UCONN

PROCUREMENT SERVICES

CAPITAL PROJECTS AND
CONTRACT ADMINISTRATION

PROJECT MANUAL

FOR

HIGH HEAD GENERATOR REPLACEMENT

UNIVERSITY OF CONNECTICUT

STORRS CAMPUS
Storrs, Connecticut

PROJECT NUMBER: LL170420

September 7, 2018

ARCHITECT/ENGINEER OF RECORD:
DTC, INC.

UNIVERSITY OF CONNECTICUT
HIGH HEAD GENERATOR REPLACEMENT
PROJECT NUMBER: LL170420

The following Bid Documents and all Bid Clarifications are to be obtained by accessing the following web link and clicking on the Project Number: LL170420
http://cpca.uconn.edu/construction-current-opportunities-open-bids/

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INVITATION TO BID

September 7, 2018

DUE DATE: **October 2, 2018**
TIME: **2:00 p.m.**
LOCATION: **University of Connecticut**
Capital Projects & Contract Administration
3 Discovery Drive, Unit 6076
Storrs, CT 06269
Attn: Cesar Alonzo

The University of Connecticut is accepting sealed bids for:

UNIVERSITY OF CONNECTICUT
HIGH HEAD GENERATOR REPLACEMENT
PROJECT NUMBER: LL170420

Bids must be submitted on the forms supplied and in the manner specified within the Bid Documents. This invitation is **Open Only to Previously Prequalified General Contractors.**

PROJECT DESCRIPTION:

Remove and proper disposal of the existing indoor 375KW generator system, including 1000 gallon below ground diesel fuel tank, all ATS's, panels, wiring, and accessories. Furnish and install a new pad-mounted outdoor 750KW diesel generator with sub-base fuel tank and full tank of fuel, ATS's, panels, wiring, and accessories. Existing Square D Switchboard modification(s) at the Tower Loop Pump Station. New service upgrade at the High Head Pump Station, including new pad-mounted transformer, pad, grounding, service entrance panelboard, sub-panels and wiring. Furnish and install active harmonic filters at each pump stations. Contractor to provide portable generator rentals and fuel to perform shutdowns and switchovers until project is complete per contract documents. Contractor to provide all trenching, backfill, re-paving, cutting, patching, and firestopping as required for a complete project.

Planned Construction Start May 2019 with a project duration of 6 months after NTP is issued.

PRE-BID CONFERENCE:

There will be a job-site walkthrough on **Thursday, September 13, 2018 at 1:00 PM.** This walkthrough is ***not mandatory***; however, interested bidders are ***strongly encouraged*** to attend to view existing conditions. Meet at the **Purchasing Conference Room, 3 Discovery Drive, 6076, Storrs, Connecticut.** The Pre-Bid Conference will commence promptly at the time noted herein. There are limited short-term visitor parking spaces around the Purchasing Building. The North Parking Garage is recommended to all vendors as parking on campus is at your own risk.

REQUEST FOR INFORMATION PROCEDURE:

All Requests for Information ("RFI") must be received in writing no later than **2:00PM on Thursday, September 20, 2018** and emailed to cesar.alonzo@uconn.edu using the RFI form included within the bid documents. Include in the subject line: RFI – High Head Generator Replacement, Project #LL170420. **Questions received verbally will not be answered.** All answers will be published by written Bid Clarification. Extensions of RFI deadlines may only be revised via written Bid Clarification. It is the

responsibility of all bidders to verify that they are current with all Bid Clarifications issued prior to bid submission.

Bids will be accepted at the Office of Capital Projects and Contract Administration, 3 Discovery Drive, Storrs, CT 06269 until 2:00 P.M. local time on Tuesday, October 2, 2018 at which time they will be publicly opened and read.

The Bid shall be accompanied by a Bid Bond in the amount of ten percent (10%) of the amount bid. All bonds required for this Project shall be acceptable to the University and, as a minimum, issued through a bonding company licensed to transact such business in the State of Connecticut and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the "Treasury Department Circular 570".

The successful Contractor shall be required to provide a Labor and Material Payment Bond and a Performance Bond for one hundred percent (100%) of the Contract price.

The "Set-Aside" for this project is that (1) not less than thirty (30%) of the total Contract Price be awarded to subcontractors who are certified by the Connecticut Department of Administrative Services as "Small Business Enterprises" ("SBEs") and (2) not less than ten (10%) of the total Contract Price be awarded to subcontractors who are certified by the Connecticut Department of Administrative Services as "Minority Business Enterprises" ("MBEs") (the 10% set aside for MBEs may be included in the 30% set aside for SBEs). The general contractors are responsible for ensuring that they and the SBEs they have selected are eligible contractors, and that they meet State requirements.

The University of Connecticut is committed to increasing participation and enrollment of Small and Minority Businesses (S/MBE's) on our contracts. It is expected that those contracting with us will give thoughtful consideration both to the approach they use in their selection of the eligible Connecticut-certified S/MBE's that they will utilize and in the maximizing of contracting and work opportunities for S/MBE's. To ensure that you are exploring all possible ways to be inclusive, included below is a sample of specific possibilities for breakout of the schedule of values. We appreciate your partnering with us to ensure that S/MBE's are given an opportunity to work, contribute and grow their businesses on University projects.

Specific possibilities for Inclusion of S/MBE's in the Schedule of Values
*Bold indicates suggested categories (if applicable)

01 – General Conditions	**Summary, Allowances, Prices, Etc.** **Controls, Documentation, Etc.**
02 – Existing Conditions	**Asbestos Abatement**
03 – Concrete	**Cast-in-Place Concrete**
05 - Metals	**Structural Steel Framing** **Slotted Channel Framing**
07 – Thermal & Moisture Protection	**Self-Adhering Sheet Waterproofing**
10 – Specialties	**Signage**
22 – Plumbing	**Ball Valves** **Hangers and Supports** **Identification**

	Plumbing Piping Insulation **Facility Water Distribution Piping** **Domestic Water Piping** **Domestic Water Piping Specialties** **Sanitary Waste and Vent Piping** **Sump Pumps**
23 – HVAC (Heating, Ventilating, Air Conditioning)	**Expansion fittings** **Gages** **General-duty Valves** **Hangers and Supports** **Vibration Controls** **Insulation** **Instrumentation and Control** **Underground Steam Piping** **Steam and Condensate Piping Specialties** **Condensate Pumps** **Metal Ducts** **HVAC Power Ventilators**
26 – Electrical	**Low Voltage Cabling** **Grounding and Bonding** **Hangers and Supports** **Raceways and Boxes** **Underground Ducts** **Sleeves and sleeve seals** **Identification** **Enclosed Switches**
31 – Earthwork	**Site Clearing** **Earth Moving** **Sedimentation and Erosion Control**
32 – Exterior Improvements	**Asphalt Paving** **Concrete Paving** **Granite Curbing** **Concrete Paving Joint Sealants** **Turfs and Grasses**

The University reserves the right to reject any or all Bids, in whole or in part, to award any item, group of items, or total Bid, and to waive any informality or technical defects, if it is deemed to be in the best interests of the University.

No Bidder may withdraw its Bid within ninety (90) days of the date of the Bid opening. Should there be reasons why the Contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the University and the Bidder.

Cesar Alonzo
University Business Services
Capital Projects and Facilities Procurement

High Head Generator System

Project #LL170420

Prequalified Contractors

1	**All State Construction Inc.** Farmington, CT
2	**L. Holzner Electric Company** Bridgeport, CT

INSTRUCTIONS TO PREQUALIFIED BIDDERS

ARTICLE 1 GENERAL PROVISIONS

1.1 Connecticut Sales and Use Tax

1.1.1 The University of Connecticut is a tax-exempt institution. The Contractor shall be familiar with the current regulations of the Department of Revenue Service. The tax on materials or supplies exempted by such regulations shall not be included as part of the Bid. A Sales Tax Certificate is available from the Purchasing Department upon written request.

1.2 Contractor's Qualifications

In the Pre-Qualification to Bid Documents for this project, the University has reserved the right to request additional information from prospective Bidders beyond what may have been submitted in any Application and Statement of Qualifications in response to the Invitation to Pre-Qualify. The University has also reserved the right to find any Bidder to be non-responsible with respect to a specific project notwithstanding the fact that the Bidder may have previously been pre-qualified pursuant to the pre-qualification process. The University reaffirms these reservations of rights. In finding that a Bidder is non-responsible, the University may rely upon any information obtained prior to or subsequent to a finding that Bidder is pre-qualified.

1.2.1 CGS 4b-91 Requires each bid submitted shall include a copy of a prequalification certificate issued by the Commissioner of Administrative Services. The bid shall also be accompanied by an update bid statement in such form as the Commissioner of Administrative Services prescribes. The form for such update bid 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 as determined by the provisions of subdivision (6) of subsection (c) of section 4a-100 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 bid statement shall be invalid and considered non-responsible.

1.3 Academic Schedule

1.3.1 It is important to the University, in order to maintain the integrity of its ongoing academic activities, that its rules and regulations and the requirements of the Contract Documents, regarding noise control, traffic control etc. and other matters which may affect its operations be strictly adhered to, and that its academic schedule be maintained. Therefore, all Bidders shall familiarize themselves with and comply with the academic schedule of the University, and its regulations regarding noise, traffic, etc. which are available from Architectural and Engineering Services. No noise generating work shall be allowed during exam periods where the noise will impact classroom functions. Examples of noise generating work include, but are not limited to, sawing, drilling, and hammering/jackhammering. The Contractor shall keep the

University Representative informed as to the location of its operations to enable necessary precautions or co-ordination to be implemented.

1.4 Non-Discrimination and Affirmative Action Provisions

1.4.1 Non-discrimination. References in this section to "Contract" shall mean the execution of AIA 101 or Purchase Order Contract; and references to "Contractor" shall mean the person or entity who will be solely responsible for execution of the work.

(a) The following subsections are set forth here as required by section 4a-60 of the Connecticut General Statutes:

(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.

(b) If the Contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works project.

(c) "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.

(d) 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.

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

(f) 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.

(g) The following subsections are set forth here as required by section 4a-60a of the Connecticut General Statutes:

(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.

(h) The Contractor shall include the provisions of section (g) 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.

(i) For the purposes of this entire Non-Discrimination section, “Contract” or "contract" includes any extension or modification of the Contract or contract, “Contractor” or "contractor" includes any successors or assigns of the Contractor or 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).

1.5 Union Labor

1.5.1 Attention is called to the fact that there may be construction work now being carried on at the site at which this construction is contemplated being done by UNION LABOR. This fact must be kept in mind by all Bidders submitting proposals for this work.

