplitude (in air), average measurement at tip and head.	Repair or replace defective vibrators.
<u>Moist Curing</u>			
2 per lot, min 4 per day	Visual		Repair defects, extend curing by 1 day
<u>Membrane Compound Curing</u>			
Daily	Visual	Calculate coverage based on quantity/area	Respray areas where coverage defective. Recalibrate equipment
<u>Cold Weather Protection</u>			
Once per day	Visual		Repair defects, report conditions to COR

3.12.3 Concrete Strength Testing for CQC

Perform Contractor Quality Control operations for concrete strength consisting of the following steps:

- a. Take samples for strength tests at the paving site. Fabricate and cure test beams in accordance with ASTM C31/C31M; test them in accordance with ASTM C78/C78M.
- b. Fabricate and cure 2 test beams per subplot from the same batch or truckload and at the same time acceptance beams are fabricated and test them for flexural strength at 7-day age.
- c. Average all 8 flexural tests per lot. Convert this average 7-day flexural strength per lot to equivalent 90-day flexural strength using the Correlation Ratio determined during mixture proportioning studies.
- d. Compare the equivalent 90-day flexural strength from the conversion to the "Average Flexural Strength Required for Mixtures" from paragraph of same title.
- e. If the equivalent average 90-day strength for the lot is below the

"Average Flexural Strength Required for Mixtures" by 69 psi flexural strength or more, at any time, adjust the mixture to increase the strength, as approved.

- f. Maintain up-to-date control charts for strength, showing the 7-day CQC flexural strength and the 90-day flexural strength (from acceptance tests) of each of these for each lot.

3.12.4 Reports

Report all results of tests or inspections conducted informally as they are completed and in writing daily. Prepare a weekly report for the updating of control charts covering the entire period from the start of the construction season through the current week. During periods of cold-weather protection, make daily reports of pertinent temperatures. These requirements do not relieve the obligation to report certain failures immediately as required in preceding paragraphs. Confirm such reports of failures and the action taken in writing in the routine reports. The Government has the right to examine all Contractor quality control records.

-- End of Section --

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SECTION 32 13 73

COMPRESSION JOINT SEALS FOR CONCRETE PAVEMENTS
04/08

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 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

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 548 (1988) Standard Specification for Jet-Fuel
and Heat-Resistant Preformed
Polychloroprene Elastomeric Joint Seals
for Rigid Pavements

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Equipment

Manufacturer's Instructions

SD-04, Samples

Compression Seals; G

SD-06 Test Reports

Test Requirements

1.3 QUALITY ASSURANCE

1.3.1 Safety

Do not place compression joint seals within 25 feet of liquid oxygen (LOX) equipment, LOX storage, or LOX piping.

1.3.2 Trial Joint Seal and Lubricant/Adhesive Installation

Prior to the cleaning and sealing of the joints for the entire Project, prepare a test section at least 200 feet long at a designated location in the Project pavement, using the specified materials and the approved equipment to demonstrate the proposed joint preparation and sealing of all types of joints in the Project. Following the completion of the trial length and before any other joint is sealed, the trial joints will be inspected by the Government to determine that the materials and installation meet the requirements specified. If materials or installation do not meet requirements, remove the materials, and the joints shall be recleaned and resealed at no cost to the Government. No other joints shall be sealed until the test installation has been approved. If the trial section is approved, it may be incorporated into the permanent work. Seal other joints in the manner approved for sealing the trial joint.

1.4 DELIVERY, STORAGE, AND HANDLING

Materials delivered to the Job Site shall be inspected for defects, unloaded, and stored with a minimum of handling to avoid damage. Provide storage facilities that protect materials from weather and maintain materials at temperatures recommended by the manufacturer.

1.5 ENVIRONMENTAL REQUIREMENTS

The ambient temperature and the pavement temperature within the joint wall shall be at least 35 degrees F and rising at the time of installation of the materials. Sealant installation will not be allowed if moisture or foreign material is observed in the joint.

PART 2 PRODUCTS

2.1 SYSTEM EQUIPMENT

Provide machines, tools, and equipment, used in the performance of the Work required by this Section, approved before the work is started and maintained in satisfactory condition at all times. Submit list of proposed equipment to be used in the performance of construction work, including descriptive data, 30 days prior to use on the Project.

2.1.1 Joint Cleaning Equipment

2.1.1.1 Concrete Saw

Provide a self-propelled power saw with water-cooled diamond saw blades for cutting joints to the depths and widths specified and for removing filler, existing old joint seal, or other material embedded in the joints or adhered to the joint faces.

2.1.1.2 Sandblasting Equipment

Include with the sandblasting equipment an air compressor, hose, and a long-wearing venturi-type nozzle of proper size, shape, and opening. The maximum nozzle opening should not exceed 1/4 inch. Provide a portable air compressor capable of furnishing not less than 150 cubic feet per minute and maintaining a line pressure of not less than 90 psi at the nozzle while in use. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water. The nozzle shall have an adjustable guide that will hold the nozzle aligned with the joint about 1 inch above the pavement surface and will direct the blast to clean the joint walls. Adjust the height, angle of inclination, and the size of the nozzle as necessary to ensure satisfactory results.

2.1.1.3 Waterblasting Equipment

Include with the waterblasting equipment a trailer-mounted water tank, pumps, high-pressure hose, a wand with safety release cutoff controls, nozzle, and auxiliary water resupply equipment. The water tank and auxiliary water resupply equipment shall be of sufficient capacity to permit continuous operations. The pumps, hoses, wand, and nozzle shall be of sufficient capacity to permit the cleaning of both walls of the joint and the pavement surface for a width of at least 1/2 inch on either side of the joint. A pressure gauge mounted at the pump shall show at all times the pressure in psi at which the equipment is operating.

2.1.2 Sealing Equipment

Equipment used to install the compression seal shall place the compression seal to the prescribed depths within the specified tolerances without cutting, nicking, twisting, or otherwise damaging the seal. The equipment shall be capable of placing the seal with not more than two percent longitudinal stretch or compression of the seal during installation. The machine shall be an automatic self-propelled joint seal application equipment and engine powered. The machine shall include a reservoir for the lubricant/adhesive, a device for conveying the lubricant/adhesive in the proper quantities to the sides of the compression seal or the sidewalls of the joints, a reel capable of holding one full spool of compression seal, and a power-driven apparatus for feeding the joint seal through a compression device and inserting the seal into the joint. The equipment shall also include a guide to maintain the proper course along the joint being sealed. The machine shall at all times be operated by an experienced operator.

2.1.3 Test Requirements

Submit certified copies of test results, 30 days prior to use of material on the Project. Each lot of compression joint seal and lubricant/adhesive shall be sampled, identified, and tested for conformance with the applicable Material Specification.

- a. A lot of compression seal shall consist of 1 day's production or 20,000 linear feet for each cross section, whichever is less. A lot of lubricant/adhesive shall consist of 1 day's production. Samples of the compression joint seal and lubricant/adhesive material shall be submitted and will be tested by the Government. No material shall be used at the Project prior to receipt of written notice that the materials meet the laboratory requirements.

- b. If the samples fail to meet Specification Requirements, the materials represented by the sample shall be replaced and the new materials tested. Testing of the compression joint seal and lubricant/adhesive material is the responsibility of the Contractor and shall be performed in an approved independent laboratory, and certified copies of the test reports shall be submitted for approval 30 days prior to the use of the materials at the Job Site.
- c. Samples of each lot of material shall also be submitted and will be retained by the Government for possible future testing should the materials appear defective during or after application. Furnish additional samples of materials, in sufficient quantity to be tested, upon request. Final acceptance will be based on conformance to the specified test requirements and the performance of the in-place materials.

2.2 COMPRESSION SEALS

Regardless of testing responsibility, submit 9 feet long samples of the materials, 60 days prior to use on the Project. Printed directions from the manufacturer on recommended installation criteria shall be furnished with the samples plus the manufacturer's certification that the selected seal is recommended for the installation on this Project. Compression joint seal materials shall be a vulcanized elastomeric compound using polychloroprene as the only base polymer. The material and manufactured seal shall conform to ASTM D2628 and COE CRD-C 548 where jet fuel and/or heat blast resistance is required. The joint seal shall be a labyrinth type seal. The uncompressed depth of the face of the compression seal (that is to be bonded to the joint wall) shall be greater than the uncompressed width of the seal, except that for seals 1 inch or greater in width, the depth need be only 1 inch or greater. The actual width of the uncompressed seal for construction and contraction joints shall be 0.75 or 1 inch and for expansion joints shall be 1.25 inches. The tolerance on the seal shall be plus 1/8 inch or minus 1/16 inch.

2.3 LUBRICANT/ADHESIVE

Lubricant/adhesive used for the compression elastomeric joint seal shall be a one-component compound conforming to ASTM D2835.

PART 3 EXECUTION

3.1 PREPARATION OF JOINTS

Immediately before installation of the compression joint seal, thoroughly clean the joints to remove laitance, filler, existing sealer, foreign material, and protrusions of hardened concrete from the sides and upper edges of the joint space to be sealed. Cleaning shall be by sandblasting or waterblasting and shall extend along pavement surfaces at least 1/2 inch on either side of the joint. After final cleaning and immediately prior to sealing, the joints shall be blown out with compressed air and left completely free of debris and water. Demonstrate that the selected cleaning operation meets the cleanliness requirements. Correct any irregularity in the joint face which would prevent uniform contact between the joint seal and the joint face prior to the installation of the joint seal.

3.1.1 Sawing

Clean and open joints to the specified width and depth by sawing. Immediately following the sawing operation, thoroughly clean the joint faces and opening using a water jet to remove saw cuttings or debris remaining on the faces or in the joint opening. Install compression seal within 3 calendar days of the time the joint cavity is sawed. Depth of the joint cavity shall be in accordance with manufacturer's instructions. Where installation procedures are required in accordance with the manufacturer's recommendations, submit printed copies of manufacturers' instructions, 30 days prior to use on the Project. The saw cut for the joint seal cavity shall be centered over the joint line. The nominal width of the sawed joint seal cavity shall be as follows; the actual width shall be within a tolerance of plus or minus 1/16 inch:

- a. If a nominal 13/16 inch wide compression seal is furnished, the nominal width of the saw cut shall be 1/2 inch when the pavement temperature at the time of sawing is between 25 and 80 degrees F. If the pavement temperature at the time of sawing is above this range, the nominal width of the saw cut shall be decreased 1/16 inch. If the pavement temperature at the time of sawing is below this range, the nominal width of the saw cut shall be increased 1/16 inch.
- b. If a nominal 1 inch wide compression seal is furnished, the nominal width of the saw cut shall be 9/16 inch when the pavement temperature at the time of sawing is between 25 and 140 degrees F. If the pavement temperature at the time of sawing is above this range, the nominal width of the saw cut shall be decreased 1/16 inch. If the pavement temperature at the time of sawing is below this range, the nominal width of the saw cut shall be increased 1/16 inch.
- c. Measure the pavement temperature in the presence of the Construction Administrator. Make measurement each day before commencing sawing and at any other time during the day when the temperature appears to be varying from the allowable sawing range.

3.1.2 Waterblast Cleaning

Use a multiple pass waterblast technique until the surfaces are free of dust, dirt, curing compound, or any residue that might prevent ready insertion or uniform contact of the seal and bonding of the lubricant/adhesive to the concrete.

3.1.3 Rate of Progress

Limit sandblasting or waterblasting of joint faces to the length of joint that can be sealed during the same workday.

3.2 INSTALLATION OF THE COMPRESSION SEAL

A representative of the joint seal manufacturer shall be present at the trial joint installation to correct any installation issues prior to full installation.

3.2.1 Time of Installation

Seal joints immediately within 3 calendar days of sawing the joint seal cavity and following concrete cure and the final cleaning of the joint walls. Provide open joints, ready for sealing that cannot be sealed under

the specified conditions, with an approved temporary seal to prevent infiltration of foreign material. When rain interrupts the sealing operations, the joints shall be washed, air pressure cleaned, and allowed to dry prior to installing the lubricant/adhesive and compression seal.

3.2.2 Sequence of Installation

Seal first longitudinal joints, followed by transverse joints. Install seals in longitudinal joints so that all transverse joint seals will be intact from edge to edge of the pavement. Intersections shall be made monolithic by use of joint seal adhesive and care in fitting the intersection parts together. Extender pieces of seal shall not be used at intersections. Any seal falling short at the intersection shall be removed and replaced with new seal at no additional cost to the Government. Seals that are required to change direction by more than 20 degrees, may require a poured sealant at the intersection. Poured sealant shall be in accordance with compression seal manufacturer's instructions.

3.3 SEALING OF JOINTS

The sides of the joint seal or the sides of the joint shall be covered with a coating of lubricant/adhesive and the seal installed as specified. Butt joints and seal intersections shall be coated with liberal applications of lubricant/adhesive. Lubricant/adhesive spilled on the pavement shall be removed immediately to prevent setting on the pavement. The in-place joint seal shall be in an upright position and free from twisting, distortion, and cuts. Adjustments shall be made to the installation equipment and procedure, if the stretch exceeds 1 percent. Any seal exceeding 2 percent stretch shall be removed and replaced. The joint seal shall be placed at a uniform depth within the tolerances specified. In-place joint seal which fails to meet the specified requirements shall be removed and replaced with new joint seal at no cost to the Government. The compression joint seal shall be placed to a depth of 1/4 inch, plus or minus 1/8 inch, below the pavement surface except when the joint is beveled or has a radius at the surface, or unless otherwise directed. For beveled joints or joints with a radius at the surface, the compression joint seal shall be installed at a depth of 1/8 inch, plus or minus 1/8 inch, below the bottom of the edge of the bevel or radius. No part of the seal shall be allowed to project above the surface of the pavement or above the edge of the bevel or radius. The seal shall be installed in the longest practicable lengths in longitudinal joints and shall be cut at the joint intersections to provide continuous installation of the seal in the transverse joints. The lubricant/adhesive in the longitudinal joints shall be allowed to set for 1 hour prior to cutting at the joint intersections to reduce the possibility of shrinkage. For all transverse joints, the minimum length of the compression joint seal shall be the pavement width from edge to edge.

3.4 CLEAN-UP

Upon completion of the Project, remove all unused materials from the Site, remove any lubricant/adhesive on the pavement surface, and leave the pavement in clean condition.

3.5 QUALITY CONTROL PROVISIONS

3.5.1 Application Equipment

Inspect the application equipment to assure uniform application of

lubricant/adhesive to the sides of the compression joint seal or the walls of the joint. If any equipment causes cutting, twisting, nicking, excessive stretching or compressing of the seal, or improper application of the lubricant/adhesive, suspend the operation until causes of the deficiencies are determined and corrected.

3.5.2 Procedures

3.5.2.1 Quality Control Inspection

Provide quality control provisions during the joint cleaning process to prevent or correct improper equipment and cleaning techniques that damage the concrete in any manner. Cleaned joints shall be approved by the Government prior to installation of the lubricant/adhesive and compression joint seal.

3.5.2.2 Conformance to Stretching and Compression Limitations

Determine conformance to stretching and compression limitations. Mark the top surface of the compression seal at 1 foot intervals in a manner clear and durable to enable length determinations of the seal. After installation, measure the distance between the marks on the seal. If the stretching or compression exceeds 2 percent, remove the seal and replace it with new joint at no additional cost to the Government. The seal shall be removed up to the last correct measurement. The seal shall be inspected a minimum of once per 100 feet of seal for compliance to the shrinkage or compression requirements. Measurements shall also be made at the same interval to determine conformance with depth and width of installation requirements. Remove and replace compression seal that is not in conformance with Specification Requirements with new joint seal at no additional cost to the Government.

3.5.2.3 Pavement Temperature

Determine the pavement temperature by placing a thermometer in the initial saw cut for the joint and record the reading. The thermometer shall remain in the joint for an adequate time to provide a control reading.

3.5.3 Final Inspection

Inspect the joint sealing system (compression seal and lubricant/adhesive) for proper rate of cure and bonding to the concrete, cuts, twists, nicks and other deficiencies. Seals exhibiting any defects, at any time prior to final acceptance of the Project, shall be removed from the joint, wasted, and replaced in a satisfactory manner.

-- End of Section --

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SECTION 32 16 19

CONCRETE CURBS, GUTTERS AND SIDEWALKS
05/18

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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO M 182 (2005; R 2017) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats

ASTM INTERNATIONAL (ASTM)

ASTM A1064/A1064M (2017) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

ASTM A615/A615M (2016) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

ASTM C143/C143M (2015) Standard Test Method for Slump of Hydraulic-Cement Concrete

ASTM C171 (2016) Standard Specification for Sheet Materials for Curing Concrete

ASTM C172/C172M (2017) Standard Practice for Sampling Freshly Mixed Concrete

ASTM C173/C173M (2016) Standard Test Method for Air 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 C309 (2011) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

ASTM C31/C31M (2018a) Standard Practice for Making and Curing Concrete Test Specimens in the Field

ASTM C920 (2018) Standard Specification for Elastomeric Joint Sealants

ASTM C94/C94M	(2017a) Standard Specification for Ready-Mixed Concrete
ASTM D1751	(2004; E 2013; R 2013) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D1752	(2004a; R 2013) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion
ASTM D5893/D5893M	(2016) Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements

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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Concrete

Biodegradable Form Release Agent

SD-06 Test Reports

Field Quality Control

1.3 EQUIPMENT, TOOLS, AND MACHINES

1.3.1 General Requirements

Plant, equipment, machines, and tools used in the work will be subject to approval and must be maintained in a satisfactory working condition at all times. Use equipment capable of producing the required product, meeting grade controls, thickness control, and smoothness requirements as specified. Discontinue using equipment that produces unsatisfactory results. Allow the Construction Administrator access at all times to the plant and equipment to ensure proper operation and compliance with Specifications.

1.3.2 Slip Form Equipment

Slip form paver or curb forming machines, will be approved based on trial use on the Job and must be self-propelled, automatically controlled, crawler mounted, and capable of spreading, consolidating, and shaping the plastic concrete to the desired cross section in one pass.

1.4 ENVIRONMENTAL REQUIREMENTS

1.4.1 Placing During Cold Weather

Do not place concrete when the air temperature reaches 40 degrees F and is falling, or is already below that point. Placement may begin when the air temperature reaches 35 degrees F and is rising, or is already above 40 degrees F. Make provisions to protect the concrete from freezing during the specified curing period. If necessary to place concrete when the temperature of the air, aggregates, or water is below 35 degrees F, placement and protection must be approved in writing. Approval will be contingent upon full conformance with the following provisions. Prepare and protect the underlying material so that it is entirely free of frost when the concrete is deposited. Heat aggregates as necessary to result in the temperature of the in-place concrete being between 50 and 85 degrees F. Methods and equipment for heating must be approved. Use only aggregates that are free of ice, snow, and frozen lumps before entering the mixer. Provide covering or other means as needed to maintain the concrete at a temperature of at least 50 degrees F for not less than 72 hours after placing, and at a temperature above freezing for the remainder of the curing period.

1.4.2 Placing During Warm Weather

The temperature of the concrete as placed must not exceed 85 degrees F except where an approved retarder is used. Cool the mixing water and aggregates as necessary to maintain a satisfactory placing temperature. The placing temperature must not exceed 95 degrees F at any time.

PART 2 PRODUCTS

2.1 CONCRETE

Provide concrete conforming to the applicable requirements of ASTM C94/C94M except as otherwise specified. Concrete must have a minimum compressive strength of 3500 psi at 28 days. Size of aggregate must not exceed 1-1/2 inches. Submit copies of certified delivery tickets for all concrete used in the construction.

2.1.1 Air Content

Use concrete mixtures that have an air content by volume of concrete of 5 to 7 percent, based on measurements made immediately after discharge from the mixer.

2.1.2 Slump

Use concrete with a slump of 3 inches plus or minus 1 inch for hand placed concrete or 1 inch plus or minus 1/2 inch for slipformed concrete as determined in accordance with ASTM C143/C143M.

2.1.3 Reinforcement Steel

Use reinforcement bars conforming to ASTM A615/A615M. Use wire mesh reinforcement conforming to ASTM A1064/A1064M.

2.2 CONCRETE CURING MATERIALS

2.2.1 Impervious Sheet Materials

Use impervious sheet materials conforming to ASTM C171, type optional, except that polyethylene film, if used, must be white opaque.

2.2.2 Burlap

Use burlap conforming to AASHTO M 182.

2.2.3 White Pigmented Membrane-Forming Curing Compound

Use white pigmented membrane-forming curing compound conforming to ASTM C309, Type 2.

2.3 CONCRETE PROTECTION MATERIALS

Use concrete protection materials consisting of a linseed oil mixture of equal parts, by volume, of linseed oil and either mineral spirits, naphtha, or turpentine. At the option of the Contractor, commercially prepared linseed oil mixtures, formulated specifically for application to concrete to provide protection against the action of deicing chemicals may be used, except that emulsified mixtures are not acceptable.

2.4 JOINT FILLER STRIPS

2.4.1 Expansion Joint Filler, Premolded

Unless otherwise indicated, use 1/2 inch thick premolded expansion joint filler conforming to ASTM D1751 or ASTM D1752.

2.5 JOINT SEALANTS

Use cold-applied joint sealant conforming to ASTM C920 or ASTM D5893/D5893M.

2.6 FORM WORK

Design and construct form work to ensure that the finished concrete will conform accurately to the indicated dimensions, lines, and elevations, and within the tolerances specified. Use wood or steel forms that are straight and of sufficient strength to resist springing during depositing and consolidating concrete.

2.6.1 Wood Forms

Use forms that are surfaced plank, 2 inches nominal thickness, straight and free from warp, twist, loose knots, splits or other defects. Use forms with a nominal length of 10 feet. Radius bends may be formed with 3/4 inch boards, laminated to the required thickness.

2.6.2 Steel Forms

Use channel-formed sections with a flat top surface and welded braces at each end and at not less than two intermediate points. Use forms with interlocking and self-aligning ends. Provide flexible forms for radius forming, corner forms, form spreaders, and fillers as needed. Use forms with a nominal length of 10 feet and that have a minimum of 3 welded stake pockets per form. Use stake pins consisting of solid steel rods with

chamfered heads and pointed tips designed for use with steel forms.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

Construct subgrade to the specified grade and cross section prior to concrete placement.

3.1.1 Curb Subgrade

Place and compact the subgrade in accordance with Section 31 00 00 EARTHWORK. Test the subgrade for grade and cross section by means of a template extending the full width of the curb. Use subgrade materials equal in bearing quality to the subgrade under the adjacent pavement.

3.1.2 Maintenance of Subgrade

Maintain subgrade in a smooth, compacted condition in conformity with the required section and established grade until the concrete is placed. The subgrade must be in a moist condition when concrete is placed. Prepare and protect subgrade so that it is free from frost when the concrete is deposited.

3.2 FORM SETTING

Set forms to the indicated alignment, grade, and dimensions. Hold forms rigidly in place by a minimum of 3 stakes per form placed at intervals not to exceed 4 feet. Use additional stakes and braces at corners, deep sections, and radius bends, as required. Use clamps, spreaders, and braces where required to ensure rigidity in the forms. Remove forms in a manner that will not injure the concrete. Do not use bars or heavy tools against the concrete when removing the forms. Promptly and satisfactorily repair concrete found to be defective after form removal. Clean forms and coat with form oil or biodegradable form release agent each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed, except that with probable freezing temperatures, oiling is mandatory.

3.2.1 Curbs

Remove forms used along the front of the curb not less than 2 hours nor more than 6 hours after the concrete has been placed. Do not remove forms used along the back of curb until the face and top of the curb have been finished, as specified for concrete finishing. Do not remove gutter forms while the concrete is sufficiently plastic to slump in any direction.

3.3 CURB CONCRETE PLACEMENT AND FINISHING

3.3.1 Formed Curb

Place concrete to the required section in a single lift. Consolidate concrete using approved mechanical vibrators. Curve shaped gutters must be finished with a standard curb "mule".

3.3.2 Curb Finishing

Approved slipformed curb machines may be used in lieu of hand placement.

3.3.3 Concrete Finishing

Float and finish exposed surfaces with a smooth wood float until true to grade and section and uniform in texture. Brush floated surfaces with a fine-hair brush using longitudinal strokes. Round the edges of the gutter and top of the curb with an edging tool to a radius of 1/2 inch. Immediately after removing the front curb form, rub the face of the curb with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. Brush the front curb surface, while still wet, in the same manner as the curb top.

3.3.4 Joint Finishing

Finish curb edges at formed joints as indicated.

3.3.5 Surface and Thickness Tolerances

Finished surfaces must not vary more than 1/4 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.4 SIDEWALK JOINTS

Construct sidewalk joints to divide the surface into rectangular areas. Space transverse contraction joints at a distance equal to the sidewalk width or 5 feet on centers, whichever is less, and continuous across the slab. Construct longitudinal contraction joints along the centerline of all sidewalks 10 feet or more in width. Construct transverse expansion joints at sidewalk returns and opposite expansion joints in adjoining curbs. Where the sidewalk is not in contact with the curb, install transverse expansion joints as indicated. Form expansion joints around structures and features which project through or into the sidewalk pavement, using joint filler of the type, thickness, and width indicated. Expansion joints are not required between sidewalks and curb that abut the sidewalk longitudinally.

3.4.1 Sidewalk Contraction Joints

Form contraction joints in the fresh concrete by cutting a groove in the top portion of the slab to a depth of at least one-fourth of the sidewalk slab thickness. Unless otherwise approved or indicated, either use a jointer to cut the groove or saw a groove in the hardened concrete with a power-driven saw. Construct sawed joints by sawing a groove in the concrete with a 1/8 inch blade. Provide an ample supply of saw blades on the jobsite before concrete placement is started. Provide at least one standby sawing unit in good working order at the Job Site at all times during the sawing operations.

3.4.2 Sidewalk Expansion Joints

Form expansion joints using 1/2 inch joint filler strips. Joint filler in expansion joints surrounding structures and features within the sidewalk may consist of preformed filler material conforming to ASTM D1752 or building paper. Hold joint filler in place with steel pins or other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, round joint edges using an edging tool having a radius of 1/8 inch. Remove any concrete over the joint filler. At the end of the curing period, clean the top of expansion joints and fill with cold-applied joint sealant. Use joint

sealant that is gray or stone in color. Thoroughly clean the joint opening before the sealing material is placed. Do not spill sealing material on exposed surfaces of the concrete. Apply joint sealing material only when the concrete at the joint is surface dry and atmospheric and concrete temperatures are above 50 degrees F. Immediately remove any excess material on exposed surfaces of the concrete and clean the concrete surfaces.

3.4.3 Reinforcement Steel Placement

Accurately and securely fasten reinforcement steel in place with suitable supports and ties before the concrete is placed.

3.5 CURB JOINTS

Construct curb and gutter joints at right angles to the line of curb and gutter.

3.5.1 Contraction Joints

Construct contraction joints directly opposite contraction joints in abutting Portland cement concrete pavements and spaced so that monolithic sections between curb returns will not be less than 5 feet nor greater than 15 feet in length.

- a. Construct contraction joints (except for slip forming) by means of 1/8 inch thick separators and of a section conforming to the cross section of the curb and gutter. Remove separators as soon as practicable after concrete has set sufficiently to preserve the width and shape of the joint and prior to finishing.
- b. When slip forming is used, cut the contraction joints in the top portion of the gutter/curb hardened concrete in a continuous cut across the curb and gutter, using a power-driven saw. Cut the contraction joint to a depth of at least one-fourth of the gutter/curb depth using a 1/8 inch saw blade.

3.5.2 Expansion Joints

Form expansion joints by means of preformed expansion joint filler material cut and shaped to the cross section of curb and gutter. Construct expansion joints in curb directly opposite expansion joints of abutting Portland cement concrete pavement using the same type and thickness of joints as joints in the pavement. Where curb does not abut Portland cement concrete pavement, provide expansion joints at least 1/2 inch in width at intervals not less than 30 feet nor greater than 120 feet. Seal expansion joints immediately following curing of the concrete or as soon thereafter as weather conditions permit. Seal expansion joints and the top 1 inch depth of curb and gutter contraction-joints with joint sealant. Thoroughly clean the joint opening before the sealing material is placed. Do not spill sealing material on exposed surfaces of the concrete. Concrete at the joint must be surface dry and atmospheric and concrete temperatures must be above 50 degrees F at the time of application of joint sealing material. Immediately remove excess material on exposed surfaces of the concrete and clean concrete surfaces.