1.6 Labor Market Area

1.6.1 All Bidders shall have read Sections 31-52 and 31-52a of the Connecticut General Statutes, as amended. These references relate to the preference of State citizens, 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.

1.7 Wage Rates

1.7.1 If this project involves new construction of a building or other structure or improvement, and the total cost of all Work to be performed by Contractors and Subcontractors is $400,000.00 or more, or if the project involves remodeling, refurbishing, rehabilitation, alteration or repair of a building or other structure or improvement, and such total cost is $100,000.00 or more, then:

.1 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 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 payday.

1.7.2 The State of Connecticut Labor Department Wage Rate Schedule, when required by the University, shall be provided with these documents or will be issued as part of the bid documents or by Bid Clarification/Addendum hereto and is deemed to reflect such customary

or prevailing wages for this project, and is hereby incorporated and made a part of the Contract Documents.

1.7.3 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".

1.7.4 Wage Rates will be posted each July 1st on the Department of Labor Website: www.ctdol.state.ct.us. Such prevailing wage adjustment will not be considered a matter for an annual contract amendment.

1.7.5 Wage rates shall be paid pursuant to Section 31-53 and 31-54 of the Connecticut General Statutes, and any regulations issued hereunder.

1.7.6 **Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions.** (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has 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, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268. (b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance.

ARTICLE 2 BIDDERS' REPRESENTATIONS

2.1 The amount of each Bid shall be deemed to include the entire cost and expense of every item of labor, material and overhead necessary to complete the work bid upon, as specified, in full detail ready for use. The risk of all such costs and expenses shall be deemed assumed by the successful Bidder. The University shall assign a University Representative to work with the successful Contractor as a liaison.

2.2 In performing its obligations under this Contract, the Contractor agrees to comply with all applicable states, laws, ordinances, regulations, codes, rules or orders of, or issued by, any governmental body having jurisdiction over the work, location of the work or contract.

ARTICLE 3 BIDDING DOCUMENTS

3.1 Bid Clarifications, Addenda and Interpretations

3.1.1 No interpretations of the meaning of the Drawings, specifications or other Contract Documents will be made orally to any Bidder. Every request for such interpretation must be made in writing to the University Office of Capital Project & Contract Administration, and to be given consideration shall be received at the specified date outlined within the invitation to bid and/or adjusted by a bid clarification/addenda.

3.1.2 Any and all such interpretations and any supplemental instructions will be in the form of written bid clarification/addenda which, if issued, will be posted on the University's Capital Projects and Contract Administration's Department website; www.cpca.uconn.edu. for all prospective Bidders to access or for those without access to a computer you can obtain them through Joseph Merritt, no later than five (5) days prior to the date fixed for the opening of Bids. Failure of any Bidder to receive any such addendum or interpretation shall not release any Bidder from any obligations under his Bid as submitted, provided notice has been sent to the address furnished by such prospective Bidder for the transmittal of notices, addenda and interpretations. It shall be the Bidder's responsibility to make inquiry as to, and to obtain, the Addenda issued, if any.

3.1.3 The number of days shown in 3.1.1 and 3.1.2 may differ from the actual dates given in an Agenda for a Pre-Bid or Pre-Proposal Conference, if so, the number of days listed are, hereby, superseded by the Agenda dates, unless the Bid or Proposal is extended by Addendum, in which case the number of days will again apply unless stated differently in the Addendum.

3.1.4 Bidders shall promptly notify the University of any ambiguity, inconsistency or error which they may discover upon examination of these Contract Documents.

ARTICLE 4 BIDDING PROCEDURES

4.1 Requests for Information

4.1.1 Enclosed with this Invitation to Submit Proposals Manual is a Request for Information Form (RFI). All questions/clarifications must be submitted in writing on this form and before the prescribed RFI Deadline. No verbal questions will be answered. All answers to RFI's will be issued in a Bid Clarification/Addenda. Form is at the end of this document.

4.2 Form of Proposal

4.2.1 Enclosed with this Invitation to Submit Proposals Manual is a Form of Proposal. Bids shall be submitted on a copy of this form. Additional instructions to bidders including information on submission of bids and award and Contract appear on this form. All documents required by these Bid Documents must be returned with your Bid.

4.3 Bids and Rejection of Bids

4.3.1 General Bids shall be for the complete work as specified and shall include the names of any Subcontractors for the classes of work specified in the Form of Proposal, and for each other class of work for which the University has required a separate section and the dollar amounts of their subcontracts, and the General Contractor shall be selected on the basis of such general Bids. It shall be presumed that the general 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 general Bidder's qualifications for performing such work shall be subject to review by the University pursuant to the Bid and the Contract Documents.

4.3.2 Bids shall be submitted only on the forms furnished for the specific project, which shall include a completed Form of Proposal containing all information required on the Proposal form, executed with an original signature by a duly authorized officer or representative of the Bidder, and, in the case of a Joint Venture, by duly authorized representatives of each Joint Venture. In no event will Bids or changes in Bids made by telephone, email or fax be considered. Any Form of Proposal omitting or adding items, altering the form, containing conditional or alternative Bids, or without the original signature of the Bidder or its authorized representative, may be rejected.

4.3.3 Any Bids received after the scheduled closing time for the receipt of Bids will be returned to the Bidders unopened.

4.3.4 Any Bid once deposited with the University of Connecticut may only be withdrawn by letter of request, signed by the depositing Bidder and presented to the Office of Capital Project and Contract Administration, prior to the time of opening of any Bid for the project designated or identified project.

4.4 Bid Security

4.4.1 Each Bid must be accompanied by a certified check payable to the order of the University of Connecticut, or the Bid may be accompanied by a Bid Bond in the form required by the University, having as surety thereto such surety company or companies acceptable to the University and as are authorized to do business in this State, for an amount not less than 10 per cent of the Bid. All checks submitted by unsuccessful Bidders shall be returned to them after the Contract has been awarded. Bid Security is not required for projects under $50,000.00.

4.4.2 Failure of the successful Bidder to file the required Performance and Labor & Material bonds shall be just cause for the amount of the security deposited with the Bid to be forfeited, any part of the whole of which may be used to make up the difference between the Bid of the defaulting Bidder and the Bid of the next lowest responsible qualified Bidder to whom the work is finally awarded. Failure to execute a contract after award as specified and Bid shall also result in the forfeiture of such Bid Bonds or Certified Check.

4.5 Subcontractors

4.5.1 The Contractor shall not contract with a person or entity who appears on the State of Connecticut Debarment List, the Federal Davis Bacon Act Debarment List, both of which are available through: **http://ctdol.state.ct.us** or the Federal List of Excluded Parties Listing System available through: **http://epls.arnet.gov**

4.5.2 The Bidder shall furnish, with his submitted Bid, as is set forth in the Proposal Form, in the space provided for such purpose, the names and prices of responsible and qualified Subcontractors who are actually to perform the following categories of work under the Base Bid, if their prices exceed $25,000.00:

.1 Masonry
.2 Electrical
.3 Mechanical other than HVAC
.4 HVAC
.5 Any other class of work identified in the Proposal Form for which a blank space has been provided.

4.5.3 The Bidder further agrees that each of the Subcontractors listed on the Proposal Form will be used for the work indicated at the amount stated unless a substitution is permitted by the University.

4.5.4 The Bidder further agrees and warrants that he has 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 his employment practices and procedures as they relate to the provisions of the general statutes governing contract requirements.

4.5.5 Pursuant to Connecticut General Statutes Section 49-41a, for every contract with the University for the construction, alteration or repair of any building or work, (1) the Contractor, within 30 days after payment to the Contractor by the University, shall be required to 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 University; (2) the 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 30 days after each Subcontractor receives a payment from the Contractor which encompasses labor or materials furnished by such Subcontractor.

4.5.6 Within five days after being notified of the award of a general Contract by the University, or, in the case of an approval of a substitute Subcontractor by the University, 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 Section 4b-96 of the Connecticut General Statutes and must be executed with all of your named subcontractors in your form of proposal.

.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 University. When seeking approval for a substitute Subcontractor, the general Bidder shall provide the University 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 University

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 University a copy of each executed subcontract within ten days, Saturdays, Sundays and legal holidays excluded, of presentation of a subcontract to such Subcontractor.

.3 In the event of any conflict or inconsistency between the University of Connecticut's Subcontract form and the Contractor's standard Subcontract form, the provisions of the University of Connecticut's Subcontract form shall prevail. Any standard Subcontract form used will be attached as a supplement to the University of Connecticut's Subcontract form.

4.6 LIQUIDATED DAMAGES

4.6.1 Liquidated Damages of **Five Hundred and 00/100 Dollars ($500.00)** per calendar day shall be assessed if the Contractor fails to achieve Substantial Completion, or causes delay to the Substantial Completion of any portion of the Work within the Contract Time.

4.7 **COMMISSION ON HUMAN RIGHTS AND OPPORTUNITIES CONTRACT COMPLIANCE REGULATIONS:**

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-81i(d) of the Connecticut General Statutes. There are Contract Compliance Regulations codified at Section-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.

4.7.1 The following BIDDER CONTRACT COMPLIANCE MONITORING REPORT must be completed in full, signed, and submitted with the bid for this contract. The contract awarding agency and the Commission on Human Rights and Opportunities will use the information contained thereon to determine the bidders compliance to Sections 4a-60 and 4a-60a CONN. GEN. STAT., and Sections 46a-68j-23 of the Regulations of Connecticut State Agencies regarding equal employment opportunity, and the bidders __good faith efforts to include minority business enterprises as subcontractors and suppliers for the work of the contract.

1) Definition of 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 ten 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.

2) Description of Job Categories (as used in Part IV Bidder Employment Information)
MANAGEMENT: Managers plan, organize, direct, and control the major functions of an organization through subordinates who are at the managerial or supervisory level. They make policy decisions and set objectives for the company or departments. They are not usually directly involved in production or providing services. Examples include top executives, public relations managers, managers of operations specialties (such as financial, human resources, or purchasing managers), and construction and engineering managers.
BUSINESS AND FINANCIAL OPERATIONS: These occupations include managers and professionals who work with the financial aspects of the business. These occupations include accountants and auditors, purchasing agents, management analysts, labor relations specialists, and budget, credit, and financial analysts.
COMPUTER SPECIALISTS: Professionals responsible for the computer operations within a company are grouped in this category. Examples of job titles in this category include computer programmers, software engineers, database administrators, computer scientists, systems analysts, and computer support specialists
ARCHITECTURE AND ENGINEERING: Occupations related to architecture, surveying, engineering, and drafting are included in this category. Some of the job titles in this category include electrical and electronic engineers, surveyors, architects, drafters, mechanical engineers, materials engineers, mapping technicians, and civil engineers.
OFFICE AND ADMINISTRATIVE SUPPORT: All clerical-type work is included in this category. These jobs involve the preparing, transcribing, and preserving of written communications and records; collecting accounts; gathering and distributing information; operating office machines and electronic data processing equipment; and distributing mail. Job titles listed in this

category include telephone operators, payroll clerks, bill and account collectors, customer service representatives, files clerks, dispatchers, shipping clerks, secretaries and administrative assistants, computer operators, mail clerks, and stock clerks.