3.6 CURING AND PROTECTION

3.6.1 General Requirements

Protect concrete against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation. Protect unhardened concrete from rain and flowing water. All equipment needed for adequate curing and protection of the concrete must be on hand and ready for use before actual concrete placement begins. Protect concrete as necessary to prevent cracking of the pavement due to temperature changes during the curing period.

3.6.1.1 Mat Method

Cover the entire exposed surface with two or more layers of burlap. Overlap mats at least 6 inches. Thoroughly wet the mat with water prior to placing on concrete surface and keep the mat continuously in a saturated condition and in intimate contact with concrete for not less than 7 days.

3.6.1.2 Impervious Sheeting Method

Wet the entire exposed surface with a fine spray of water and then cover with impervious sheeting material. Lay sheets directly on the concrete surface with the light-colored side up and overlapped 12 inches when a continuous sheet is not used. Use sheeting that is not less than 18-inches wider than the concrete surface to be cured. Secure sheeting using heavy wood planks or a bank of moist earth placed along edges and laps in the sheets. Satisfactorily repair or replace sheets that are torn or otherwise damaged during curing. Sheeting must remain on the concrete surface to be cured for not less than 7 days.

3.6.1.3 Membrane Curing Method

Apply a uniform coating of white-pigmented membrane-curing compound to the entire exposed surface of the concrete as soon after finishing as the free water has disappeared from the finished surface. Coat formed surfaces immediately after the forms are removed and in no case longer than 1 hour after the removal of forms. Do not allow concrete surface to dry before application of the membrane. If drying has occurred, moisten the surface of the concrete with a fine spray of water and apply the curing compound as soon as the free water disappears. Apply curing compound in two coats by hand-operated pressure sprayers at a coverage of approximately 200 square feet/gallon for the total of both coats. Apply the second coat in a direction approximately at right angles to the direction of application of the first coat. The compound must form a uniform, continuous, coherent film that will not check, crack, or peel and must be free from pinholes or other imperfections. If pinholes, abrasion, or other discontinuities exist, apply an additional coat to the affected areas within 30 minutes. Respray concrete surfaces that are subjected to heavy rainfall within 3 hours after the curing compound has been applied by the method and at the coverage specified above. Respray areas where the curing compound is damaged by subsequent construction operations within the curing period. Take precautions necessary to ensure that the concrete is properly cured at sawed joints, and that no curing compound enters the joints. Tightly seal the top of the joint opening and the joint groove at exposed edges before the concrete in the region of the joint is resprayed with curing compound. Use a method used for sealing the joint groove that prevents loss of moisture from the joint during the entire specified curing

period. Provide approved standby facilities for curing concrete pavement at a location accessible to the Job Site for use in the event of mechanical failure of the spraying equipment or other conditions that might prevent correct application of the membrane-curing compound at the proper time. Adequately protect concrete surfaces to which membrane-curing compounds have been applied during the entire curing period from pedestrian and vehicular traffic, except as required for joint-sawing operations and surface tests, and from other possible damage to the continuity of the membrane.

3.6.2 Backfilling

After curing, remove debris and backfill, grade, and compact the area adjoining the concrete to conform to the surrounding area in accordance with lines and grades indicated.

3.6.3 Protection

Protect completed concrete from damage until accepted. Repair damaged concrete and clean concrete discolored during construction. Remove and reconstruct concrete that is damaged for the entire length between regularly scheduled joints. Refinishing the damaged portion will not be acceptable. Dispose of removed material as directed.

3.6.4 Protective Coating

Apply a protective coating of linseed oil mixture to the exposed-to-view concrete surface after the curing period, if concrete will be exposed to de-icing chemicals within 6 weeks after placement. Moist cure concrete to receive a protective coating.

3.6.4.1 Application

Complete curing and backfilling operation prior to applying two coats of protective coating. Concrete must be surface dry and clean before each application. Spray apply at a rate of not more than 50 square yards/gallon for first application and not more than 70 square yards/gallon for second application, except that the number of applications and coverage for each application for commercially prepared mixture must be in accordance with the manufacturer's instructions. Protect coated surfaces from vehicular and pedestrian traffic until dry.

3.6.4.2 Precautions

Do not heat protective coating by direct application of flame or electrical heaters and protect the coating from exposure to open flame, sparks, and fire adjacent to open containers or applicators. Do not apply material at ambient or material temperatures lower than 50 degrees F.

3.7 FIELD QUALITY CONTROL

Submit copies of all test reports within 24 hours of completion of the test.

3.7.1 General Requirements

Perform the inspection and tests described and meet the specified requirements for inspection details and frequency of testing. Based upon the results of these inspections and tests, take the action and submit

reports as required below, and additional tests to ensure that the requirements of these Specifications are met.

3.7.2 Concrete Testing

3.7.2.1 Strength Testing

Take concrete samples in accordance with ASTM C172/C172M not less than once a day nor less than once for every 250 cubic yards of concrete placed. Mold cylinders in accordance with ASTM C31/C31M for strength testing by an approved laboratory. Each strength test result must be the average of 2 test cylinders from the same concrete sample tested at 28 days, unless otherwise specified or approved. Concrete specified on the basis of compressive strength will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength, and no individual strength test result falls below the specified strength by more than 500 psi.

3.7.2.2 Air Content

Determine air content in accordance with ASTM C173/C173M or ASTM C231/C231M. Use ASTM C231/C231M with concretes and mortars made with relatively dense natural aggregates. Make two tests for air content on randomly selected batches of each class of concrete placed during each shift. Make additional tests when excessive variation in concrete workability is reported by the placing foreman or the Government inspector. Notify the placing foreman if results are out of tolerance. The placing foreman must take appropriate action to have the air content corrected at the plant. Additional tests for air content will be performed on each truckload of material until such time as the air content is within the tolerance specified.

3.7.2.3 Slump Test

Perform two slump tests on randomly selected batches of each class of concrete for every 250 cubic yards, or fraction thereof, of concrete placed during each shift. Perform additional tests when excessive variation in the workability of the concrete is noted or when excessive crumbling or slumping is noted along the edges of slip-formed concrete.

3.7.3 Thickness Evaluation

Determine the anticipated thickness of the concrete prior to placement by passing a template through the formed section or by measuring the depth of opening of the extrusion template of the curb forming machine. If a slip form paver is used for sidewalk placement, construct the subgrade true to grade prior to concrete placement. The thickness will be determined by measuring each edge of the completed slab.

3.7.4 Surface Evaluation

Provide finished surfaces for each category of the completed work that are uniform in color and free of blemishes and form or tool marks.

3.8 SURFACE DEFICIENCIES AND CORRECTIONS

3.8.1 Thickness Deficiency

When measurements indicate that the completed concrete section is

deficient in thickness by more than 1/4 inch the deficient section will be removed, between regularly scheduled joints, and replaced.

3.8.2 High Areas

In areas not meeting surface smoothness and plan grade requirements, reduce high areas either by rubbing the freshly finished concrete with carborundum brick and water when the concrete is less than 36 hours old or by grinding the hardened concrete with an approved surface grinding machine after the concrete is 36 hours old or more. The area corrected by grinding the surface of the hardened concrete must not exceed 5 percent of the area of any integral slab, and the depth of grinding must not exceed 1/4 inch. Remove and replace pavement areas requiring grade or surface smoothness corrections in excess of the limits specified.

3.8.3 Appearance

Exposed surfaces of the finished work will be inspected by the Construction Administrator and deficiencies in appearance will be identified. Remove and replace areas which exhibit excessive cracking, discoloration, form marks, or tool marks or which are otherwise inconsistent with the overall appearances of the work.

-- End of Section --

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SECTION 32 17 23

PAVEMENT MARKINGS

08/16

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 the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D4061	(2013) Standard Test Method for Retroreflectance of Horizontal Coatings
ASTM D6628	(2003; R 2015) Standard Specification for Color of Pavement Marking Materials
ASTM E1710	(2011) Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM E2177	(2011) Standard Test Method for Measuring the Coefficient of Retroreflected Luminance (RL) of Pavement Markings in a Standard Condition of Wetness
ASTM E2302	(2003; R 2016) Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer

INTERNATIONAL CONCRETE REPAIR INSTITUTE (ICRI)

ICRI 03732	(1997) Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays
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U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 150/5370-10	(2014; Rev G; Errata 1 2015; Errata 2 2016) Standards for Specifying Construction of Airports
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U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD	(2015) Manual on Uniform Traffic Control Devices
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U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FED-STD-595	(Rev C; Notice 1) Colors Used in
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Government Procurement

FS TT-B-1325	(Rev D; Notice 1; Notice 2 2017) Beads (Glass Spheres) Retro-Reflective (Metric)
FS TT-P-1952	(2015; Rev F) Paint, Traffic and Airfield Markings, Waterborne

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. 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 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

- Surface Preparation Equipment List; G
- Application Equipment List; G
- Exterior Surface Preparation
- Safety Data Sheets; G
- Reflective Media for Airfields; G
- Reflective Media for Roads; G
- Waterborne Paint; G
- Solventborne Paint; G
- Thermoplastic Compound; G
- Raised Pavement Markers Primers and Adhesives; G

SD-06 Test Reports

- Reflective Media for Airfields; G
- Reflective Media for Roads; G
- Waterborne Paint; G
- Solventborne Paint; G
- High Build Acrylic Coating (HBAC); G
- Thermoplastic Compound; G
- Raised Pavement Markers Primers and Adhesives; G
- Test Reports

SD-07 Certificates

Qualifications; G

Reflective Media for Airfields

Reflective Media for Roads

Waterborne Paint

Solventborne Paint

Volatile Organic Compound, (VOC); G

Thermoplastic Compound

SD-08 Manufacturer's Instructions

Waterborne Paint; G

Solventborne Paint; G

Thermoplastic Compound; G

1.3 QUALITY ASSURANCE

1.3.1 Regulatory Requirements

Submit certificate stating that the proposed pavement marking paint meets the Volatile Organic Compound, (VOC) regulations of the local Air Pollution Control District having jurisdiction over the geographical area in which the Project is located. Submit Safety Data Sheets for each product.

1.3.2 Qualifications

Submit documentation certifying that pertinent personnel are qualified for equipment operation and handling of applicable chemicals. The documentation should include experience on five projects of similar size and scope with references for all personnel.

1.3.3 Qualifications For Airfield Marking Personnel

Submit documentation of qualifications in resume format a minimum of 14 days before pavement marking work is to be performed showing personnel who will be performing the work have experience working on airfields, operating mobile self-powered marking, cleaning, and paint removal equipment and performing these tasks. Include with resume a list of references complete with points of contact and telephone numbers. Provide certification for pavement marking machine operator and foreman demonstrating experience successfully completing a minimum of two airfield pavement marking projects of similar size and scope. Provide documentation demonstrating personnel have a minimum of three years of experience operating similar equipment and performing the same or similar work in similar environments, similar in size and scope of the planned project. The Construction Administrator reserves the right to require additional proof of competency or to reject proposed personnel.

1.4 DELIVERY AND STORAGE

Deliver paint materials, thermoplastic compound materials, and reflective media in original sealed containers that plainly show the designated name, specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer.

Provide storage facilities at the Job Site, only in areas approved by the Construction Administrator, for maintaining materials at temperatures recommended by the manufacturer. Make available paint stored at the Project Site or segregated at the source for sampling not less than 30 days prior to date of required approval for use to allow sufficient time for testing. Notify the Construction Administrator when paint is available for sampling.

1.5 PROJECT/SITE CONDITIONS

1.5.1 Environmental Requirements

1.5.1.1 Weather Limitations for Application

Apply pavement markings to clean, dry surfaces, and unless otherwise approved, only when the air and pavement surface temperature is at least 5 degrees F above the dew point and the air and pavement temperatures are within the limits recommended by the pavement marking manufacturer. Allow pavement surfaces to dry after water has been used for cleaning or rainfall has occurred prior to striping or marking. Test the pavement surface for moisture before beginning work each day and after cleaning. Do not commence marking until the pavement is sufficiently dry and the pavement condition has been approved by the Construction Administrator. Employ the "plastic wrap method" to test the pavement for moisture as specified in Paragraph "Testing for Moisture".

1.5.1.2 Weather Limitations for Removal of Pavement Markings on Roads and Parking Areas

Pavement surface must be free of snow, ice, or slush; with a surface temperature of at least 40 degrees F and rising at the beginning of operations, except those involving shot or sand blasting or grinding. Cease operation during thunderstorms, or during rainfall, except for waterblasting and removal of previously applied chemicals. Cease waterblasting where surface water accumulation alters the effectiveness of material removal.

1.5.2 Traffic Controls

Place warning signs conforming to MUTCD near the beginning of the Work Site and well ahead of the Work Site for alerting approaching traffic from both directions. Place small markers along newly painted lines or freshly placed raised markers to control traffic and prevent damage to newly painted surfaces or displacement of raised pavement markers. Mark painting equipment with large warning signs indicating slow-moving painting equipment in operation.

When traffic must be rerouted or controlled to accomplish the Work, provide necessary warning signs, flag persons, and related equipment for the safe passage of vehicles.

1.5.3 Airfield Traffic Control

Coordinate performance of all Work in the controlled zones of the airfield with the Construction Administrator. Neither equipment nor personnel can use any portion of the airfield without permission of these officers unless the runway is closed.

1.5.4 Airfield Radio Communication

No personnel or equipment will be allowed in the controlled zones of the airfield.

1.5.5 Airfield Emergency Landing and Takeoff

Emergencies take precedence over all operations. Upon notification from the control tower of an emergency landing or imminent takeoff, stop all operations immediately and evacuate all personnel and equipment to an area not utilized for aircraft traffic which is at least 250 feet measured perpendicular to and away from the near edge of the runway unless otherwise authorized by the Construction Administrator. Equipment and chemicals or detergents as well as excess water must be able to clear the Work Area within 3 minutes.

1.5.6 Lighting

When night operations are necessary, provide all necessary lighting and equipment. Direct or shade lighting to prevent interference with aircraft, the air traffic control tower, and other base operations. Provide lighting and related equipment capable of being removed from the runway within 15 minutes of notification of an emergency. Night work must be coordinated with the Flight Operations Manager or Airfield Manager and approved in advance by the Construction Administrator. The Government reserves the right to accept or reject night work on the day following night activities by the Contractor.

PART 2 PRODUCTS

2.1 EQUIPMENT

2.1.1 Surface Preparation Equipment for Roads and Parking Areas

Submit a surface preparation equipment list by serial number, type, model, and manufacturer. Include descriptive data indicating area of coverage per pass, pressure adjustment range, tank and flow capacities, and safety precautions required for the equipment operation. Mobile equipment must allow for removal of markings without damaging the pavement surface or joint sealant. Maintain machines, tools, and equipment used in the performance of the Work in satisfactory operating condition.

2.1.1.1 Sandblasting Equipment

Use mobile sandblasting equipment capable of producing a pressurized stream of sand and air that effectively removes paint from the surface without filling voids with debris in asphalt or tar pavements or removing joint sealants in Portland cement concrete pavements. Include with the equipment and air compressor, hoses, and nozzles of adequate size and capacity for removing paint. Equip the compressor with traps and coalescing filters that maintain the compressed air free of oil and water.

2.1.1.2 Waterblasting Equipment

Use mobile waterblasting equipment capable of producing a pressurized stream of water that effectively removes paint from the pavement surface without significantly damaging the pavement. Provide equipment, tools, and machinery which are safe and in good working order at all times.

2.1.1.3 Grinding or Scarifying Equipment

Use equipment capable of removing surface contaminants, paint build-up, or extraneous markings from the pavement surface without leaving any residue. Clean the surface by hydro blast to remove surface contaminants and ash after a weed torch is used to remove paint.

2.1.1.4 Chemical Removal Equipment

Use chemical equipment capable of applying and removing chemicals and paint from the pavement surface, leaving only non-toxic biodegradable residue without scarring or other damage to the pavement or joints and joint seals.

2.1.2 Application Equipment

Submit application equipment list appropriate for the material(s) to be used. Include manufacturer's descriptive data and certification for the planned use that indicates area of coverage per pass, pressure adjustment range, tank and flow capacities, and all safety precautions required for operating and maintaining the equipment. Provide and maintain machines, tools, and equipment used in the performance of the Work in satisfactory operating condition, or remove them from the Work Site. Provide mobile and maneuverable application equipment to the extent that straight lines can be followed and normal curves can be made in a true arc.

2.1.2.1 Paint Application Equipment

2.1.2.1.1 Hand-Operated, Push-Type Machines

Provide hand-operated push-type applicator machine of a type commonly used for application of water based paint or two-component, chemically curing paint, thermoplastic, or preformed tape, to pavement surfaces for small marking projects, such as legends and cross-walks, parking areas, or surface painted signs. Provide applicator machine equipped with the necessary tanks and spraying nozzles capable of applying paint uniformly at coverage specified. Hand operated spray guns may be used in areas where push-type machines cannot be used.

2.1.2.1.2 Self-Propelled or Mobile-Drawn Spraying Machines

Provide self-propelled or mobile-drawn spraying machine with suitable arrangements of atomizing nozzles and controls to obtain the specified results. Provide machine having a speed during application capable of applying the stripe widths indicated at the paint coverage rate specified herein and of even uniform thickness with clear-cut edges.

2.1.2.1.2.1 Road Marking

Provide equipment used for marking roads capable of placing the prescribed number of lines at a single pass as solid lines, intermittent lines, or a combination of solid and intermittent lines using a maximum of three

different colors of paint as specified.

2.1.2.1.2.2 Airfield Marking

Provide self-propelled or mobile-drawn spraying machine for applying the paint for airfield pavements with an arrangement of atomizing nozzles capable of applying the specified line width in a single pass. Provide paint applicator with paint reservoirs or tanks of sufficient capacity and suitable gauges to apply paint in accordance with requirements specified. Equip tanks with suitable mechanical agitators. Equip spray mechanism with quick-action valves conveniently located, and include necessary pressure regulators and gauges in full view and reach of the operator. Install paint strainers in paint supply lines to ensure freedom from residue and foreign matter that may cause malfunction of the spray guns. The paint applicator must be readily adaptable for attachment of a dispenser for the reflective media approved for use.

2.1.2.1.2.3 Hand Application

Provide spray guns for hand application of paint in areas where the mobile paint applicator cannot be used.

2.1.2.2 Thermoplastic Application Equipment

2.1.2.2.1 Thermoplastic Material

Apply thermoplastic material with equipment that is capable of providing continuous uniformity in the dimensions and reflectorization of the marking.

2.1.2.2.2 Application Equipment

- a. Provide application equipment capable of continuous mixing and agitation of the material, with conveying parts which prevent accumulation and clogging between the main material reservoir and the extrusion shoe or spray gun. All parts of the equipment which come into contact with the material must be easily accessible and exposed for cleaning and maintenance. All mixing and conveying parts up to and including the extrusion shoes and spray guns must maintain the material at the required temperature with heat-transfer oil or electrical-element-controlled heat.
- b. Provide application equipment constructed to ensure continuous uniformity in the dimensions of the stripe. Provide an applicator with a means for cleanly cutting off stripe ends squarely and providing a method of applying "skiplines." Provide equipment capable of applying varying widths of traffic markings.
- c. Provide mobile and maneuverable application equipment allowing straight lines to be followed and normal curves to be made in a true arc. Provide equipment used for the placement of thermoplastic pavement markings of two general types: Mobile applicator and portable applicator.
- d. Equip the applicator with a pressurized or drop-on type bead dispenser capable of uniformly dispensing reflective glass spheres at controlled rates of flow. The bead dispenser must operate automatically to begin flow prior to the flow of binder to assure that the strip is fully reflectorized.

2.1.2.2.3 Mobile Application Equipment

Provide a truck-mounted, self-contained pavement marking machine that is capable of hot applying thermoplastic by either the extrusion or spray method.

- a. Equip the unit to apply the thermoplastic marking material at temperatures according to the manufacturer's instructions, at widths varying from 3 to 12 inches, with an automatic pressurized or drop-on bead dispensing system, capable of operating continuously, and of installing a minimum of 20,000 lineal feet of longitudinal markings in an 8-hour day.
- b. Equip the mobile unit with a melting kettle which holds a minimum of 6000 pounds of molten thermoplastic material; capable of heating the thermoplastic composition to temperatures as recommended by the manufacturer. Use a thermostatically controlled heat transfer liquid. Heating of the composition by direct flame is not allowed. Oil and material temperature gauges must be visible at both ends of the kettle.
- c. Equip mobile units for application of extruded markings with a minimum of two extrusion shoes; located one on each side of the truck, capable of marking simultaneous edge line and centerline stripes; each being a closed, oil-jacketed unit; holding the molten thermoplastic at a temperature as recommended by the manufacturer; and capable of extruding a line of 3 to 8 inches in width; and at a thickness of not less than 0.120 inch nor more than 0.190 inch, of generally uniform cross section.
- d. Equip mobile units for application of spray markings with a spray gun system capable of marking simultaneous edgeline and centerline stripes. Surround (jacket) the spray system with heating oil to maintain the molten thermoplastic at a temperature of 375 to 425 degrees F, capable of spraying a stripe of 3 to 12 inches in width, and in thicknesses varying from 0.060 inch to 0.098 inch, of generally uniform cross section.
- e. Equip the mobile unit with an electronic programmable line pattern control system, capable of applying skip or solid lines in any sequence, through any and all of the extrusion shoes, or the spray guns, and in programmable cycle lengths. In addition, equip the mobile unit with an automatic counting mechanism capable of recording the number of lineal feet of thermoplastic markings applied to the pavement surface with an accuracy of 0.5 percent.

2.1.2.2.4 Portable Application Equipment

Provide portable hand-operated equipment, specifically designed for placing special markings such as crosswalks, stop bars, legends, arrows, and short lengths of lane, edge and centerlines; and capable of applying thermoplastic pavement markings by the extrusion method. Equip the portable applicator with all the necessary components, including a materials storage reservoir, bead dispenser, extrusion shoe, and heating accessories, capable of holding the molten thermoplastic at the temperature recommended by the manufacturer, and of extruding a line of 3 to 12 inches in width, and in thickness of not less than 0.120 inch nor more than 0.190 inch and of generally uniform cross section.

2.1.2.3 Reflective Media Dispenser

Attach the dispenser for applying the reflective media to the paint dispenser and designed to operate automatically and simultaneously with the applicator through the same control mechanism. The bead applicator must be capable of adjustment and designed to provide uniform flow of reflective media over the full length and width of the stripe at the rate of coverage specified in Paragraph "Application".

2.1.2.4 Preformed Tape Application Equipment

Provide and use mechanical application equipment for the placement of preformed marking tape which is a mobile pavement marking machine specifically designed for use in applying pressure-sensitive pavement marking tape of varying widths. Equip the applicator with rollers, or other suitable compaction device to provide initial adhesion of the material with the pavement surface. Use additional tools and devices as needed to properly seat the applied material as recommended by the manufacturer.

2.2 MATERIALS

Use waterborne or methacrylate paint for airfield markings. Use waterborne paint for roads. The maximum allowable VOC content of pavement markings is 150 grams per liter. Color of markings are indicated on the drawings and must conform to ASTM D6628 for roads and parking areas and FED-STD-595 for airfields. Provide materials conforming to the requirements specified herein.

2.2.1 Waterborne Paint

FS TT-P-1952, Type I.

2.2.2 Methacrylate Paint

Formulate methacrylate paint to meet the requirements of FAA AC 150/5370-10, Item P-620.2, Methacrylate.

2.2.3 Reflective Media

2.2.3.1 Reflective Media for Airfields

FS TT-B-1325, Type I, Gradation A.

2.2.3.2 Reflective Media for Roads

FS TT-B-1325, Type I, Gradation A.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Testing for Moisture

Test the pavement surface for moisture before beginning pavement marking after each period of rainfall, fog, high humidity, or cleaning, or when the ambient temperature has fallen below the dew point. Do not commence marking until the pavement is sufficiently dry and the pavement condition

has been approved by the Construction Administrator or authorized representative.

Employ the "plastic wrap method" to test the pavement for moisture as follows: Cover the pavement with a 12 inch by 12 inch section of clear plastic wrap and seal the edges with tape. After 15 minutes, examine the plastic wrap for any visible moisture accumulation inside the plastic. Do not begin marking operations until the test can be performed with no visible moisture accumulation inside the plastic wrap. Re-test surfaces when work has been stopped due to rain.

3.1.2 Surface Preparation Demonstration

Prior to surface preparation, demonstrate the proposed procedures and equipment. Prepare areas large enough to determine cleanliness, adhesion of remaining coating and rate of cleaning. Perform a demonstration removal of pavement marking in an area designated by the Construction Administrator. Approved demonstration area establishes the standard for the remainder of the work.

3.1.3 Test Stripe Demonstration

Prior to paint application, demonstrate test stripe application within the work area using the proposed materials and equipment. Apply separate test stripes in each of the line widths and configurations required herein using the proposed equipment. Make the test stripes long enough to determine the proper speed and operating pressures for the vehicle(s) and machinery, but not less than 50 feet long.

3.1.4 Application Rate Demonstration

During the Test Stripe Demonstration, demonstrate compliance with the application rates specified herein. Document the equipment speed and operating pressures required to meet the specified rates in each configuration of the equipment and provide a copy of the documentation to the Construction Administrator prior to proceeding with the Work.

3.1.5 Retroreflective Value Demonstration

After the test stripes have cured to a "no-track" condition, demonstrate compliance with the average retroreflective values specified herein. Take a minimum of ten readings on each test stripe with a Retroreflectometer with a direct readout in millicandelas per square meter per lux (mcd/m²/lx). Conform testing per ASTM D4061, ASTM E1710, ASTM E2177, and ASTM E2302.

3.1.6 Level of Performance Demonstration

The Construction Administrator will be present at the application demonstrations to observe the results obtained and to validate the operating parameters of the vehicle(s) and equipment. If accepted by the Construction Administrator, the test stripe is the measure of performance required for this Project. Do not proceed with the Work until the demonstration results are satisfactory to the Construction Administrator.

3.2 EXTERIOR SURFACE PREPARATION

Allow new pavement surfaces to cure for a period of not less than 30 days before application of marking materials. Thoroughly clean surfaces to be

marked before application of the paint. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods as required. Remove rubber deposits, existing paint markings, residual curing compounds, and other coatings adhering to the pavement by water blasting

- a. For Portland cement concrete pavement, grinding, light shot blasting, or light scarification, to a resulting profile equal to ICRI 03732 CSP 2, CSP 3, and CSP 4, respectively, can be used in addition to water blasting on most pavements, to either remove existing coatings, or for surface preparation.
- b. Do not use shot blasting on airfield pavements due to the potential of Foreign Object Damage (FOD) to aircraft. Scrub affected areas, where oil or grease is present on old pavements to be marked, with several applications of trisodium phosphate solution or other approved detergent or degreaser and rinse thoroughly after each application. After cleaning oil-soaked areas, seal with shellac or primer recommended by the manufacturer to prevent bleeding through the new paint. Do not commence painting in any area until pavement surfaces are dry and clean.

3.2.1 Early Painting of Rigid Pavements

Pretreat rigid pavements that require early painting with an aqueous solution containing 3 percent phosphoric acid and 2 percent zinc chloride. Apply the solution to the areas to be marked.

3.2.2 Early Painting of Asphalt Pavements

For asphalt pavement systems requiring painting application at less than 30 days, apply the paint and beads at half the normal application rate, followed by a second application at the normal rate after 30 days.

3.3 APPLICATION

Apply pavement markings to dry pavements only.

3.3.1 Paint

Apply paint pneumatically with approved equipment at rate of coverage specified herein. Provide guidelines and templates as necessary to control paint application. Take special precautions in marking numbers, letters, and symbols. Manually paint numbers, letters, and symbols. Sharply outline all edges of markings. The maximum drying time requirements of the Paint Specifications will be strictly enforced, to prevent undue softening of bitumen, and pickup, displacement, or discoloration by tires of traffic. If there is a deficiency in drying of the markings, painting operations must cease until the cause of the slow drying is determined and corrected.

3.3.1.1 Waterborne Paint

3.3.1.1.1 Airfields

For non-reflectorized and reflectorized markings, apply paint conforming to FS TT-P-1952 Type I or II at a rate of 121 plus or minus 6 square feet per gallon.

For reflectorized markings, apply paint and glass spheres at the following rates:

TABLE IV			
Bead Type	Paint Type	Paint Application Rate	Bead Application Rate
Type I (Gradation A)	Type I, II, III	121 plus or minus 6 Sq Ft/Gallon	8 plus or minus 1 lb/gallon

3.3.1.1.2 Roads

Apply paint at a rate of 105 plus or minus 5 square feet per gallon.
Apply FS TT-B-1325 Type I (Gradation A) beads at a rate of 7 plus or minus 0.5 pounds of glass spheres per gallon.