BUILDING AND GROUNDS CLEANING AND MAINTENANCE:
This category includes occupations involving landscaping, housekeeping, and janitorial services. Job titles found in this category include supervisors of landscaping or housekeeping, janitors, maids, grounds maintenance workers, and pest control workers.

CONSTRUCTION AND EXTRACTION: This category includes construction trades and related occupations. Job titles found in this category include boilermakers, masons (all types), carpenters, construction laborers, electricians, plumbers (and related trades), roofers, sheet metal workers, elevator installers, hazardous materials removal workers, paperhangers, and painters. Paving, surfacing, and tamping equipment operators; drywall and ceiling tile installers; and carpet, floor and tile installers and finishers are also included in this category. First line supervisors, foremen, and helpers in these trades are also grouped in this category..

INSTALLATION, MAINTENANCE AND REPAIR: Occupations involving the installation, maintenance, and repair of equipment are included in this group. Examples of job titles found here are heating, ac, and refrigeration mechanics and installers; telecommunication line installers and repairers; heavy vehicle and mobile equipment service technicians and mechanics; small engine mechanics; security and fire alarm systems installers; electric/electronic repair, industrial, utility and transportation equipment; millwrights; riggers; and manufactured building and mobile home installers. First line supervisors, foremen, and helpers for these jobs are also included in the category.

MATERIAL MOVING WORKERS: The job titles included in this group are Crane and tower operators; dredge, excavating, and lading machine operators; hoist and winch operators; industrial truck and tractor operators; cleaners of vehicles and equipment; laborers and freight, stock, and material movers, hand; machine feeders and offbearers; packers and packagers, hand; pumping station operators; refuse and recyclable material collectors; and miscellaneous material moving workers.

3) Definition of Racial and Ethnic Terms (as used in Part IV Bidder Employment Information):
White (not of Hispanic Origin)- All persons having origins in any of the original peoples of Europe, North Africa, or the Middle East.
Black (not of Hispanic Origin)- All persons having origins in any of the Black racial groups of Africa.
Hispanic- All persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.
Asian or Pacific Islander- All persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes China, India, Japan, Korea, the Philippine Islands, and Samoa.
American Indian or Alaskan Native- All persons having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition

ARTICLE 5 CONSIDERATION OF BIDS

5.1 Every general bid which is conditional or obscure, or which contains any addition not called for shall be invalid; and the University shall reject every such general Bid. The University shall be authorized to waive minor irregularities, which it considers in its best interest, provided the reasons for any such waiver are stated in writing by the University and made a part of the contract file. No such general 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 general Proposal Form furnished by the University, but this sentence shall not be applicable to any failure to furnish prices or information required by Articles 4.2.1 and 4.4.1 above to be furnished in the form provided by the University. The University also reserves the right to reject any and all bids and again advertise for bids, or to otherwise proceed as permitted under Connecticut General Statues 10a-109a through 10a-109y.

5.2 General Bids shall be publicly opened and read by the University forthwith. The University may require in the Proposal Form that the General Contractor agree to perform a stated, minimum percentage of work with his own forces. The University may also require the General Contractor to set aside a portion of the contract for Subcontractors who are eligible for set aside contracts. The University shall not permit substitution of a Subcontractor for one named in accordance with the provisions of these Instructions or substitution of a Subcontractor for any designated subtrade work bid to be performed by the General 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 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 Proposal Form; (5) inability to obtain, or loss of, a license necessary for the performance of a particular category of work; (6) failure or inability to comply with a requirement of law applicable to Contractors, Subcontractors, on construction, alteration, or repair projects; (7) failure to perform his agreement to execute a subcontract under Connecticut General Statutes Section 4b-96.

5.3 The general Bid Price shall be the price set forth in the space provided on the general Proposal Form. No general Bid shall be rejected (1) because of error in setting forth the name of a Subcontractor as long as the Subcontractors designated are clearly identifiable, or (2) because the Drawings and specifications do not accompany the Bid or are not submitted with the Bid. **FAILURE TO CORRECTLY STATE A SUBCONTRACTOR'S PRICE MAY BE CAUSE FOR REJECTION OF THE GENERAL BIDDER'S BID.**

5.4 Any General Contractor who violates any provision of Connecticut General Statutes Section 4b-95 may be disqualified from bidding on other contracts that are subject to the provisions of Chapter 60 of the General Statutes for a period not to exceed twenty-four months, commencing from the date on which the violation is discovered, for each violation.

5.5 The University reserves the right to accept or reject any or all Bids within 90 calendar days of the Bid opening, and the Bidder agrees that it may not modify, withdraw, or cancel its Bid and that its Bid Price will be firm for this 90 day period. This 90 day period may be extended by mutual agreement between the University and the Bidder.

5.6 The project will be awarded to the responsible qualified Bidder submitting the lowest Bid in compliance with the Bid requirements and within the budget, subject to the provisions of Connecticut General Statues 10a-109a through 10a-109y.

5.7 The University reserves the right to elect to implement some, all or none of the Alternates and/or Options set forth in the Proposal forms, as may be in the best interest of the University. The low Bid shall be determined by taking the Base Price set forth in the Proposal form as selected by the University, plus the Alternates and/or Options selected by the University.

5.8 The Bidder agrees that if selected as General Contractor, he shall, within ten (10) days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the University, execute a contract in accordance with the terms of the general Bid.

ARTICLE 6 POST- BID INFORMATION

6.1 Affirmative Action

6.1.1 Pursuant to Connecticut General Statutes Section 46a-68d, if this project is estimated to cost more than $50,000.00 then: In the event that the Bidder's Bid is accepted, after acceptance, but before a contract is awarded, the successful Bidder shall file and have approved by the Commission on Human Rights and Opportunities an Affirmative Action Plan. The Commission may provide for conditional acceptance of an Affirmative Action Plan provided written assurances are given by the Contractor that it will amend its plan to conform to affirmative action requirements. The University shall withhold 2% of the total Contract Price per month from any payment made to such Contractor until such time as the Contractor has developed an Affirmative Action Plan, and received the approval of the Commission. Notwithstanding the provisions of Connecticut General Statutes Section 46a-68d, a Contractor subject to the provisions of that Section may file a plan in advance of or at the same time as its Bid.

6.1.2 The University shall not enter into a contract with any Bidder or prospective Contractor unless the Bidder or prospective Contractor has satisfactorily complied with the provisions of Sections 4a-60, 32-9e, 46a-56 and 46a-68c to 46a-68f, inclusive of the Connecticut General Statutes, or submits a program for compliance acceptable to the Commission on Human Rights and Opportunities.

6.1.3 The Contractor shall designate an "Equal Opportunity Contract Compliance Officer" for the project. The Contractor designee, in addition to any other duties assigned by the Contractor, shall have the following responsibilities for the implementation of the Contractor Affirmative Action Plan (AAP) that is required for the project pursuant to Connecticut General Statutes Section's 46a-68c and 46a-68d.

.1 Maintain a project EEO file to include all records, correspondence and other documentation related to the project AAP.

.2 Communicate to and inform all project Contractors and Subcontractors, regardless of tier, and labor referral organizations (if applicable) about project equal opportunity and AAP expectations and performance requirements.

.3 Compile all on-site Contractor MONTHLY EMPLOYMENT UTILIZATION REPORTS (form CHRO cc-257) and submit a cumulative report for the project each month to report on contractor compliance to project AAP hiring goals. The cumulative report shall be submitted to the contract awarding agency and to the Commission on Human Rights and Opportunities by the 15th day following the end of each calendar month during the pendency of the on-site construction work of the project.

.4 Attach a copy of your transmittal letter to CHRO as a document to be submitted with your invoice.

.5 Compile and submit a QUARTERLY SMALL CONTRACTOR AND MINORITY BUSINESS ENTERPRISE PAYMENT STATUS REPORT (form CHRO cc-258) to report on the participation of such Contractors identified to participate on the project. The report shall be submitted to the contract awarding agency and to the Commission on Human Rights and Opportunities by the 15th day following the end of each calendar quarter during the pendency of the on-site construction work of the project.

.6 Attach a copy of your transmittal letter to CHRO as a document to be submitted with your invoice.

.7 Participate in project job meetings to inform project Contractors about project equal opportunity and AAP performance.

.8 Coordinate "External Communication" section (employment outreach) of contractor AAP for all employment opportunities resultant during the course of the project from all project Contractors and maintain documentation of all contacts and responses.

6.2 Tax Identification

6.2.1 The Contractor shall furnish to the Owner, at the time of execution of the Contract, the following information

.1 The identity and addresses of all subcontractors performing work on the project.
.2 The Connecticut tax registration numbers of the Contractor and all subcontractors.
.3 The Federal Social Security account numbers, or Federal Employer Identification numbers, or both, if applicable, for the Contractor and all subcontractors.

6.2.2 The aforementioned information shall be continuously updated by the Contractor to reflect any additions or changes to the previously identified subcontractors. Any final additions or changes to this information shall be submitted to the Owner with the Contractor's application for final payment.

6.3 Labor Rates

6.3.1 The Contractor shall provide labor rates for trade labor work self-performed by the Contractor utilizing the labor rate form template provided by the Owner and located at the following weblink:
http://paes.uconn.edu/contractors-working-at-uconn/

ARTICLE 7 PERFORMANCE AND PAYMENT BONDS AND CERTIFICATE OF COMPLIANCE.

7.1 Performance Bond

7.1.1 Prior to execution of the Contract, the successful Bidder shall substitute for the check or Bid Bond accompanying his Bid, an executed University of Connecticut Performance Bond, in the amount of 100 per cent of the Contract Price, conditioned upon the faithful performance of the Contract. See Form of Proposal for the appropriate form to be executed.