3.3.1.2 Methacrylate Paint

Apply paint evenly to the pavement surface at a maximum rate of 45 square feet per gallon. Apply glass spheres conforming to FS TT-B-1325 uniformly to the wet paint on airfield pavement. Use Type I (Gradation A) beads. Apply Type I (Gradation A) beads at a minimum rate of 15 pounds of glass spheres per gallon.

3.3.2 Cleanup and Waste Disposal

Keep the Work Site clean and free of debris and waste from the removal and application operations. Immediately cleanup following removal operations in areas subject to aircraft traffic. Dispose of debris at approved sites.

3.4 FIELD QUALITY CONTROL

3.4.1 Sampling and Testing

As soon as the paint materials and reflective media are available for sampling, obtain by random selection from the sealed containers, two quart samples of each batch in the presence of the Construction Administrator. Two quarts will be for sampling and testing by the Contractor and two quarts will be for retention by the Government. Accomplish adequate mixing prior to sampling to ensure a uniform, representative sample. A batch is defined as that quantity of material processed by the manufacturer at one time and identified by number on the label. Clearly identify samples by designated name, Specification number, batch number, Project Contract number, intended use, and quantity involved.

Test samples by an approved laboratory. If a sample fails to meet Specification, replace the material in the area represented by the samples and retest the replacement material as specified above. Submit certified copies of the test reports, prior to the use of the materials at the Job Site. At the discretion of the Construction Administrator, samples provided may be tested by the Government for verification.

3.4.2 Material Inspection

Examine material at the Job Site to determine that it is the material referenced in the report of test results or certificate of compliance. A certificate of compliance shall be accompanied by test results substantiating conformance to the specified requirements.

3.4.3 Dimensional Tolerances

Apply all markings in the standard dimensions provide in the drawings. New markings may deviate a maximum of 10 percent larger than the standard dimension. The maximum deviation allowed when painting over an old marking is up to 20 percent larger than the standard dimensions.

3.4.4 Bond Failure Verification

Inspect newly applied markings for signs of bond failure based on visual inspection and comparison to results from "Test Stripe Demonstration" Paragraph.

3.4.5 Reflective Media and Coating Application Verification

Use a wet film thickness gauge to measure the application of wet paint. Use a microscope or magnifying glass to evaluate the embedment of glass beads in the paint. Verify the glass bead embedment with approximately 50 percent of the individual bead spheres embedded and 50 percent of the individual bead spheres exposed.

3.4.6 Retroreflective Markings

Collect and record readings for white and yellow retroreflective markings at the rate of one reading per 1000 linear feet. The minimum acceptable average for white markings is 200 millicandelas per square meter per lux (mcd/m²/lx) (measured with Retroreflectometer). The minimum acceptable average for yellow markings is 175 millicandelas per square meter per lux (mcd/m²/lx). Compute readings by averaging a minimum of 10 readings taken within the area at random locations. Re-mark areas not meeting the retroreflective requirements stated above.

3.4.7 Material Bond Verification and Operations Area Cleanup for Airfields

Vacuum sweep the aircraft operating area before it is opened for aircraft operations to preclude potential foreign object damaged to aircraft engines. Visually inspect the pavement markings and the material captured by the vacuum. Verify that no significant loss of reflective media has occurred to the pavement marking due to the vacuum cleaning.

-- End of Section --

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SECTION 32 31 13.53

HIGH-SECURITY CHAIN LINK FENCES AND GATES
04/08

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 A116	(2011) Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric
ASTM A121	(2013) Standard Specification for Metallic-Coated Carbon Steel Barbed Wire
ASTM A153/A153M	(2016) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A392	(2011a; R 2017) Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A702	(2013) Standard Specification for Steel Fence Posts and Assemblies, Hot Wrought
ASTM A780/A780M	(2009; R 2015) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A824	(2011; R 2017) Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence
ASTM B117	(2016) Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM C94/C94M	(2017a) Standard Specification for Ready-Mixed Concrete
ASTM F1043	(2017a) Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework
ASTM F1083	(2016) Standard Specification for Pipe, Steel, Hot-Dipped Zinc Coated (Galvanized) Welded, for Fence Structures
ASTM F1184	(2016) Industrial and Commercial Horizontal Slide Gates

ASTM F567	(2014a) Standard Practice for Installation of Chain Link Fence
ASTM F626	(2014) Standard Specification for Fence Fittings
ASTM F900	(2011; R 2017) Standard Specification for Industrial and Commercial Swing Gates

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS RR-F-191	(Rev K) Fencing, Wire and Post Metal (and Gates, Chain-Link Fence Fabric, and Accessories)
FS RR-F-191/1	(Rev F) Fencing, Wire and Post, Metal (Chain-Link Fence Fabric)
FS RR-F-191/2	(Rev E) Fencing, Wire and Post, Metal (Chain-Link Fence Gates)
FS RR-F-191/3	(Rev E; Am 1) Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces)
FS RR-F-191/4	(Rev F) Fencing, Wire and Post, Metal (Chain-Link Fence Accessories)

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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fence Installation

Installation Drawings

Location of Gate, Corner, End, And Pull Posts

Gate Assembly

Turnstiles

Gate Hardware and Accessories

SD-03 Product Data

Fence Installation

Gate Assembly

Gate Hardware and Accessories

SD-04 Samples

Fabric

Posts

Post Caps

Braces

Line Posts

Sleeves

Top Rail

Bottom Rail

Tension Wire

Barbed Wire

Barbed Wire Supporting Arms

Barbed Tape

Stretcher Bars

Gate Posts

Gate Hardware and Accessories

Turnstiles

Padlocks

Wire Ties

SD-06 Test Reports

Zinc Coating

PVC Coating

Aluminum Alloy Coating

SD-07 Certificates

Chain Link Fence

Reports

Zinc Coating

PVC Coating

Aluminum Alloy Coating

Fabric

Barbed Wire

Stretcher Bars

Gate Hardware and Accessories

Concrete

Gate Operator

SD-08 Manufacturer's Instructions

Fence Installation

Gate Assembly

Hardware Assembly

Accessories

SD-10 Operation and Maintenance Data

Electro-Mechanical Locks

Gate Operator

Operating And Maintenance Instructions

1.3 QUALITY ASSURANCE

1.3.1 Required Report Data

Submit reports, signed by an official authorized to certify on behalf of the manufacturer, of chain-link fencing listing and accessories regarding weight in ounces for zinc coating, thickness of PVC coating, and chemical composition and thickness of aluminum alloy coating. Submit reports demonstrating full compliance with the following standards: FS RR-F-191, FS RR-F-191/1, FS RR-F-191/2, FS RR-F-191/3, and FS RR-F-191/4.

1.3.2 Assembly and Installation Drawings

Submit Manufacturer's instructions and complete Fence Installation Drawings for review and approval by the Construction Administrator prior to shipment. Drawing details shall include, but are not limited to: Fence installation, location of gate, corner, end, and pull posts, gate assembly, turnstiles, and gate hardware and accessories.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to Site in an undamaged condition. Store materials off the ground to provide protection against oxidation caused by ground contact.

PART 2 PRODUCTS

2.1 FENCE FABRIC

2.1.1 General

Provide ASTM A392, Class 1, zinc-coated steel wire with minimum coating weight of 1.2 ounces of zinc per square foot of coated surface. Fabricate fence fabric of 9 gauge wire woven in 2 inch mesh conforming to ASTM A116. Set fabric height at 8 feet. Fabric shall be twisted and barbed on the top selvage and knuckled on the bottom selvage. Secure fabric to posts using stretcher bars or ties spaced 15 inches on center, or by integrally weaving to integral fastening loops of end, corner, pull, and gate posts for full length of each post. Install fabric on opposite side of posts from area being secured.

2.2 POSTS

2.2.1 Metal Posts for Chain Link Fence

Provide posts conforming to ASTM F1083, zinc-coated. Group IA, with external coating Type A steel pipe. Group IC steel pipe, zinc-coated with external coating Type A or Type B and Group II, roll-formed steel sections, meeting the strength and coating requirements of ASTM F1043 and ASTM A702. Provide sizes as shown on the drawings. Line posts and terminal (corner, gate, and pull) posts selected shall be of the same designation throughout the fence. Provide gate post for the gate type specified subject to the limitation specified in ASTM F900 and/or ASTM F1184. Post spacing shall conform to the recommended guidelines as set forth in the CLFMI "Wind Load Guide for the Selection of Line Post Spacing and Size" unless specified to exceed those guidelines.

2.2.2 Accessories

- a. Provide accessories conforming to ASTM F626. Ferrous accessories shall be zinc coated.
- b. Furnish truss rods for each terminal post. Provide truss rods with turnbuckles or other equivalent provisions for adjustment.
- c. Provide barbed wire supporting arms of the 45 degree outward angle 3-strand arm type and of the design required for the post furnished. Secure arms by top tension wire.
- d. Furnish post caps in accordance with manufacturer's standard accessories.
- e. Tie wires for attaching fabric to tension wire on high security fences shall be 16 gauge stainless steel. Provide double loop tie wires 6.5 inches in length. Miscellaneous hardware coatings shall conform to ASTM A153/A153M unless modified.

2.3 BRACES AND RAILS

ASTM F1083, zinc-coated, Group IA, steel pipe, size NPS 1-1/4. Group IC steel pipe, zinc-coated, shall meet the strength and coating requirements of ASTM F1043. [Braces and rails shall be [Group IA] [Group IC], steel pipe, size NPS 1-1/4 or Group II, formed steel sections, size 1-21/32 inch and be zinc coated (Type A) and polyvinyl chloride-coated conforming to

the requirements of ASTM F1043.] Group II, formed steel sections, size 1-21/32 inch, conforming to ASTM F1043, may be used as braces and rails if Group II line posts are furnished.

Braces and bottom rail; Class [1, steel pipe, Grade [A] [or] [B]], in minimum sizes listed in FS RR-F-191/3 for each class and grade Steel pipe, Class 1, Grade B shall meet the following performance criteria when subjected to salt spray testing in accordance with ASTM B117: Exterior 1,000 hours with maximum 5 percent red rust; Interior 650 hours with maximum 5 percent red rust.

2.4 WIRE

2.4.1 Wire Ties

Submit samples as specified. FS RR-F-191/4.

2.4.2 Barbed Wire

Provide barbed wire conforming to ASTM A121 zinc-coated, Type Z, Class 3, or aluminum-coated, Type A, with 12.5 gauge wire with 14 gauge, round, 4-point barbs spaced no more than 5 inches apart.

2.4.3 Tension Wire

Provide Type I or Type II tension wire, Class 4 coating, in accordance with ASTM A824.

2.5 CONCRETE

ASTM C94/C94M, using 3/4 inch maximum size aggregate, and having minimum compressive strength of 3000 psi at 28 days. Grout shall consist of one part Portland cement to three parts clean, well-graded sand and the minimum amount of water to produce a workable mix.

2.6 GATES

2.6.1 Gate Assembly

Provide gate assembly conforming to ASTM F900 and/or ASTM F1184 of the type and swing shown. Provide gate frames conforming to strength and coating requirements of ASTM F1083 for Group IA, steel pipe, with external coating Type A, nominal pipe size (NPS) 1-1/2. Provide gate frames conforming to strength and coating requirements of ASTM F1043, for Group IC, steel pipe with external coating Type A or Type B, nominal pipe size (NPS) 1-1/2. Gate fabric shall be as specified for chain link fabric.

2.6.2 Gate Leaves

For gate leaves, more than 8 feet wide, provide either intermediate members and diagonal truss rods or tubular members as necessary to provide rigid construction, free from sag or twist. Gate leaves less than 8 feet wide shall have truss rods or intermediate braces. Provide intermediate braces on all gate frames with an electro-mechanical lock. Attach fabric to the gate frame by method standard with the manufacturer except that welding will not be permitted.

2.6.3 Gate Hardware and Accessories

Submit manufacturer's catalog data. Furnish and install latches, hinges, stops, keepers, rollers, and other hardware items as required for the operation of the gate. Arrange latches for padlocking so that the padlock will be accessible from both sides of the gate. Provide stops for holding the gates in the open position. For high security applications, each end member of gate frames shall be extended sufficiently above the top member to carry three strands of barbed wire in horizontal alignment with barbed wire strands on the fence.

2.7 GATE OPERATOR

Provide electric gate operators for sliding gates as follows: Electrical gate operators shall have a right angle gearhead instantly reversing motor with magnetic drum-type brake, friction disc clutch, reversing starter with thermal overload protection, and a chain-driven geared rotary-type automatic limit switch. Gears shall consist of a hardened steel machine cut worm and mating bronze gear. All gears and bearings shall operate in a bath of oil. Gate operators with V-belt pulleys are not allowed. Equip gate operators with an emergency release to allow the gate to be operated manually. The emergency release mechanism shall be capable of being locked in the engaged or disengaged position. Provide positive stops on the gate tracks as a backup to the limit switches.

2.8 ELECTRO-MECHANICAL LOCKS

Electro-mechanical locking devices for sliding gates and personnel gates shall be solenoid actuated such that the deadbolt retracts when the solenoid is energized and remains electrically retracted until the gate is closed. Provide continuous duty type solenoid, rated for 120V AC, 60Hz operation. The locking device shall be unlockable by key and keyed on both sides. Status of the electro-mechanical lock shall be monitored by two limit switches (integral to the locking device) wired in series. One switch shall monitor the deadlock lever and the other monitor the locking tongue.

PART 3 EXECUTION

3.1 FENCE INSTALLATION

Perform complete installation conforming to ASTM F567.

3.1.1 Line and Grade

Install fence to the lines and grades indicated. Clear the area on either side of the fence line to the extent indicated. Space line posts equidistant at intervals not exceeding 10 feet. Terminal (corner, gate, and pull) posts shall be set at abrupt changes in vertical and horizontal alignment. Provide fabric continuous between terminal posts; however, runs between terminal posts shall not exceed 500 feet. Repair any damage to galvanized surfaces, including welding, with paint containing zinc dust in accordance with ASTM A780/A780M.

3.1.2 Excavation

Clear all post holes of loose material. Spread waste material where directed. Eliminate ground surface irregularities along the fence line to the extent necessary to maintain a 2 inch clearance between the bottom

of the fabric and finish grade.