7.2 Labor and Material Payment Bond

7.2.1 Prior to execution of the Contract, the Bidder shall submit a University of Connecticut Labor and Material Payment Bond in the sum of not less than 100 per cent of the Contract Price, containing the condition that the Contractor will promptly pay for all material furnished and labor, supplied or performed in the prosecution of the work whether or not said material or labor is involved and/or becomes a component part of the structure or structures to be erected. Such additional bond shall be held for the use of each party who, as Subcontractor or otherwise, shall have furnished material or supplies or shall have performed labor in the prosecution of the work as herein provided and who has not been paid therefore. Such additional bond shall provide specifically that any person may bring suit thereon in the name of the person suing, prosecute the same to the final judgment and have execution thereon for such sum or sums as may be justly due. The State shall not be liable to furnish counsel nor for the payment of any costs or expenses of any such suit. This bond is to be furnished pursuant to Section 49-41 of the General Statutes of Connecticut, and claims thereon shall be subject to the provisions of Connecticut General Statutes Section 49-42. Such forms will be provided with the Letter of Intent to award to be executed.

7.3 Nonresident Contractor Certificate of Compliance

7.3.1 Prior to execution of the Contract, the Bidder shall submit proof that ensures they and all subcontractors being contracted to perform work under the awarded bid; are State of Connecticut resident contractors. Such proof shall be in a form on the awarding Contractor's letter head signed by the owner or principle of the company having authority to ensure that all agreements entered into under this contract are in-state resident contractors. Should the awarding Contractor and/or subcontractors who will perform work under this contract, are nonresident of the State of Connecticut, the awarding Contractor must provide a Certificate of Compliance from the Department of Revenue Services (DRS) for those nonresident firms who will be under contract. This Certificate of Compliance is pursuant to Statue 12-430 as amended by 2005 Connecticut Public Acts 260, 6; Connecticut Agencies Regulations 12-430 (7)-1.

7.4 General Provisions Regarding Bonds

7.4.1 The aforementioned Performance and Payment bonds shall be provided in the forms required by the University, samples of which are appended hereto. If the Contractor is a Joint Venture, all such bonds shall name all joint ventures as principals. The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney. The above bonds shall be required for awards for which the total estimated cost of labor and materials under the Contract is at least $100,000.00. The above bonds shall be acceptable to the University and, as a minimum, issued through a bonding company licensed to transact such business in the State of Connecticut and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the "Treasury Department Circular 570."

ARTICLE 8 AFFIDAVITS/ETHICS AFFIRMATIONS

8.1 Affidavits/Ethics Affirmations to be completed in accordance with the instructions provided on the OPM website for each Affidavits/Ethics Affirmations.

Form 5. Consulting Agreement Affidavit (for contract values >$50,000)

Form 6. Affirmation of Receipt of State Ethics Laws Summary (for contract values >$500,000)

8.2 With regard to a State contract as defined in P.A. 07-1 having a value in a calendar year of $50,000 or more or a combination of 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 state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice. See attached **SEEC Form 11.**

Obtain OPM has posted the approved Forms on the OPM Web site - http://www.opm.state.ct.us/secr/forms/ContractAffidavitRequirements.htm

ARTICLE 9 CONTRACT

9.1 A draft of the contract has been provided with the bid documents. The University reserves the right to modify the contract or wave any informality as it deems to be in the best interest of the University. By submitting a bid the Contractor accepts the contract and any modifications that the University deems necessary to it without exception. Exceptions to the contract submitted by the Contractor at any time will not be considered.

UNIVERSITY OF CONNECTICUT
HIGH HEAD GENERATOR REPLACEMENT
PROJECT NUMBER: LL170420

REQUEST FOR INFORMATION FORM

TO: **Cesar Alonzo**
cesar.alonzo@uconn.edu

FROM: _____
(Name of Bidding Firm)

Contact Name: _____

RFI Deadline: 9/20/2018 by 2:00PM

Phone # :_____ **Fax #** :_____

Specification Section: _____

Drawing No. / Drawing Date: _____

QUESTION (Please be specific): _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Signature: _____ **Date:** _____

NOTE: All questions must be submitted in writing before the prescribed RFI Deadline. No verbal questions will be answered. All questions must be submitted in writing on this RFI Form. All answers to RFI's will be issued in a Bidder's Clarification.

STATE OF CONNECTICUT
STATE ELECTIONS ENFORCEMENT COMMISSION
20 Trinity Street Hartford, Connecticut 06106—1628

SEEC FORM 11

NOTICE TO EXECUTIVE BRANCH STATE CONTRACTORS AND PROSPECTIVE STATE CONTRACTORS OF CAMPAIGN CONTRIBUTION AND SOLICITATION BAN

This notice is provided under the authority of Connecticut General Statutes 9-612(g)(2), as amended by P.A. 07-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (italicized words are defined below):

Campaign Contribution and Solicitation Ban

No *state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor*, with regard to a *state contract* or *state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to, or *solicit* contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee;

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to, or solicit contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

Duty to Inform

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

Penalties for Violations

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:
Civil penalties--$2000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of $2000 or twice the amount of the prohibited contributions made by their principals.
Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or $5000 in fines, or both.

Contract Consequences

Contributions made or solicited in violation of the above prohibitions may result, in the case of a state contractor, in the contract being voided.

Contributions made or solicited in violation of the above prohibitions, in the case of a prospective state contractor, shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State will not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information and the entire text of P.A 07-1 may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to "State Contractor Contribution Ban."

Definitions:

"State contractor" means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. "State contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Prospective state contractor" means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section 4a-100. "Prospective state contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Principal of a state contractor or prospective state contractor" means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization**,** (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract,* (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

"State contract" means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee. "State contract" does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan or a loan to an individual for other than commercial purposes.

"State contract solicitation" means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

"Managerial or discretionary responsibilities with respect to a state contract" means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

"Dependent child" means a child residing in an individual's household who may legally be claimed as a dependent on the federal income tax of such individual.

"Solicit" means (A) requesting that a contribution be made, (B) participating in any fund-raising activities for a candidate committee, exploratory committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

END OF INSTRUCTION TO BIDDERS

UCONN

PROCUREMENT SERVICES

CAPITAL PROJECTS AND
CONTRACT ADMINISTRATION

BID SUBMISSION

FOR

HIGH HEAD GENERATOR REPLACEMENT

PROJECT NUMBER: LL170420

UNIVERSITY OF CONNECTICUT
STORRS CAMPUS
Storrs, Connecticut

October 2, 2018

NAME OF FIRM SUBMITTING:

_____

UNIVERSITY OF CONNECTICUT
HIGH HEAD GENERATOR REPLACEMENT
PROJECT NUMBER: LL170420

FORM OF PROPOSAL

Proposal Submission Checklist

The following documents and information shall be submitted and included as your bid proposal. All documents must be submitted in a sealed envelope reflecting the submitting firm's name and address; addressed to CPCA attention to the appropriate purchasing agent, clearly stating the project name and project number. All required documents are to be included and executed in their original condition as issued.

- ☐ Ethics Forms 5 (if contract value is > $50,000) and 6 (if contract value is > $500,000).
- ☐ Bid Bond
- ☐ Fully executed Form of Proposal
- ☐ Copies of prequalification certificate and an updated statement as prescribed by Commissioner of Administrative Services for the State of Connecticut.

Contractors Certification

By submitting a bid proposal, the bidder is attesting to the review, reading, understanding, and acceptance of the information and requirements of the project contained within the bid documents without exception. By submitting a bid proposal, the Bidder represents that they have examined the site, and accept the conditions under which the work will be performed and we have read, evaluated, understand, and accepted all the Contract Documents, including those documents provided and their content in their entirety and have included all provisions necessary to accomplish all work according to the information and requirements prescribed therein without exception.

SUBMITTED BY:
Firm: _____ Date: _____

Address: _____

SUBMITTED BY: _____

Print Name: _____

Title: _____

Email Address: _____

Phone Number: _____

Contractor's Initials:_____

FORM OF PROPOSAL

University of Connecticut
Cesar Alonzo, Procurement Services
Capital Project & Contract Administration
3 Discovery Drive, Unit 6047
Storrs, Connecticut 06269-6047

Dear Mr. Alonzo:

1. In accordance with Connecticut General Statutes Sections 10a-109a through 10a-109y and pursuant to, and in compliance with your Invitation to Bid, the Notice and Instructions to Bidders, the Form of Contract, including the conditions thereto, the form of required bond, I (we) propose to furnish the labor and/or materials installed as required for the project named and numbered on the FORM OF PROPOSAL of this proposal to the extent of the Proposal 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 specifications and/or drawings together with all addenda issued and received prior to the scheduled closing time for the receipt of the bids, and in conformity with requirements of the University of Connecticut 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 FORM OF PROPOSAL, hereof.

2. The Lump Sum Base Bid by me (us) on the FORM OF PROPOSAL includes all work indicated on the drawings and/or described in the specifications (including the furnishing and installing of all required materials, labor, equipment and allowances where applicable), except:

   A. Work covered by Alternates as may be listed on the FORM OF PROPOSAL.

   B. Contingent work covered by Unit Prices as may be listed on the FORM OF PROPOSAL.

   C. Work covered by Options as may be listed on the FORM OF PROPOSAL.

3. This proposal is submitted subject to and in compliance with the foregoing and following conditions and/or information.

   A. AWARD: All proposals shall be subject to the provisions and requirements of the Bid Documents and for purpose of award, consideration shall be given only to proposals submitted by qualified and responsible bidders.

   B. COMMENCEMENT AND COMPLETION OF WORK: Contractor shall commence and complete the work in accordance with the requirements of the Contract Documents.

   C. If the Contractor fails to complete the work within the time required by the Contract Documents, the University shall have the right to assess liquidated damages as provided in Paragraph 9.11 of the General Conditions.

   D. CONTRACTORS INSURANCE REQUIRED:
      1. The limits of liability and coverages shall be those set forth in Article 11 of the General Conditions included with this bid package (or as previously executed with the on-call trade contract).

 Contractor's Initials:_____

E. REQUIRED PERCENTAGES OF WORK AND SET-ASIDES

.1 If awarded this contract, we (I) as the General Contractor on this Project shall be required to perform not less than 10% of the completed dollar value of the Work with its own forces.

.2 We (I) as the General Contractor on this project shall award not less than 30% of the total Contract Price to subcontractors who are certified and eligible to participate under the State of Connecticut Small Business Set Aside Program, of which 10% (of the total Contract) must be awarded to Women Owned or Minority Businesses. 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, 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 and failure to comply with any portion of this requirement, including but not limited to failure to list or meet the necessary dollar amount of percentage of the bid price will be cause to reject your bid.

F. NONDISCRIMINATION & LABOR RECRUITMENT:

We (I) agree that the Contract awarded for this project shall be subject to the Executive Orders No. Three and Seventeen, promulgated June 16, 1971 and February 15, 1973 respectively and to the Guidelines and Rules of the State Labor Department implementing Executive Order No. Three and further agree to submit reports of Compliance Staffing on Labor Department Form E.O.3-1, when and as requested.