3.2 POST INSTALLATION

3.2.1 Earth and Bedrock

- a. Set posts plumb and in alignment. Except where solid rock is encountered, set posts in concrete to the depth indicated on the drawings. Where solid rock is encountered with no overburden, set posts to a minimum depth of 18 inches in rock. Where solid rock is covered with an overburden of soil or loose rock, set posts to the minimum depth indicated on the drawing unless a penetration of 18 inches in solid rock is achieved before reaching the indicated depth, in which case terminate depth of penetration. Grout all portions of posts set in rock.
- b. Portions of posts not set in rock shall be set in concrete from the rock to ground level. Posts set in concrete shall be set in holes not less than the diameter shown on the drawings. Make diameters of holes in solid rock at least 1 inch greater than the largest cross section of the post. Thoroughly consolidate concrete and grout around each post, free of voids and finished to form a dome. Allow concrete and grout to cure for 72 hours prior to attachment of any item to the posts. Group II line posts may be mechanically driven, for temporary fence construction only, if rock is not encountered. Set driven posts to a minimum depth of 3 feet and protect with drive caps when setting.
- c. Test fence post rigidity by applying a 50 pound force on the post, perpendicular to the fabric, at 5 feet above ground. Post movement measured at the point where the force is applied shall be less than or equal to 3/4 inch from the relaxed position. Test every tenth post for rigidity. When a post fails this test, make further tests on the next four posts on either side of the failed post. All failed posts shall be removed, replaced, and retested at the Contractor's expense.

3.3 RAILS

Bolt bottom rail to double rail ends and securely fasten double rail ends to the posts. Peen bolts to prevent easy removal. Install bottom rail before chain link fabric. Provide 3/8 inch diameter eye hook anchored into concrete footing at midpoint.

3.4 FABRIC INSTALLATION

- a. Install chain link fabric on the side of the post indicated. Attach fabric to terminal posts with stretcher bars and tension bands. Space bands at approximately 15 inch intervals. Install fabric and pull taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Fasten fabric to line posts at approximately 15 inch intervals and fastened to all rails and tension wires at approximately 12 inch intervals.
- b. Cut fabric by untwisting and removing pickets. Accomplish splicing by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall be 2 plus or minus 1/2 inch above the ground.
- c. After the fabric installation is complete, exercise the fabric by

applying a 50 pound push-pull force at the center of the fabric between posts; the use of a 30 pound pull at the center of the panel shall cause fabric deflection of not more than 2.5 inches when pulling fabric from the post side of the fence; every second fence panel shall meet this requirement; resecure and retest all failed panels at the Contractor's expense.

3.5 SUPPORTING ARMS

Install barbed wire supporting arms and barbed wire as indicated on the drawings and as recommended by the manufacturer. Anchor supporting arms to the posts in a manner to prevent easy removal with hand tools. Pull barbed wire taut and attach to the arms with clips or other means that will prevent easy removal.

3.6 GATE INSTALLATION

- a. Install gates at the locations shown. Mount gates to swing as indicated. Install latches, stops, and keepers as required. Install Slide gates as recommended by the manufacturer.
- b. Attach padlocks to gates or gate posts with chains. Weld or otherwise secure hinge pins, and hardware assembly to prevent removal.
- c. Submit 6 copies of operating and maintenance instructions, a minimum of 2 weeks prior to field training. Operating instructions shall outline the step-by-step procedures required for system startup, operation, and shutdown. Include the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and their basic operating features. Include in the maintenance instructions routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guide. Also include the general gate layout, equipment layout, and simplified wiring and control diagrams of the system as installed.

3.7 GROUNDING

- a. Ground fencing as [indicated on drawings][and][specified].
- b. Ground fences crossed by overhead powerlines in excess of 600 volts. Electrical equipment attached to the fence shall be grounded.
- c. Ground fences on each side of all gates, at each corner, at the closest approach to each building located within 50 feet of the fence, and where the fence alignment changes more than 15 degrees. Grounding locations shall not exceed 650 feet. Bond each gate panel with a flexible bond strap to its gate post. Ground fences crossed by powerlines of 600 volts or more at or near the point of crossing and at distances not exceeding 150 feet on each side of crossing.
- d. Provide ground conductor consisting of No. 8 AWG solid copper wire. Grounding electrodes shall be 3/4 inch by 10 foot long copper-clad steel rod. Drive electrodes into the earth so that the top of the electrode is at least 6 inches below the grade. Where driving is impracticable, electrodes shall be buried a minimum of 12 inches deep and radially from the fence. The top of the electrode shall not be less than 2 feet or more than 8 feet from the fence. Clamp ground conductor to the fence and electrodes with bronze grounding clamps to create electrical continuity between fence posts, fence fabric, and

ground rods. Total resistance of the fence to ground shall not be greater than 25 ohms.

3.8 SECURITY

Install new security fencing, remove existing security fencing, and perform related work to provide continuous security for facility. Schedule and fully coordinate work with Construction Administrator and cognizant Security Officer.

3.9 CLEANUP

Remove waste fencing materials and other debris from the Work Site each workday.

-- End of Section --

SECTION 32 92 19

SEEDING

10/06

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 C602	(2013a) Agricultural Liming Materials
ASTM D117	(2010) Standard Guide for Sampling, Test Methods, Specifications and Guide for Electrical Insulating Oils of Petroleum Origin
ASTM D1388	(2014, E1) Standard Test Method for Stiffness of Fabrics
ASTM D4427	(2013) Peat Samples by Laboratory Testing
ASTM D4972	(2013) pH of Soils
ASTM D6475	(2006) Standard Test Method for Measuring Mass Per Unit Area of Erosion Control Blankets (Withdrawn 2015)
ASTM D6525/D6525M	(2014) Standard Test Method for Measuring Nominal Thickness of Rolled Erosion Control Products
ASTM D6567	(2014) Standard Test Method for Measuring the Light Penetration of a Turf Reinforcement Mat (TRM)
ASTM D6818	(2014) Standard Test Method for Ultimate Tensile Properties of Rolled Erosion Control Products
ASTM D7322	(2013a) Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions

U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1940; R 1988; R 1998) Federal Seed Act
DOA SSIR 42	(1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

1.2 DEFINITIONS

1.2.1 Stand of Seed

95 percent ground cover of the established species.

1.3 RELATED REQUIREMENTS

Section 31 00 00 EARTHWORK applies to this Section for pesticide use and plant establishment requirements, with additions and modifications herein.

1.4 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 to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Wood Cellulose Fiber Mulch

Fertilizer

Include physical characteristics and recommendations.

SD-06 Test Reports

Topsoil Composition Tests (Reports and Recommendations)

SD-07 Certificates

State Certification and Approval for Seed

SD-08 Manufacturer's Instructions

Erosion Control Materials

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

1.5.1.1 Seed Protection

Protect from drying out and from contamination during delivery, on-site storage, and handling.

1.5.1.2 Fertilizer, Sulfur, Iron, and Lime Delivery

Deliver to the Site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to State and Federal laws. Instead of containers, fertilizer, sulphur, iron, and lime may be furnished in bulk with certificate indicating the above information.

1.5.2 Storage

1.5.2.1 Seed, Fertilizer, Sulfur, Iron, and Lime Storage

Store in cool, dry locations away from contaminants.

1.5.2.2 Topsoil

Prior to stockpiling topsoil, treat growing vegetation with application of appropriate specified non-selective herbicide. Clear and grub existing vegetation three to four weeks prior to stockpiling topsoil.

1.5.2.3 Handling

Do not drop or dump materials from vehicles.

1.6 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.6.1 Restrictions

Do not plant when the ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.7 TIME LIMITATIONS

1.7.1 Seed

Apply seed within twenty four hours after seed bed preparation.

PART 2 PRODUCTS

2.1 SEED

Provide fresh, clean, new crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America and as required below.

2.1.1 Classification

Provide State-certified seed of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weedseed content, and inert material. Label in conformance with AMS Seed Act and applicable state seed laws. Wet, moldy, or otherwise damaged seed will be rejected.

2.1.2 Planting Dates

<u>Planting Season</u>	<u>Planting Dates</u>
Season 1	March 15 to June 1

<u>Planting Season</u>	<u>Planting Dates</u>
Season 2	September 15 to November 1

2.1.3 Seed Purity

Botanical Name	Minimum Percent Pure Seed	Minimum Percent Germination and Hard Seed	Maximum Percent Weed Seed	Mix Percent (by weight)
Turf Type Tall Fescue (Blend of Min. 3 Species)	95	95	1	100

2.2 TOPSOIL

2.2.1 On-Site Topsoil

Surface soil stripped and stockpiled on site and modified as necessary to meet the requirements specified for topsoil in Paragraph entitled "Composition." When available topsoil shall be existing surface soil stripped and stockpiled on-site in accordance with Section 31 00 00 EARTHWORK.

2.2.2 Off-Site Topsoil

Conform to requirements specified in Paragraph entitled "Composition." Additional topsoil shall be furnished by the Contractor, or obtained from topsoil excavated elsewhere as part of this Project.

2.2.3 Composition

Containing from 6 to 12 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 3/4 inch, with maximum 3 percent retained on 1/4 inch screen. The pH shall be tested in accordance with ASTM D4972. Topsoil shall be free of sticks, stones, roots, and other debris and objectionable materials. Topsoil composition shall conform to NYSDOT topsoil Type A or Type B.

2.3 SOIL CONDITIONERS

Add conditioners to topsoil as required to bring into compliance with "Composition" standard for topsoil as specified herein.

2.3.1 Lime

Commercial grade limestone shall contain a calcium carbonate equivalent (C.C.E.) as specified in ASTM C602 of not less than 88 percent. Limestone shall have a minimum of 90 percent pass the No. 20 sieve, and a minimum of 60 percent pass the No. 100 sieve.

2.3.2 Peat

Natural product of peat moss derived from a freshwater site and conforming to ASTM D4427. Shred and granulate peat to pass a 1/2 inch mesh screen and condition in storage pile for minimum 6 months after excavation. Peat moss shall have an acidity range of 3.5 pH to 5.5 pH as determined in accordance with methods of testing of Association of Official Agricultural Chemists.

2.3.3 Sand

Clean and free of materials harmful to plants.

2.3.4 Composted Derivatives

Ground bark, nitrolized sawdust, humus or other source-separated organic biosolids free of stones, sticks, and conforming to NYSDOT Type A or Type B composition and gradation requirements for compost material.

2.4 FERTILIZER

2.4.1 Material Requirements

Fertilizers may be either fluid or dry formulations of commercial carriers of available plant nutrients.

The following fertilizers shall be as specified:

- a. Type No. 3: 10-6-4 (50 percent N/UF). 50 percent of total nitrogen shall be derived from ureaform furnishing a minimum of 3.5 percent water insoluble nitrogen (3.5 percent WIN). The balance of the nitrogen shall be present as methylene urea, water soluble urea, nitrate, and ammoniacal compounds.
- b. Type No. 11: A fertilizer in standardized packets designed to control the release of their contents over a specified period of time. The minimum guaranteed analysis shall be 16-8-8.

2.5 MULCH

Mulch shall be free from noxious weeds, mold, and other deleterious materials.

2.5.1 Straw

Stalks from oats, wheat, rye, barley, or rice. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Straw shall contain no fertile seed.

2.6 WATER

Source of water shall be approved by Construction Administrator and of

suitable quality for irrigation, containing no elements toxic to plant life.

2.7 EROSION CONTROL MATERIALS

Blanket shall be extended-term double net erosion control blanket. It shall be a machine-produced mat of 70 percent agricultural straw and 30 percent coconut fiber with a functional longevity of up to 18 months. The blanket shall be of consistent thickness with the straw and coconut evenly distributed over the entire area of the mat. The blanket shall be covered on the top and bottom sides with a 100 percent biodegradable woven natural organic fiber netting. The netting shall consist of machine directional strands formed from two intertwined yarns with cross directional strands interwoven through the twisted machine strands to form an approximate 0.50 by 1.0 inch mesh. The blanket shall be sewn together on 1.50 inch centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches from the edge) as an overlap guide for adjacent mats. The erosion control blanket shall be installed and fastened per manufacturer's specifications.

Erosion Control Blanket shall conform to the following Specifications:

Index Property	Test Method	Typical
Thickness	ASTM D6525/D6525M	0.25 in.
Resiliency	ECTC Guidelines	86 percent
Water Absorbency	ASTM D117	311 percent
Mass/Unit Area	ASTM D6475	8.32 oz/sy
Swell	ECTC Guidelines	46 percent
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	0.42 oz-in
Light Penetration	ASTM D6567	7.6 percent
Tensile Strength - MD	ASTM D6818	201.6 lbs/ft
Elongation - MD	ASTM D6818	13.4 percent
Tensile Strength - TD	ASTM D6818	164.4 lbs/ft
Elongation - TD	ASTM D6818	14.2 percent
Biomass Improvement	ASTM D7322	641 percent

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 EXTENT OF WORK

Provide soil preparation (including soil conditioners as required), fertilizing, seeding, and surface topdressing of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.1.1.1 Topsoil

Provide 4 inches of topsoil as required to meet indicated finish grade. After areas have been brought to indicated finish grade, incorporate fertilizer, pH adjusters and/or soil conditioners into soil a minimum depth of 4 inches by disking, harrowing, tilling, or other method approved by the Construction Administrator. Remove debris and stones larger than 3/4 inch in any dimension remaining on the surface after finish grading. Correct irregularities in finish surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

3.1.1.2 Soil Conditioner Application Rates

Apply soil conditioners at rates as determined by laboratory soil analysis of the soils at the Job Site. For bidding purposes only apply at rates for the following:

- a. Lime 80 pounds per 1000 square feet.

3.1.1.3 Fertilizer Application Rates

Apply fertilizer at rates as determined by laboratory soil analysis of the soils at the Job Site. For bidding purposes apply at 500 pounds per acre to prepare seedbeds.

3.2 SEEDING

3.2.1 Seed Application Seasons and Conditions

Immediately before seeding, restore soil to proper grade. Do not seed when ground is muddy, frozen, snow covered or in an unsatisfactory condition for seeding. If special conditions exist that may warrant a variance in the above seeding dates or conditions, submit a written request to the Construction Administrator stating the special conditions and proposed variance. Apply seed within twenty four hours after seedbed preparation. Sow seed by approved sowing equipment. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing.