G. FEDERAL & STATE WAGE DETERMINATIONS AND PRICING CONSIDERATION:

.1 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”.

.2 In determining bid price, consideration should be given to Section 31-53 of the General Statutes of Connecticut as amended by Public Act 02-69, “An Act Concerning Annual Adjustments to Prevailing Wages”. Such prevailing wage adjustment will not be considered a basis for an annual contract adjustment.

.3 The State of Connecticut Labor Department Wage Schedule where required, shall be provided with these documents, typically with the Bidders’ Convenience Package, or will be incorporated in the Contract Documents as an Addendum. At the time of bidding, the bidder agrees to accept the current prevailing wage scale, as well as any annual adjustment to the prevailing wage scale, as provided by the Connecticut Department of Labor. Wage Rages will be posted each July 1st on the Department of Labor website: www.ctdol.state.ct.us . Such prevailing wage adjustment will not be considered a basis for an annual contract amendment.

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

We (I) acknowledge that we (I) and our subcontractors are obligated to fill out the forms provided by the University of Connecticut Office of Capital Project and Contract Administration and to agree to certify to the compliance of non-segregated facilities.

I. NOTICE TO EXECUTIVE BRANCH STATE CONTRACTORS AND PROSPECTIVE STATE CONTRACTORS OR CAMPAIGN CONTRIBUTION AND SOLICITATION BAN.

With regard to a State contract as defined in P.A. 07-1 having a value in a contract 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 advertising prospective principals of the contents of the notice. See Attachment SEEC Form 11.

4. ACCOMPANYING THIS PROPOSAL IS:

A. A CERTIFIED CHECK drawn to the order of the University of Connecticut in the amount of 10% of the Bid, i.e.:

_____ DOLLARS $_____

and drawn on the _____
(STATE BANK & TRUST COMPANY)

_____ located at _____
(A NATIONAL BANKING ASSOCIATION) (CITY & STATE)

which 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 in this proposal as accepted by the University of Connecticut.

OR;

B. A BID BOND having as surety thereto a Surety Company for Companies authorized to transact business in the State of Connecticut and made out in the penal sum of 10% of the bid, (Bids $50,000 and greater) i.e.:

_____ DOLLARS $_____

If the bidder is a joint venture, the Bid Bond shall specifically identify and include each joint venturer as a principal.

C. If the bidder is a joint venture, a copy of the executed Joint Venture Agreement shall be submitted along with the bid materials.

5. We (I), the undersigned, hereby declare that I am (we are) the only person(s) interested in the proposal and that it is without any connection with any other person making any bid for the same work. No person acting for, or employed by, the State of Connecticut is directly interested in this proposal, or in any contract which may be made under it, or in expected profits to arise therefrom. This 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 of any other person or corporation. This 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 proposal is based solely on my (our) investigation and research and not in reliance upon any representations of any employee, officer or agent of the State.

6. Each class of work set forth in a separate Section of the Specifications and designated as a subtrade in Item 2A of the proposal pages shall be the matter of a subcontract made in accordance with the procedures set forth in the Bid and Contract Documents.

7. The undersigned agrees that, if selected as General Contractor, he shall, within ten (10) days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the University of Connecticut, execute a contract in accordance with the terms of this general bid.

8. The undersigned agrees and warrants that he has 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 his employment practices and procedures as they relate to the provisions of the Connecticut General Statutes governing contract requirements.

9. The undersigned acknowledges that should their submitted Form of Proposal fail to have included a copy of your firm's prequalification certificate and an updated statement accompany their bid submission, that their bid will be invalid and considered non-responsive. Per CGS 4b-91 amended.

Contractor's Initials:_____

A. STANDARD BID BOND:

NOW 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, _____, in lawful money of the United States of America, for the payment of which sum, 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 the other obligee related to a contract for the Project Referenced above.

NOW, THEREFORE, if the said contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter in 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 Obligee the damages which the Obligee may suffer by reason of such failure not exceeding the penal sum of this bond, then this obligation shall be void, otherwise to remain in full force and effect.

SIGNED, SEALED AND DATED this _____ day of _____, 20___

_____	_____	_____	_____
Witness	Surety	Witness	Principal
	_____		_____
	Title		Title

B. The undersigned proposes to furnish all labor and material required for:

HIGH HEAD GENERATOR REPLACEMENT
PROJECT NUMBER: LL170420

University of Connecticut
Storrs, CT

In accordance with the accompanying Drawings and Specifications prepared by:

DTC, Inc.

The Contract Price specified below subject to additions and deductions according to the terms of the Contract Documents.

C. BID CLARIFICATIONS:

The undersigned acknowledges receipt of the following Bid Clarifications issued during the bidding period and has included all changes therein in the above base bid amount.

Clarifications/Addenda #_____, Dated_____
Clarifications/Addenda #_____, Dated_____
Clarifications/Addenda #_____, Dated_____
Clarifications/Addenda #_____, Dated_____

D. PROPOSED BASE CONTRACT PRICE:

Having carefully examined the Bid Documents for the above reference project, and having visited the project site and examined all conditions affecting the work, the undersigned, upon written notice of award of contract, agrees to provide all labor, supervision, materials, tools, construction equipment, services, safety, insurance, bonds, and to pay all applicable taxes, and other costs necessary or required to complete the Work of this Bid in full accordance with all Bid Documents and within the required timeframe as indicated by the proposed schedule for the Lump Sum Bid of:

_____US Dollars

($_____) (Which incorporates all allowances as may be listed in the plans and specifications)

(Show the amount in both words and figures. In case of discrepancy, amount shown in words will govern.)

The University reserves the right to elect to implement some, all or none of the Alternates and/or Options set forth in the Proposal forms, as may be in the best interest of the University. The low Bid shall be determined by taking the Base Price set forth in the Proposal form as selected by the University, plus the Alternates and/or Options selected by the University.

E. SCHEDULE OF ALTERNATES:

Provide Alternate Prices which reflect the work of the bid package under which this bid proposal was submitted and shall remain valid for the life of the project and include all costs for a complete installation. All pricing is inclusive of all costs of wages, applicable taxes, benefits, and applicable insurance. The Prices herein shall remain valid for the life of the project and include all costs for a complete installation.

Alternate Number 1: In lieu of permanently installed generator system, provide portable camlock switchboard.
Add / Deduct (circle one): $_____

Alternate Number 2: Provide Maintenance Service in accordance with Specification Section 263213.14.3.7.
Add / Deduct (circle one): $_____

Alternate Number 3: Provide Factory Witness Testing in accordance with Specification Section 263213.14.3.9.
Add / Deduct (circle one): $_____

END OF ALTERNATES

Contractor's Initials:_____

F. SCHEDULE OF UNIT PRICES:

All rates are inclusive of all costs of wages, applicable taxes, benefits, applicable insurance. The rates provided will be negotiated and included as part of the contract and of your subcontracts. The Unit Prices herein shall remain valid for the life of the project and include all costs for a complete installation. Unit prices are good for both adds and deducts.

Unit Price No. 1: Loading, transportation and disposal of non-hazardous petroleum impacted soil to an approved landfill licensed to accept such material.

1. Unit Price: $_____ /Ton (based on estimated qty of 5 Ton)

Unit Price No. 2: Delivery and placement of additional gravel fill to replace petroleum impacted soil removed from a UST grave.

1. Unit Price: $_____ /Cubic Yard (based on estimated qty of 5 CY)

Unit Price No 3: Rock excavation Section 31200 Paragraph 3.4B.

1. Unit Price: $_____ /Cubic Yard Measured In-place (based on estimated qty of 10 CY)

End of Unit Prices

G. SCHEDULE OF VALUES:

The undersigned agrees that the Schedule of Values submitted with this Bid is a true representation of the distribution of the costs of this project and equals the Stipulated Sum shown above. The Schedule of Values is an integral part of this proposal. Please indicate N/A for those divisions of work not applicable. The costs provided below include the complete cost for furnishing and installing of materials, labor, and equipment required to provide the complete scope of work for each specified division (includes the costs of applicable taxes, insurance, bonds, overhead, profit, small tools, travel, parking, supervision, etc.). The "TOTAL" price must equal your total lump sum bid proposal.

Division	Group	
01	General Requirements	**$**
02	Existing Conditions	**$**
03	Concrete	**$**
05	Metals	**$**
07	Thermal & Moisture Protection	**$**
22	Plumbing	**$**
*23	HVAC Heating, Ventilating, Air Conditioning	**$**
26	Electrical	**$**
*31	Earthwork	**$**
32	Exterior Improvements	**$**
Insurance		**$**
Bonds		**$**
Allowance #1	Include an additional 50 lineal feet of 4" Hub and Spigot Sanitary piping removal and replacement above what is being shown on MEP-101-FS.	**$**
Allowance #2	Contractor shall include value allowance for the sum of $75,000 to cover the costs necessary to furnish, install and maintain temporary heating services as required and as coordinated with the University, until which time, permanent heating services are re-instated.	**$ 75,000.00**
TOTAL		**$**

H. The subdivision of Work in the proposed Contract Price is as follows:

ITEM 1 WORK BY GENERAL CONTRACTOR:
For all work other than that to be done by subcontractors included in Item 2A and Item 2B.

$_____(ITEM 1)

Note: In accordance with paragraph 3.E.1 this amount, together with work by the general contractor as listed in Item 2A below, must be at least 10% of the total bid price.

ITEM 2A WORK BY SUBCONTRACTORS NAMED:

Subcontractors and prices for the following trades must be listed (if such prices exceed $25,000). However, the general bidder may list himself together with his price if he customarily performs any of the trades specified. If the general contractor requires a performance and/or labor & material payment bond then the general contractor must indicate below which of the subcontractors are subject to this requirement. The amount (%) shall not exceed the subcontractor's price listed below.

DESCRIPTION	NAME OF SUBCONTACTOR	DOLLAR AMOUNT	LABOR & MATERIAL BOND	PERFORMANCE BOND
MASONRY				
ELECTRICAL				
MECHANICAL WITHOUT HVAC				
HVAC				

A copy of the executed agreement between the successful bidder and the named subcontractors above must be presented to the Office of CPCA at time of contract signing. The contract may not be executed until copies of executed agreements are received by CPCA.

ITEM 2B WORK BY SUBCONTRACTORS NOT NAMED:

$_____
(INCLUDES ALL SUBCONTRACT WORK NOT LISTED IN ITEM 2A)

The undersigned agrees that each of the subcontractors listed on this FORM OF PROPOSAL will be used for the work indicated at the amount stated, unless a substitution is permitted by the University.

FORM OF PROPOSAL

I. SET-ASIDE CONTRACTOR SCHEDULE

By submitting a bid for this project, the bidder represents that it has used good faith efforts to secure commitments from SBEs and MBEs in a value that is equal to, or greater than, the Set Aside (as defined in the Invitation to Bid). If, despite its good faith efforts, a bidder has not yet been able to secure commitments for the full value of the Set Aside, the bidder will nonetheless be expected to meet the Set Aside if it is awarded the contract for this project

Below, the bidder shall list those SBEs and MBEs from whom the bidder has secured commitments for the project as of the date hereof and the dollar amounts the bidder anticipates awarding to each such SBE/MBE.
The amount is NOT LESS THAN 30% of the proposed base contract price as stated on the Form of Proposal, Section D.

Name	Address	Amount

CERTIFICATE OF ELIGIBILIT HAS BEEN OBTAINED THROUGH THE FOLLOWING WEBSITE;
https://www.biznet.ct.gov/SupplierDiversity/SDSearch.aspx

FOR EACH OF THE NAMED CONTRACTORS AND IS BEING SUBMITTED WITH THIS FORM.
The Undersigned agrees that each of the subcontractors listed on the proposal form will be used for the work indicated at the amount stated, unless a substitution is permitted by the awarding authority.

_____ _____
Authorized Signature Title

_____
Company Name

J. BIDDER CONTRACT COMPLIANCE MONITORING REPORT

PART I - Bidder Information

<table>
<tr><td>Company Name
Street Address
City & State
Chief Executive</td><td>Bidder Federal Employer
Identification Number_____
Or
Social Security Number_____</td></tr>
<tr><td>Major Business Activity
(brief description)</td><td rowspan="3">Bidder Identification
(response optional/definitions in Instruction to Bidders page 18)

-Bidder is a small contractor. Yes__ No__

-Bidder is a minority business enterprise Yes__ No__
(If yes, check ownership category)

Black___ Hispanic___ Asian American___ American Indian/Alaskan Native ____
Iberian Peninsula___
Individual(s) with a Physical Disability___
Female___

-Bidder is certified as above by State of CT
Yes__ No__ -
DAS Certification Number
_____</td></tr>
<tr><td>Bidder Parent Company(If any)</td></tr>
<tr><td>Other Locations in Ct. (If any)</td></tr>
</table>

PART II - Bidder Nondiscrimination Policies and Procedures

1. Does your company have a written Affirmative Action/Equal Employment Opportunity statement posted on company bulletin boards? Yes__ No__	7. Do all of your company contracts and purchase orders contain non-discrimination statements as required by Sections 4a-60 & 4a-60a Conn. Gen. Stat.? Yes__ No__
2. Does your company have the state-mandated sexual harassment prevention in the workplace policy posted on company bulletin boards? Yes__ No__	8. Do you, upon request, provide reasonable accommodation to employees, or applicants for employment, who have physical or mental disability? Yes__ No__
3. Do you notify all recruitment sources in writing of your company's Affirmative Action/Equal Employment Opportunity employment policy? Yes__ No__	9. Does your company have a mandatory retirement age for all employees? Yes__ No__
4. Do your company advertisements contain a written statement that you are an Affirmative Action/Equal Opportunity Employer? Yes__ No__	10. If your company has 50 or more employees, have you provided at least two (2) hours of sexual harassment training to all of your supervisors? Yes__ No__ NA__
5. Do you notify the Ct. State Employment Service of all employment openings with your company? Yes__ No__	11. If your company has apprenticeship programs, do they meet the Affirmative Action/Equal Employment Opportunity requirements of the apprenticeship standards of the Ct. Dept. of Labor? Yes__ No__ NA__
6. Does your company have a collective bargaining agreement with workers? Yes__ No__ 6a. If yes, do the collective bargaining agreements contain non-discrimination clauses covering all workers? Yes__ No__ 6b. Have you notified each union in writing of your commitments under the nondiscrimination requirements of contracts with the state of Ct? Yes__ No__	12. Does your company have a written affirmative action Plan? If no, please explain. Yes__ No__ 13. Is there a person in your company who is responsible for equal employment opportunity? Yes__ No__ If yes, give name and phone number. _____ _____ _____

Part III - Bidder Subcontracting Practices

1. Will the work of this contract include subcontractors or suppliers? Yes__ No__

1a. If yes, please list all subcontractors and suppliers and report if they are a small contractor and/or a minority business enterprise as defined on page 1 / use additional sheet if necessary)

1b. Will the work of this contract require additional subcontractors or suppliers other than those identified in 1a? Yes__ No__

Part IV – Bidder Employment Information Date:

JOB CATEGORY	OVERALL TOTALS	WHITE (not of Hispanic origin)		BLACK (not of Hispanic origin)		HISPANIC		ASIAN or PACIFIC ISLANDER		AMERICAN INDIAN or ALASKAN NATIVE	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Management											
Business & Financial Ops											
Computer Specialists											
Architecture/Engineering											
Office & Admin Support											
Bldg/ Grounds Cleaning/Maintenance											
Construction & Extraction											
Installation , Maintenance & Repair											
Material Moving Workers											
TOTALS ABOVE											
Total One Year Ago											
FORMAL ON THE JOB TRAINEES	(ENTER FIGURES FOR THE SAME CATEGORIES AS ARE SHOWN ABOVE)										
Apprentices											
Trainees											

PART V - Bidder Hiring and Recruitment Practices

1. Which of the following recruitment sources are used by you? (check yes or not and report percent used)				2. Check (x) any of the below listed requirements that you use as a hiring qualification		3. Describe below any other practices or actions that you take which show that you hire, train, and promote employees without discrimination?
SOURCE	YES	NO	% of applicants provided by source	(x)		
State Employment Service					Work Experience	
Private Employment Agencies					Ability To Speak Or Write English	
Schools And Colleges					Written Tests	
Newspaper Advertisements					High School Diploma	
Walk Ins					College Degree	
Present Employees					Union Membership	
Labor Organizations					Personal Recommendations	
Minority/Community Organizations					Height Or Weight	
Others Please Identify					Car Ownership	
					Arrest Record	
					Wage Garnishments	

Certification (Read this form and check your statements on it CAREFULLY before signing).
I certify that the statements made by me on this BIDDER CONTRACT COMPLIANCE MONITORING REPORT are complete and true to the best of my knowledge and belief, and are made in good faith. I understand that if I knowingly make any misstatements of facts, I am subject to be declared in non-compliance with Section 4a-60, 4a-60a, and related sections of the CONN. GEN. SAT.

Signature) (Date Signed)

(Title) (Telephone)

K. PROPOSER'S QUALIFICATION/RESPONSIBILITY STATEMENT

The Proposer shall have already completed and submitted the Questionnaire and other submission required by the University in its Invitation to Pre-Qualify, regarding the Proposer's qualifications. If changed circumstances arising since the initial submission, or other facts have occurred which would result in a material change to any of the Proposer's initial responses or submissions, the Proposer shall provide any such supplementary, or revised information at this time, along with its Proposal.

1. State, identify any such changed circumstances or other facts and provide any such supplementary or revised information as described above, identifying specifically, by number and content, each prior question, response to the Questionnaire, or information changed, supplemented or revised. (Attach a separate sheet if necessary)

2. State "NONE" if there are no changes to be made. _____

Please note that if the end date of the time period covered by the information submitted during your pre-qualification is three or more months old, please provide current financial documentation demonstrating that your present financial position has remained the same, or showing and identifying any changes in any way, in relation to the audited financial statement you submitted with your pre-qualified application on this proposal.

Dated at 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 and that the
(Position or Title) (Firm Name)
answers to the foregoing questions and all statements therein contained are true and correct.
Subscribed and sworn to before me this day of 20
Notary Public:
My Commission Expires: 20

L. ETHICS FORMS **-** A duly authorized representative of the company must sign these forms

- √ **These forms must be notarized and clearly show notary seal or acknowledged by a Commissioner of the Superior Court**.

- √ ALL REQUIRED forms, **must be completed, signed and returned** by the bidder/proposer as part of the bid/proposal/RFQ response package.

- √ Failure to submit ALL REQUIRED forms constitutes grounds for rejection of your bid/proposal/RFQ.

- √ If it is determined by the University of Connecticut and/or State of Connecticut that **any information requested was not referenced and submitted** with this bid/proposal/RFQ/LOI, and then such determination **will be just cause for disqualification of the bid/proposal/RFQ.**

STATE OF CONNECTICUT
GIFT AND CAMPAIGN CONTRIBUTION CERTIFICATION

Written or electronic certification to accompany a State contract with a value of $50,000 or more in a calendar or fiscal year, pursuant to C.G.S. §§ 4-250 and 4-252(c); Governor M. Jodi Rell's Executive Orders No. 1, Para. 8, and No. 7C, Para. 10; and C.G.S. §9-612(g)(2)

INSTRUCTIONS:
Complete all sections of the form. Attach additional pages, if necessary, to provide full disclosure about any lawful campaign contributions made to campaigns of candidates for statewide public office or the General Assembly, as described herein. Sign and date the form, under oath, in the presence of a Commissioner of the Superior Court or Notary Public. Submit the completed form to the awarding State agency at the time of initial contract execution and if there is a change in the information contained in the most recently filed certification, such person shall submit an updated certification either (i) not later than thirty (30) days after the effective date of such change or (ii) upon the submittal of any new bid or proposal for a contract, whichever is earlier. Such person shall also submit an accurate, updated certification not later than fourteen days after the twelve-month anniversary of the most recently filed certification or updated certification.

CHECK ONE: ☐ Initial Certification ☐ 12 Month Anniversary Update (Multi-year contracts only.)

☐ Updated Certification because of change of information contained in the most recently filed certification or twelve-month anniversary update.

GIFT CERTIFICATION:

As used in this certification, the following terms have the meaning set forth below:
1) "Contract" means that contract between the State of Connecticut (and/or one or more of it agencies o instrumentalities) and the Contractor, attached hereto, or as otherwise described by the awarding Stat agency below;
2) If this is an Initial Certification, "Execution Date" means the date the Contract is fully executed by, and becomes effective between, the parties; if this is a twelve-month anniversary update, "Execution Date" means the date this certification is signed by the Contractor;
3) "Contractor" means the person, firm or corporation named as the contactor below;
4) "Applicable Public Official or State Employee" means any public official or state employee described i C.G.S. §4-252(c)(1)(i) or (ii);
5) **"Gift"** has the same meaning given that term in C.G.S. § 4-250(1);
6) "Principals or Key Personnel" means and refers to those principals and key personnel of the Contractor, and its or their agents, as described in C.G.S. §§ 4-250(5) and 4-252(c)(1)(B) and (C).