3.2.2 Seed Application Method

Seeding method shall be broadcasted and drop seeding, dry seeding with a spreader, or seeding machine.

3.2.2.1 Broadcast and Drop Seeding

Seed shall be uniformly broadcast at the rate of 5 pounds per 1000 square feet. Use broadcast or drop seeders. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing. Cover seed uniformly to a maximum depth 1/2 inch in sandy soils by means of spike-tooth harrow, cultipacker, raking or other approved devices.

3.2.3 Mulching

3.2.3.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

3.2.3.2 Asphalt Adhesive Tackifier

Asphalt adhesive tackifier shall be sprayed at a rate between 10 to 13 gallons per 1000 square feet. Sunlight shall not be completely excluded from penetrating to the ground surface.

3.2.3.3 Asphalt Adhesive Coated Mulch

Hay or straw mulch may be spread simultaneously with asphalt adhesive applied at a rate between 10 to 13 gallons per 1000 square feet, using power mulch equipment which shall be equipped with suitable asphalt pump and nozzle. The adhesive-coated mulch shall be applied evenly over the surface. Sunlight shall not be completely excluded from penetrating to the ground surface.

3.2.4 Rolling

Immediately after seeding, firm entire area except for slopes in excess of 3 to 1 with a roller not exceeding 90 pounds for each foot of roller width.

3.2.5 Erosion Control Material

Install in accordance with manufacturer's instructions, where indicated or as directed by the Construction Administrator.

3.2.6 Watering

Start watering areas seeded as required by temperature and wind conditions. Apply water at a rate sufficient to insure thorough wetting of soil to a depth of 2 inches without run off. During the germination process, seed is to be kept actively growing and not allowed to dry out.

3.3 PROTECTION OF TURF AREAS

Immediately after turfing, protect area against traffic and other use.

-- End of Section --

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SECTION 33 40 00

STORM DRAINAGE UTILITIES
02/10

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 294 (2017) Standard Specification for
Corrugated Polyethylene Pipe, 300- to
1500-mm (12- to 60-in.) Diameter

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M (2017) Standard Specification for Zinc
(Hot-Dip Galvanized) Coatings on Iron and
Steel Products

ASTM A48/A48M (2003; R 2012) Standard Specification for
Gray Iron Castings

ASTM A536 (1984; R 2014) Standard Specification for
Ductile Iron Castings

ASTM B26/B26M (2014; E 2015) Standard Specification for
Aluminum-Alloy Sand Castings

ASTM C139 (2017) Standard Specification for Concrete
Masonry Units for Construction of Catch
Basins and Manholes

ASTM C1433 (2016b) Standard Specification for Precast
Reinforced Concrete Monolithic Box
Sections for Culverts, Storm Drains, and
Sewers

ASTM C231/C231M (2017a) Standard Test Method for Air
Content of Freshly Mixed Concrete by the
Pressure Method

ASTM C270 (2014a) Standard Specification for Mortar
for Unit Masonry

ASTM C425 (2004; R 2013) Standard Specification for
Compression Joints for Vitriified Clay Pipe
and Fittings

ASTM C443 (2012; R 2017) Standard Specification for
Joints for Concrete Pipe and Manholes,

Using Rubber Gaskets

ASTM C478	(2018) Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
ASTM C76	(2018) Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C877	(2008) External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections
ASTM C923	(2008; R 2013; E 2016) Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM C990	(2009; R 2014) Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM D1056	(2014) Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D1171	(2016; E 2016) Standard Test Method for Rubber Deterioration - Surface Ozone Cracking Outdoors (Triangular Specimens)
ASTM D1557	(2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³) (2700 kN-m/m ³)
ASTM D1751	(2004; E 2013; R 2013) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D1752	(2004a; R 2013) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion
ASTM D1784	(2011) Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D2167	(2015) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2321	(2018) Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D3212	(2007; R 2013) Standard Specification for

Joints for Drain and Sewer Plastic Pipes
Using Flexible Elastomeric Seals

ASTM D3350	(2012) Polyethylene Plastics Pipe and Fittings Materials
ASTM D6938	(2017a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM F679	(2016) Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F714	(2013) Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
ASTM F949	(2015) Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-04 Samples

Pipe for Culverts and Storm Drains

SD-07 Certificates

Resin Certification

Oil Resistant Gasket

Leakage Test

Hydrostatic Test on Watertight Joints

Determination of Density

Frame and Cover for Gratings

Post-Installation Inspection Report

SD-08 Manufacturer's Instructions

Placing Pipe

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to Site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. Keep a copy of the manufacturer's instructions available at the construction site at all times and follow these instructions unless directed otherwise by the Construction Administrator. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install plastic pipe shall be stored in accordance with the manufacturer's recommendations and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

1.3.2 Handling

Materials shall be handled in a manner that ensures delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Concrete Pipe

Manufactured in accordance with and conforming to ASTM C76, Class III.

2.1.2 Poly Vinyl Chloride (PVC) Pipe

Submit the pipe manufacturer's resin certification, indicating the cell classification of PVC used to manufacture the pipe, prior to installation of the pipe.

2.1.2.1 Smooth Wall PVC Pipe

ASTM F679 produced from PVC certified by the Manufacturer as meeting the requirements of ASTM D1784, minimum cell class 12454-B.

2.1.2.2 Corrugated PVC Pipe

ASTM F949 produced from PVC certified by the Manufacturer as meeting the requirements of ASTM D1784, minimum cell class 12454-B.

2.1.3 Polyethylene (PE) Pipe

Submit the pipe manufacturer's resin certification, indicating the cell classification of PE used to manufacture the pipe, prior to installation of the pipe. The minimum cell classification for polyethylene plastic shall apply to each of the seven primary properties of the cell classification limits in accordance with ASTM D3350.

2.1.3.1 Smooth Wall PE Pipe

ASTM F714, maximum DR of 21 for pipes 3 to 24 inches in diameter and maximum DR of 26 for pipes 26 to 48 inches in diameter. Pipe shall be produced from PE certified by the resin producer as meeting the requirements of ASTM D3350, minimum cell class 335434C.

2.1.3.2 Corrugated PE Pipe

For underground infiltration basins only. AASHTO M 294, Type S. For slow crack growth resistance, acceptance of resins shall be determined by using the notched constant ligament-stress (NCLS) test meeting the requirements of AASHTO M 294. Pipe walls shall have the following properties:

Nominal Size (inch))	Minimum Wall Area (square in/ft)	Minimum Moment of Inertia of Wall Section (in. to the 4th/in.)
12	1.5	0.024
15	1.91	0.053
18	2.34	0.062
24	3.14	0.116
30	3.92	0.163
36	4.50	0.222
42	4.69	0.543
48	5.15	0.543
54	5.67	0.800
60	6.45	0.800

2.2 PERFORATED PIPING

2.2.1 Corrugated PE Pipe

AASHTO M 294, Type S. Soil Tight.

2.3 DRAINAGE STRUCTURES

2.3.1 Precast Reinforced Concrete Box

Manufactured in accordance with and conforming to ASTM C1433.

2.4 MISCELLANEOUS MATERIALS

2.4.1 Concrete

Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements for 4000 psi concrete under Section 03 30 00

CAST-IN-PLACE CONCRETE. The concrete mixture shall have air content by volume of concrete, based on measurements made immediately after discharge from the mixer, of 5 to 7 percent when maximum size of coarse aggregate exceeds 1-1/2 inches. Air content shall be determined in accordance with ASTM C231/C231M. The concrete covering over steel reinforcing shall not be less than 1 inch thick for covers and not less than 1-1/2 inches thick for walls and flooring. Concrete covering deposited directly against the ground shall have a thickness of at least 3 inches between steel and ground. Expansion-joint filler material shall conform to ASTM D1751, or ASTM D1752, or shall be resin-impregnated fiberboard conforming to the physical requirements of ASTM D1752.

2.4.2 Mortar

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C270, Type M, except that the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar but in no case shall exceed 5-1/2 gallons of water per sack of cement. Water shall be clean and free of harmful acids, alkalis, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

2.4.3 Precast Concrete Segmental Blocks

Precast concrete segmental block shall conform to ASTM C139, not more than 8 inches thick, not less than 8 inches long, and of such shape that joints can be sealed effectively and bonded with cement mortar.

2.4.4 Precast Reinforced Concrete Manholes

Conform to ASTM C478. Joints between precast concrete risers and tops shall be made with flexible watertight, rubber-type gaskets meeting the requirements of Paragraph "Joints".

2.4.5 Frame and Cover for Gratings

Submit certification on the ability of frame and cover or gratings to carry the imposed live load. Frame and cover for gratings shall be cast gray iron, ASTM A48/A48M, Class 35B; cast ductile iron, ASTM A536, Grade 65-45-12; or cast aluminum, ASTM B26/B26M, Alloy 356.O-T6. Weight, shape, size, and waterway openings for grates and curb inlets shall be as indicated on the plans. The word "Storm Sewer" shall be stamped or cast into covers so that it is plainly visible.

2.4.6 Joints

2.4.6.1 Flexible Watertight Joints

- a. Flexible watertight joints shall be made with plastic or rubber-type gaskets for concrete pipe. The design of joints and the physical requirements for preformed flexible joint sealants shall conform to ASTM C990, and rubber-type gaskets shall conform to ASTM C443. Factory-fabricated resilient joint materials shall conform to ASTM C425. Gaskets shall have not more than one factory-fabricated splice, except that two factory-fabricated splices of the rubber-type gasket are

permitted if the nominal diameter of the pipe being gasketed exceeds 54 inches.

- b. Rubber gaskets shall comply with the oil resistant gasket requirements of ASTM C443. Certified copies of test results shall be delivered to the Construction Administrator before gaskets or jointing materials are installed. Alternate types of watertight joint may be furnished, if specifically approved.

2.4.6.2 External Sealing Bands

Requirements for external sealing bands shall conform to ASTM C877.

2.4.6.3 Flexible Watertight, Gasketed Joints

- a. Gaskets: When infiltration or exfiltration is a concern for pipe lines, the couplings may be required to have gaskets. The closed-cell expanded rubber gaskets shall be a continuous band approximately 7 inches wide and approximately 3/8 inch thick, meeting the requirements of ASTM D1056, Type 2, and shall have a quality retention rating of not less than 70 percent when tested for weather resistance by ozone chamber exposure, Method B of ASTM D1171. Rubber O-ring gaskets shall be 13/16 inch in diameter for pipe diameters of 36 inches or smaller and 7/8 inch in diameter for larger pipe having 1/2 inch deep end corrugation. Rubber O-ring gaskets shall be 1-3/8 inches in diameter for pipe having 1 inch deep end corrugations. O-rings shall meet the requirements of ASTM C990 or ASTM C443. Preformed flexible joint sealants shall conform to ASTM C990, Type B.
- b. Connecting Bands: Connecting bands shall be of the type, size, and sheet thickness of band, and the size of angles, bolts, rods and lugs as indicated or where not indicated as specified in the applicable standards or Specifications for the pipe. Exterior rivet heads in the longitudinal seam under the connecting band shall be countersunk or the rivets shall be omitted and the seam welded. Watertight joints shall be tested and shall meet the test requirements of Paragraph "Hydrostatic Test on Watertight Joints".

2.4.6.4 PVC Plastic Pipes

Joints shall be solvent cement or elastomeric gasket type in accordance with the Specification for the pipe and as recommended by the pipe manufacturer.

2.4.6.5 Smooth Wall PE Plastic Pipe

Pipe shall be joined using butt fusion method as recommended by the pipe manufacturer.

2.4.6.6 Corrugated PE Plastic Pipe

Pipe joints shall be soil tight and shall conform to the requirements in AASHTO M 294.

2.5 STEEL LADDER

Steel ladder shall be provided where the depth of the storm drainage structure exceeds 12 feet. These ladders shall be not less than 16 inches in width, with 3/4 inch diameter rungs spaced 12 inches apart. The two

stringers shall be a minimum 3/8 inch thick and 2-1/2 inches wide. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A123/A123M.

2.6 RESILIENT CONNECTORS

Flexible, watertight connectors used for connecting pipe to manholes and inlets shall conform to ASTM C923.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

Excavation of trenches, and for appurtenances and backfilling for culverts and storm drains, shall be in accordance with the applicable portions of Section 31 00 00 EARTHWORK and the requirements specified below.

3.1.1 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 12 inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheet piling and bracing, where required, shall be placed within the trench width as specified, without any overexcavation. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures will be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

3.1.2 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Construction Administrator, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in Paragraph "Backfilling". When removal of unstable material is due to the fault or neglect of the Contractor while performing shoring and sheet piling, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the Government.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

3.2.1 Concrete Pipe Requirements

When no bedding class is specified or detailed on the Drawings, concrete pipe shall be bedded in granular material minimum 4 inch in depth in trenches with soil foundation. Depth of granular bedding in trenches with rock foundation shall be 1/2 inch in depth per foot of depth of fill, minimum depth of bedding shall be 8 inch up to maximum depth of 24 inches. The middle third of the granular bedding shall be loosely placed. Bell holes and depressions for joints shall be removed and formed so entire barrel of pipe is uniformly supported. The bell hole and depressions for the joints shall be not more than the length, depth, and width required for properly making the particular type of joint.

3.2.2 Plastic Pipe

Bedding for PVC and PE pipe shall meet the requirements of ASTM D2321. Use Class IB or II material for bedding, haunching, and initial backfill. Use Class I, II, or III material for PP pipe bedding, haunching, and initial backfill. For underground infiltration basin, use material recommended by manufacturer and approved by Construction Administrator.

3.3 PLACING PIPE

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Plastic pipe, excluding SRPE pipe shall be protected from exposure to direct sunlight prior to laying, if necessary to maintain adequate pipe stiffness and meet installation deflection requirements. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Lifting lugs in vertically elongated pipe shall be placed in the same vertical plane as the major axis of the pipe. Pipe shall not be laid in water, and pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. Deflection of installed flexible pipe shall not exceed the following limits:

TYPE OF PIPE	MAXIMUM ALLOWABLE DEFLECTION (percent)
Plastic (PVC and PE)	5

Note post installation requirements of Paragraph "Deflection Testing" in PART 3 of this Specification for all pipe products including deflection testing requirements for flexible pipe.

3.3.1 Concrete and PVC Pipe

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.3.2 PE

Laying shall be with the separate sections joined firmly on a bed shaped to line and grade and shall follow manufacturer's guidelines.