I, the undersigned, am a Principal or Key Personnel of the person, firm or corporation authorized to execute this certification on behalf of the Contractor. I hereby certify that, no gifts were made by (A) such person, firm, corporation, (B) any principals and key personnel of the person firm or corporation who participate substantially in preparing bids, proposals or negotiating state contracts or (C) any agent of such, firm, corporation, or principals or key personnel who participates substantially in preparing bids, proposals or negotiating state contracts, to (i) any public official or state employee of the state agency or quasi-public agency soliciting bids or proposals for state contracts who participates substantially in the preparation of bid solicitations or request for proposals for state contracts or the negotiation or award of state contracts or (ii) any public official or state employee of any other state agency, who has supervisory or appointing authority over such state agency or quasi-public agency.

I further certify that no Principals or Key Personnel know of any action by the Contractor to circumvent (or which would result in the circumvention of) the above certification regarding **Gifts** by providing for any other Principals, Key Personnel, officials, or employees of the Contractor, or its or their agents, to make a **Gift** to any Applicable Public Official or State Employee. I further certify that the Contractor made the bid or proposal for the Contract without fraud or collusion with any person.

CAMPAIGN CONTRIBUTION CERTIFICATION:

I further certify that, on or after December 31, 2006, neither the Contractor nor any of its principals, as defined in C.G.S. § 9-612(g)(1), has made any **campaign contributions** to, or solicited any contributions on behalf of, any exploratory committee, candidate committee, political committee, or party committee established by, or supporting or authorized to support, any candidate for statewide public office, in violation of C.G.S. § 9-612(g)(2)(A). I further certify that **all lawful campaign contributions** that have been made on or after December 31, 2006 by the Contractor or any of its principals, as defined in C.G.S. § 9-612(g)(1), to, or solicited on behalf of, any exploratory committee, candidate committee, political committee, or party committee established by, or supporting or authorized to support any candidates for statewide public office or the General Assembly, are listed below:

Lawful Campaign Contributions to Candidates for Statewide Public Office:

Contribution Date	Name of Contributor	Recipient	Value	Description

Lawful Campaign Contributions to Candidates for the General Assembly:

Contribution Date	Name of Contributor	Recipient	Value	Description

Sworn as true to the best of my knowledge and belief, subject to the penalties of false statement.

_____ _____
Printed Contractor Name **Printed Name of Authorized Official**

_____
Signature of Authorized Official

Subscribed and acknowledged before me this _____ day of _____, 20___.

_____
Commissioner of the Superior Court (or Notary Public)

_____
My Commission Expires

OPM Ethics Form 5 **Rev. 3-28-14**

STATE OF CONNECTICUT
CONSULTING AGREEMENT AFFIDAVIT

Affidavit to accompany a bid or proposal for the purchase of goods and services with a value of $50,000 or more in a calendar or fiscal year, pursuant to Connecticut General Statutes §§ 4a-81(a) and 4a-81(b). For sole source or no bid contracts the form is submitted at time of contract execution.

INSTRUCTIONS:

If the bidder or vendor has entered into a consulting agreement, as defined by Connecticut General Statutes § 4a-81(b)(1): Complete all sections of the form. If the bidder or contractor has entered into more than one such consulting agreement, use a separate form for each agreement. Sign and date the form in the presence of a Commissioner of the Superior Court or Notary Public. **If the bidder or contractor has not entered into a consulting agreement, as defined by Connecticut General Statutes § 4a-81(b)(1):** Complete only the shaded section of the form. Sign and date the form in the presence of a Commissioner of the Superior Court or Notary Public.

Submit completed form to the awarding State agency with bid or proposal. For a sole source award, submit completed form to the awarding State agency at the time of contract execution.

This affidavit must be amended if there is any change in the information contained in the most recently filed affidavit not later than (i) thirty days after the effective date of any such change or (ii) upon the submittal of any new bid or proposal, whichever is earlier.

AFFIDAVIT: [Number of Affidavits Sworn and Subscribed On This Day: _____]

I, the undersigned, hereby swear that I am a principal or key personnel of the bidder or contractor awarded a contract, as described in Connecticut General Statutes § 4a-81(b), or that I am the individual awarded such a contract who is authorized to execute such contract. I further swear that I have not entered into any consulting agreement in connection with such contract, **except for the agreement listed below**:

_____ _____
Consultant's Name and Title Name of Firm (if applicable)

_____ _____ _____
Start Date End Date Cost

Description of Services Provided: _____

_____

Is the consultant a former State employee or former public official? ☐ YES ☐ NO

If YES: _____ _____
Name of Former State Agency Termination Date of Employment

Sworn as true to the best of my knowledge and belief, subject to the penalties of false statement.

_____ _____ _____
Printed Name of Bidder or Contractor **Signature of Principal or Key Personnel** **Date**

_____ _____
Printed Name (of above) Awarding State Agency

Sworn and subscribed before me on this _____ day of _____, 20___.

_____
Commissioner of the Superior Court or Notary Public

_____
My Commission Expires

OPM Ethics Form 6 **Rev. 10-01-11**

STATE OF CONNECTICUT

AFFIRMATION OF RECEIPT OF STATE ETHICS LAWS SUMMARY

Written or electronic affirmation to accompany a large State construction or procurement contract, having a cost of more than $500,000, pursuant to Connecticut General Statutes §§ 1-101mm and 1-101qq

INSTRUCTIONS:
Complete all sections of the form. Submit completed form to the awarding State agency or contractor, as directed below.

CHECK ONE:

☐ I am a person seeking a large State construction or procurement contract. I am submitting this affirmation to the awarding State agency with my bid or proposal. [Check this box if the contract will be awarded through a competitive process.]

☐ I am a contractor who has been awarded a large State construction or procurement contract. I am submitting this affirmation to the awarding State agency at the time of contract execution. [Check this box if the contract was a sole source award.]

☐ I am a subcontractor or consultant of a contractor who has been awarded a large State construction or procurement contract. I am submitting this affirmation to the contractor.

☐ I am a contractor who has already filed an affirmation, but I am updating such affirmation either (i) no later than thirty (30) days after the effective date of any such change or (ii) upon the submittal of any new bid or proposal, whichever is earlier.

IMPORTANT NOTE:

Within fifteen (15) days after the request of such agency, institution or quasi-public agency for such affirmation contractors shall submit the affirmations of their subcontractors and consultants to the awarding State agency. Failure to submit such affirmations in a timely manner shall be cause for termination of the large State construction or procurement contract.

AFFIRMATION:

I, the undersigned person, contractor, subcontractor, consultant, or the duly authorized representative thereof, affirm (1) receipt of the summary of State ethics laws* developed by the Office of State Ethics pursuant to Connecticut General Statutes § 1-81b and (2) that key employees of such person, contractor, subcontractor, or consultant have read and understand the summary and agree to comply with its provisions.

* The summary of State ethics laws is available on the State of Connecticut's Office of State Ethics website.

_____ _____
Signature Date

_____ _____
Printed Name Title

_____
Firm or Corporation (if applicable)

_____ _____ ____ _____
Street Address City State Zip

_____
Awarding State Agency

STATE OF CONNECTICUT

Written or electronic PDF copy of the written certification to accompany a large state contract pursuant to P.A. No. 13-162 (Prohibiting State Contracts With Entities Making Certain Investments In Iran)

Respondent Name: _____

INSTRUCTIONS:

CHECK ONE: ☐ Initial Certification.
☐ Amendment or renewal.

A. Who must complete and submit this form. Effective October 1, 2013, this form must be submitted for any large state contract, as defined in section 4-250 of the Connecticut General Statutes. This form must always be submitted with the bid or proposal, or if there was no bid process, with the resulting contract, regardless of where the principal place of business is located.

Pursuant to P.A. No. 13-162, upon submission of a bid or prior to executing a large state contract, **the certification portion of this form must be completed** by any corporation, general partnership, limited partnership, limited liability partnership, joint venture, nonprofit organization or other business organization **whose principal place of business is located outside of the United States**. United States subsidiaries of foreign corporations are exempt. For purposes of this form, a "foreign corporation" is one that is organized and incorporated outside the United States of America.

Check applicable box:

☐ Respondent's principal place of business is within the United States or Respondent is a United States subsidiary of a foreign corporation. Respondents who check this box **are not required to complete the certification portion of this form**, but must submit this form with its Invitation to Bid ("ITB"), Request for Proposal ("RFP") or contract package if there was no bid process.

☐ Respondent's principal place of business is outside the United States and it is not a United States subsidiary of a foreign corporation. **CERTIFICATION required.** Please complete the certification portion of this form and submit it with the ITB or RFP response or contract package if there was no bid process.

B. Additional definitions.

7) "Large state contract" has the same meaning as defined in section 4–250 of the Connecticut General Statutes;
8) "Respondent" means the person whose name is set forth at the beginning of this form; and
9) "State agency" and "quasi-public agency" have the same meanings as provided in section 1–79 of the Connecticut General Statutes.

C. Certification requirements.

No state agency or quasi-public agency shall enter into any large state contract, or amend or renew any such contract with any Respondent whose principal place of business is located outside the United States and is not a United States subsidiary of a foreign corporation unless the Respondent has submitted this certification.

Complete all sections of this certification and sign and date it, under oath, in the presence of a Commissioner of the Superior Court, a Notary Public or a person authorized to take an oath in another state.

CERTIFICATION:

I, the undersigned, am the official authorized to execute contracts on behalf of the Respondent. I certify that:

☐ Respondent has made no direct investments of twenty million dollars or more in the energy sector of Iran on or after October 1, 2013, as described in Section 202 of the Comprehensive Iran Sanctions, Accountability and Divestment Act of 2010.

☐ Respondent has either made direct investments of twenty million dollars or more in the energy sector of Iran on or after October 1, 2013, as described in Section 202 of the Comprehensive Iran Sanctions, Accountability and Divestment Act of 2010, or Respondent made such an investment prior to October 1, 2013 and has now increased or renewed such an investment on or after said date, or both.

Sworn as true to the best of my knowledge and belief, subject to the penalties of false statement.

_____ _____

Printed Respondent Name **Printed Name of Authorized Official**

_____

Signature of Authorized Official

Subscribed and acknowledged before me this _____ day of _____, 20___.

_____

Commissioner of the Superior Court (or Notary Public)

_____

My Commission Expires

Form B
07-08-2009

STATE OF CONNECTICUT

NONDISCRIMINATION CERTIFICATION — Representation By Entity

For Contracts Valued at Less Than $50,000

Written representation that complies with the nondiscrimination agreements and warranties under Connecticut General Statutes §§ 4a-60(a)(1) and 4a-60a(a)(1), as amended

INSTRUCTIONS:

For use by an entity (corporation, limited liability company, or partnership) when entering into any contract type with the State of Connecticut valued at less than $50,000 for each year of the contract. Complete all sections of the form. Submit to the awarding State agency prior to contract execution.