3.4 JOINTING

3.4.1 Concrete Pipe

3.4.1.1 Cement-Mortar Bell-and-Spigot Joint

The first pipe shall be bedded to the established grade line, with the bell end placed upstream. The interior surface of the bell shall be thoroughly cleaned with a wet brush and the lower portion of the bell filled with mortar as required to bring inner surfaces of abutting pipes flush and even. The spigot end of each subsequent pipe shall be cleaned with a wet brush and uniformly matched into a bell so that sections are closely fitted. After each section is laid, the remainder of the joint shall be filled with mortar, and a bead shall be formed around the outside

of the joint with sufficient additional mortar. If mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint shall be wrapped or bandaged with cheesecloth to hold mortar in place.

3.4.1.2 Cement-Mortar Oakum Joint for Bell-and-Spigot Pipe

A closely twisted gasket shall be made of jute or oakum of the diameter required to support the spigot end of the pipe at the proper grade and to make the joint concentric. Joint packing shall be in one piece of sufficient length to pass around the pipe and lap at top. This gasket shall be thoroughly saturated with neat cement grout. The bell of the pipe shall be thoroughly cleaned with a wet brush, and the gasket shall be laid in the bell for the lower third of the circumference and covered with mortar. The spigot of the pipe shall be thoroughly cleaned with a wet brush, inserted in the bell, and carefully driven home. A small amount of mortar shall be inserted in the annular space for the upper two-thirds of the circumference. The gasket shall be lapped at the top of the pipe and driven home in the annular space with a caulking tool. The remainder of the annular space shall be filled completely with mortar and beveled at an angle of approximately 45 degrees with the outside of the bell. If mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint thus made shall be wrapped with cheesecloth. Placing of this type of joint shall be kept at least five joints behind laying operations.

3.4.1.3 Cement-Mortar Diaper Joint for Bell-and-Spigot Pipe

The pipe shall be centered so that the annular space is uniform. The annular space shall be caulked with jute or oakum. Before caulking, the inside of the bell and the outside of the spigot shall be cleaned.

- a. Diaper Bands: Diaper bands shall consist of heavy cloth fabric to hold grout in place at joints and shall be cut in lengths that extend one-eighth of the circumference of pipe above the spring line on one side of the pipe and up to the spring line on the other side of the pipe. Longitudinal edges of fabric bands shall be rolled and stitched around two pieces of wire. Width of fabric bands shall be such that after fabric has been securely stitched around both edges on wires, the wires will be uniformly spaced not less than 8 inches apart. Wires shall be cut into lengths to pass around pipe with sufficient extra length for the ends to be twisted at top of pipe to hold the band securely in place; bands shall be accurately centered around lower portion of joint.
- b. Grout: Grout shall be poured between band and pipe from the high side of band only, until grout rises to the top of band at the spring line of pipe, or as nearly so as possible, on the opposite side of pipe, to ensure a thorough sealing of joint around the portion of pipe covered by the band. Silt, slush, water, or polluted mortar grout forced up on the lower side shall be forced out by pouring, and removed.
- c. Remainder of Joint: The remaining unfilled upper portion of the joint shall be filled with mortar and a bead formed around the outside of this upper portion of the joint with a sufficient amount of additional mortar. The diaper shall be left in place. Placing of this type of joint shall be kept at least five joints behind actual laying of pipe. No backfilling around joints shall be done until joints have been fully inspected and approved.

3.4.1.4 Cement-Mortar Tongue-and-Groove Joint

The first pipe shall be bedded carefully to the established grade line with the groove upstream. A shallow excavation shall be made underneath the pipe at the joint and filled with mortar to provide a bed for the pipe. The grooved end of the first pipe shall be thoroughly cleaned with a wet brush, and a layer of soft mortar applied to the lower half of the groove. The tongue of the second pipe shall be cleaned with a wet brush; while in horizontal position, a layer of soft mortar shall be applied to the upper half of the tongue. The tongue end of the second pipe shall be inserted in the grooved end of the first pipe until mortar is squeezed out on interior and exterior surfaces. Sufficient mortar shall be used to fill the joint completely and to form a bead on the outside.

3.4.1.5 Cement-Mortar Diaper Joint for Tongue-and-Groove Pipe

The joint shall be of the type described for cement-mortar tongue-and-groove joint in this paragraph, except that the shallow excavation directly beneath the joint shall not be filled with mortar until after a gauze or cheesecloth band dipped in cement mortar has been wrapped around the outside of the joint. The cement-mortar bead at the joint shall be at least 1/2 inch, thick and the width of the diaper band shall be at least 8 inches. The diaper shall be left in place. Placing of this type of joint shall be kept at least five joints behind the actual laying of the pipe. Backfilling around the joints shall not be done until the joints have been fully inspected and approved.

3.4.1.6 Plastic Sealing Compound Joints for Tongue-and-Grooved Pipe

Sealing compounds shall follow the recommendation of the particular manufacturer in regard to special installation requirements. Surfaces to receive lubricants, primers, or adhesives shall be dry and clean. Sealing compounds shall be affixed to the pipe not more than 3 hours prior to installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Sealing compounds shall be inspected before installation of the pipe, and any loose or improperly affixed sealing compound shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pulled together. If, while making the joint with mastic-type sealant, a slight protrusion of the material is not visible along the entire inner and outer circumference of the joint when the joint is pulled up, the pipe shall be removed and the joint remade. After the joint is made, all inner protrusions shall be cut off flush with the inner surface of the pipe. If non-mastic-type sealant material is used, the "Squeeze-Out" requirement above will be waived.

3.4.1.7 Flexible Watertight Joints

Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe,

and the joint pushed home. If, while the joint is being made the gasket becomes visibly dislocated the pipe shall be removed and the joint remade.

3.4.1.8 External Sealing Band Joint for Non-Circular Pipe

Surfaces to receive sealing bands shall be dry and clean. Bands shall be installed in accordance with manufacturer's recommendations.

3.5 DRAINAGE STRUCTURES

3.5.1 Manholes and Inlets

Construction shall be of reinforced concrete, precast reinforced concrete, precast concrete segmental blocks; complete with frames and covers or gratings; and with fixed galvanized steel ladders where indicated. Pipe studs and junction chambers of prefabricated corrugated metal manholes shall be fully bituminous-coated and paved when the connecting branch lines are so treated. Pipe connections to concrete manholes and inlets shall be made with flexible, watertight connectors.

3.6 STEEL LADDER INSTALLATION

Ladder shall be adequately anchored to the wall by means of steel inserts spaced not more than 6 feet vertically, and shall be installed to provide at least 6 inches of space between the wall and the rungs. The wall along the line of the ladder shall be vertical for its entire length.

3.7 BACKFILLING

3.7.1 Backfilling Pipe in Trenches

After the pipe has been properly bedded, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. The fill shall be thoroughly compacted under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation equal to the midpoint (spring line) of concrete pipe or has reached an elevation of at least 12 inches above the top of the pipe for flexible pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 6 inches. Tests for density shall be made as necessary to ensure conformance to the compaction requirements specified below. Where it is necessary, in the opinion of the Construction Administrator, that sheeting or portions of bracing used be left in place, the Contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.7.2 Backfilling Pipe in Fill Sections

For pipe placed in fill sections, backfill material, and the placement and compaction procedures shall be as specified below. The fill material shall be uniformly spread in layers longitudinally on both sides of the pipe, not exceeding 6 inches in compacted depth, and shall be compacted by rolling parallel with pipe or by mechanical tamping or ramming. Prior to commencing normal filling operations, the crown width of the fill at a height of 12 inches above the top of the pipe shall extend a distance of

not less than twice the outside pipe diameter on each side of the pipe or 12 feet, whichever is less. After the backfill has reached at least 12 inches above the top of the pipe, the remainder of the fill shall be placed and thoroughly compacted in layers not exceeding 6 inches. Use select granular material for this entire region of backfill for flexible pipe installations.

3.7.3 Movement of Construction Machinery

When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

3.7.4 Compaction

3.7.4.1 General Requirements

Cohesionless materials include gravels, gravel-sand mixtures, sands, and gravelly sands. Cohesive materials include clayey and silty gravels, gravel-silt mixtures, clayey and silty sands, sand-clay mixtures, clays, silts, and very fine sands. When results of compaction tests for moisture-density relations are recorded on graphs, cohesionless soils will show straight lines or reverse-shaped moisture-density curves, and cohesive soils will show normal moisture-density curves.

3.7.4.2 Minimum Density

Backfill over and around the pipe and backfill around and adjacent to drainage structures shall be compacted at the approved moisture content to the following applicable minimum density, which will be determined as specified below.

- a. Under airfield and heliport pavements, paved roads, streets, parking areas, and similar-use pavements including adjacent shoulder areas, the density shall be not less than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material, up to the elevation where requirements for pavement subgrade materials and compaction shall control.
- b. Under unpaved or turfed traffic areas, density shall not be less than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material.
- c. Under non-traffic areas, density shall be not less than that of the surrounding material.

3.8 FIELD QUALITY CONTROL

3.8.1 Tests

Testing is the responsibility of the Contractor. Perform all testing and retesting at no additional cost to the Government.

3.8.1.1 HYDROSTATIC TEST ON WATERTIGHT JOINTS

Watertight joints shall be tested and shall meet test requirements of Paragraph "Hydrostatic Test on Watertight Joints". Rubber gaskets shall

comply with the oil resistant gasket requirements of ASTM C443. Certified copies of test results shall be delivered to the Construction Administrator before gaskets or jointing materials are installed.

3.8.1.1.1 Concrete, PVC, and PE Pipe

A hydrostatic test shall be made on the watertight joint types as proposed. Only one sample joint of each type needs testing; however, if the sample joint fails because of faulty design or workmanship, an additional sample joint may be tested. During the test period, gaskets or other jointing material shall be protected from extreme temperatures which might adversely affect the performance of such materials. Performance requirements for joints in reinforced concrete pipe shall conform to ASTM C990 or ASTM C443. Test requirements for joints in PVC and PE plastic pipe shall conform to ASTM D3212.

3.8.1.2 Determination of Density

Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Tests shall be performed in sufficient number to ensure that specified density is being obtained. Laboratory tests for moisture-density relations shall be made in accordance with ASTM D1557 except that mechanical tampers may be used provided the results are correlated with those obtained with the specified hand tamper. Field density tests shall be determined in accordance with ASTM D2167 or ASTM D6938. When ASTM D6938 is used, the calibration curves shall be checked and adjusted, if necessary, using the sand cone method as described in Paragraph "Calibration" of the referenced publications. ASTM D6938 results in a wet unit weight of soil and ASTM D6938 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D6938. Test results shall be furnished the Construction Administrator. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed.

3.8.1.3 Deflection Testing

Conduct deflection test no sooner than 30 days after completion of final backfill and compaction testing. Clean or flush all lines prior to testing. Perform a deflection test on entire length of installed flexible pipeline upon completion of work adjacent to and over the pipeline, including backfilling, placement of fill, grading, paving, placement of concrete, and any other superimposed loads. Deflection of pipe in the installed pipeline under external loads shall not exceed limits in Paragraph "Placing Pipe" above as percent of the average inside diameter of pipe. Use a laser profiler or mandrel to determine if allowable deflection has been exceeded.

3.8.1.3.1 Laser Profiler

Inspect pipe interior with laser profiling equipment. Utilize low barrel distortion video equipment for pipe sizes 48 inches or less. Use a camera with suitable lighting to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally. The camera must be able to pan and tilt to a 90 degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view

or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll static or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe. For initial post installation inspections for pipe sizes larger than 48 inches, a visual inspection shall be completed of the pipe interior.

3.8.1.3.2 Mandrel

Pass the mandrel through each run of pipe by pulling it by hand. If deflection readings in excess of the allowable deflection of average inside diameter of pipe are obtained, stop and begin test from the opposite direction. The mandrel must meet the Pipe Manufacture's recommendations and the following requirements. Provide a Mandrel that is rigid, non-adjustable, has a minimum of 9 fins, pulling rings at each end, and is engraved with the nominal pipe size and mandrel outside diameter. The mandrel must be 5 percent less than the certified-actual pipe diameter for Plastic Pipe, 5 percent less than the certified-actual pipe diameter for Corrugated Steel and Aluminum, 3 percent less than the certified-actual pipe diameter for Concrete-Lined Corrugated Steel and Ductile Iron Culvert. The Government will verify the outside diameter(OD)of the Contractor provided mandrel through the use of Contractor provided proving rings.

3.8.2 Inspection

3.8.2.1 Post-Installation Inspection

Visually inspect each segment of concrete pipe for alignment, settlement, joint separations, soil migration through the joint, cracks, buckling, bulging and deflection. An engineer must evaluate all defects to determine if any remediation or repair is required.

3.8.2.1.1 Concrete

Cracks with a width greater than 0.01 inches. An engineer must evaluate all pipes with cracks with a width greater than 0.01 inches but less than 0.10 inches to determine if any remediation or repair is required.

3.8.2.1.2 Flexible Pipe

Check each flexible pipe (PE and PVC) for rips, tears, joint separations, soil migration through the joint, cracks, localized bucking, bulges, settlement, and alignment.

3.8.2.1.3 Post-Installation Inspection Report

The deflection results and final post installation inspection report must include: A copy of all video taken, pipe location identification, equipment used for inspection, inspector name, deviation from design, grade, deviation from line, deflection and deformation of flexible pipe, inspector notes, condition of joints, condition of pipe wall (e.g., distress, cracking, wall damage dents, bulges, creases, tears, holes, etc.).

3.8.3 Repair Of Defects

3.8.3.1 Leakage Test

When leakage exceeds the maximum amount specified, correct source of excess leakage by replacing damaged pipe and gaskets and retest.

3.8.3.2 Deflection Testing

When deflection readings are in excess of the allowable deflection of average inside diameter of pipe are obtained, remove pipe which has excessive deflection and replace with new pipe. Retest 30 days after completing backfill, leakage testing, and compaction testing.

3.8.3.3 Inspection

Replace pipe or repair defects indicated in the Post-Installation Inspection Report.

3.8.3.3.1 Concrete

Replace pipes having cracks with a width greater than 0.1 inches.

3.8.3.3.2 Flexible Pipe

Replace pipes having cracks or splits.

3.9 PROTECTION

Protect storm drainage piping and adjacent areas from superimposed and external loads during construction.

3.10 WARRANTY PERIOD

Pipe segments found to have defects during the warranty period must be replaced with new pipe and retested.

-- End of Section --