REPRESENTATION OF AN ENTITY:

I, _____ , _____ , of _____ ,
Authorized Signatory Title Name of Entity

an entity duly formed and existing under the laws of _____ ,
Name of State or Commonwealth

represent that I am authorized to execute and deliver this representation on behalf of

_____ and that _____
Name of Entity Name of Entity

has a policy in place that complies with the nondiscrimination agreements and warranties of Connecticut General Statutes §§ 4a-60(a)(1) and 4a-60a(a)(1), as amended.

_____ _____
Authorized Signatory Date

_____
Printed Name

STATE OF CONNECTICUT

NONDISCRIMINATION CERTIFICATION — Affidavit By Entity For Contracts Valued at $50,000 or More

Documentation in the form of an affidavit signed under penalty of false statement by a chief executive officer, president, chairperson, member, or other corporate officer duly authorized to adopt corporate, company, or partnership policy that certifies the contractor complies with the nondiscrimination agreements and warranties under Connecticut General Statutes §§ 4a-60(a)(1) and 4a-60a(a)(1), as amended

INSTRUCTIONS:

For use by an entity (corporation, limited liability company, or partnership) when entering into any contract type with the State of Connecticut valued at $50,000 or more for any year of the contract. Complete all sections of the form. Sign form in the presence of a Commissioner of Superior Court or Notary Public. Submit to the awarding State agency prior to contract execution.

AFFIDAVIT:

I, the undersigned, am over the age of eighteen (18) and understand and appreciate the obligations of

an oath. I am _____ of _____, an entity
Signatory's Title Name of Entity

duly formed and existing under the laws of _____.
Name of State or Commonwealth

I certify that I am authorized to execute and deliver this affidavit on behalf of

_____ and that _____
Name of Entity Name of Entity

has a policy in place that complies with the nondiscrimination agreements and warranties of Connecticut

General Statutes §§ 4a-60(a)(1) and 4a-60a(a)(1), as amended.

_____
Authorized Signatory

_____
Printed Name

Sworn and subscribed to before me on this _____ day of _____, 20___.

_____ _____
Commissioner of the Superior Court/ Notary Public **Commission Expiration Date**

FORM OF PROPOSAL

All pages within the Form of Proposal must be completed, signed by a duly authorized representative of the firm and returned as part of the bid/proposal/RFQ response package. NO FACSIMILE SIGNATURE PERMITTED

- √ **If the form of proposal is being submitted by a Joint Venture, each Joint Venture shall sign the Proposal, and each Joint Venture agrees to be bound by the terms and conditions thereof.**
- √ **Failure to submit ALL REQUIRED forms constitutes grounds for rejection of your bid/proposal/RFQ.**
- √ **If it is determined by the University of Connecticut and/or State of Connecticut that any information requested but not referenced and submitted with this bid/proposal; such determination will be just cause for disqualification of the bid/proposal.**

(TO BE FILLED IN AND SIGNED BY THE BIDDER)

Signed the _____ day of _____ 20____.

Firm Name: _____

Street: _____

City/State/Zip Code: _____

Telephone Number: _____

Signature/Title: _____

Print Name/Title: _____

(TO BE FILLED IN AND SIGNED BY JOINT VENTURE IF APPLICABLE)

Firm Name: _____

Street: _____

City/State/Zip Code: _____

Telephone Number: _____

Signature/Title: _____

Print Name/Title: _____

Signature/Title: _____

Print Name/Title: _____

End of Form of Proposal

THIS IS A PUBLIC WORKS PROJECT

Covered by the

PREVAILING WAGE LAW

CT General Statutes Section 31-53

If you have QUESTIONS regarding your wages
CALL (860) 263-6790

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.

Section 31-53b

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has 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, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268. (b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section. (c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project. (d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in

accordance with Federal Mine Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE, PROGRAM OR TRAINING

(Applicable to public works contracts as described by Conn. Gen. Stat. § 31-53(g) entered into *on or after July 1, 2009*)

(1) This requirement was created by Public Act No. 08-83, which is codified in Section 31-53b of the Connecticut General Statutes;

(2) The course, program or training is required for public works contracts as described by Conn. Gen. Stat. § 31-53(g) entered into on or after July 1, 2009;

(3) It is required of private workers (not state or municipal workers) and apprentices who perform the work of a mechanic, laborer or worker pursuant to the classifications of labor under Conn. Gen. Stat. § 31-53 on a public works project as described by Conn. Gen. Stat. § 31-53(g);

(4) The ten-hour construction safety and health course, program or training pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, a new mining training program approved by the Federal Mine Safety and Health Administration in accordance with 30 C.F. R. 48, or, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;

(5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;

(6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;

(7) Proof of course, program or training completion shall be demonstrated through the presentation of a "completion document" (card, document, certificate or other written record issued by federal OSHA or by the Federal Mine Safety and Health Administration) as defined by Conn. State Agencies Regs. § 31-53b-1(2).

(8) Any completion document with an issuance date more than 5 years prior to the commencement date of the public works project shall not constitute proof of compliance with § 31-53b;

(9) For each person who performs the duties of a mechanic, laborer or worker on a public works project, the contractor shall affix a copy of the completion document

to the certified payroll required to be submitted to the contracting agency for such project on which such worker's name first appears;

(10) Any mechanic, laborer or worker on a public works project found to be in non-compliance shall be subject to removal from the project if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;

(11) Any such employee who is determined to be in noncompliance may continue to work on a public works project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;

(12) The statute provides the minimum standards required for the completion of a construction safety and health course, program or training by employees on public works contracts; any contractor can exceed these minimum requirements.;

(13) Regulations pertaining to § 31-53b are located at Conn. State Agencies Regs. §31-53b-1 *et seq.*, and are effective May 5, 2009. The regulations are posted on the CTDOL website;

(14) Any questions regarding this statute or the regulations may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

November 29, 2006

Notice

To All Mason Contractors and Interested Parties Regarding Construction Pursuant to Section 31-53 of the Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.
Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute. The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- Laborers (Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine feet only.

- Power Equipment Operator (Group 9) - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

STATUTE 31-55a

- SPECIAL NOTICE -

To: All State and Political Subdivisions,Their Agents, and Contractors
Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.

- Each contractor affected by the above requirement 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 Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. 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.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

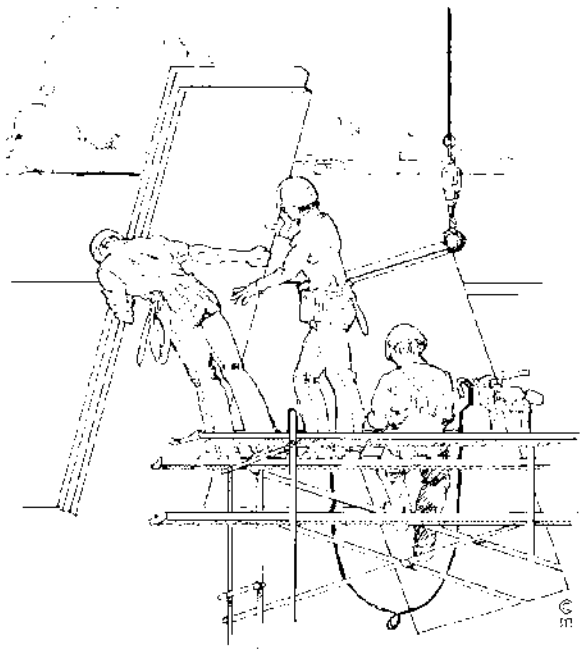
~NOTICE~

TO ALL CONTRACTING AGENCIES

Please be advised that Connecticut General Statutes Section 31-53, requires the contracting agency to certify to the Department of Labor, the total dollar amount of work to be done in connection with such public works project, regardless of whether such project consists of one or more contracts.

Please find the attached "Contracting Agency Certification Form" to be completed and returned to the Department of Labor, Wage and Workplace Standards Division, Public Contract Compliance Unit.

✎ Inquiries can be directed to (860)263-6543.



CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION
CONTRACT COMPLIANCE UNIT

CONTRACTING AGENCY CERTIFICATION FORM

I, _____, acting in my official capacity as _____,
authorized representative title

for _____, located at _____,
contracting agency address

do hereby certify that the total dollar amount of work to be done in connection with

_____, located at _____,
project name and number address

shall be $_____, which includes all work, regardless of whether such project

consists of one or more contracts.

CONTRACTOR INFORMATION

Name:_____

Address:_____
Authorized Representative:_____
Approximate Starting Date: _____

Approximate Completion Date:_____

_____ _____
Signature Date

Return To: Connecticut Department of Labor
Wage & Workplace Standards Division
Contract Compliance Unit
200 Folly Brook Blvd.
Wethersfield, CT 06109

Date Issued: _____

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM

Construction Manager at Risk/General Contractor/Prime Contractor

I,_____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

_____
Street

_____
City

and all of its subcontractors will pay all workers on the

_____
Project Name and Number

_____
Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

_____
Signed

Subscribed and sworn to before me this _____ day of _____,_____.

_____
Notary Public

Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

Rate Schedule Issued (Date): _____

CERTIFIED PAYROLL FORM WWS - CPI

In accordance with Connecticut General Statutes, 31-53 Certified Payrolls with a statement of compliance shall be submitted monthly to the contracting agency.

Note: Once you have downloaded these forms and are ready to print them out, set the print function on your PC to the horizontal print orientation.

Note2: Please download both the Payroll Certification for Public Works Projects **and** the Certified Statement of Compliance for a complete package. The Certified Statement of Compliance appears on the same page as the Fringe Benefits Explanation page.

Announcement: The Certified Payroll Form WWS-CPI can now be completed on-line!

- Certified Payroll Form WWS-CPI (PDF, 727KB)
- Sample Completed Form (PDF, 101KB)

[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each employee, to be attached to the first certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53
Certified Payrolls with a statement of compliance
shall be submitted monthly to the contracting agency.

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

Connecticut Department of Labor
Wage and Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

CONTRACTOR NAME AND ADDRESS:

SUBCONTRACTOR NAME & ADDRESS

WORKER'S COMPENSATION INSURANCE CARRIER

POLICY #

EFFECTIVE DATE:
EXPIRATION DATE:

PAYROLL NUMBER | Week-Ending Date | PROJECT NAME & ADDRESS

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE S	M	T	W	TH	F	S	Total ST Hours Total O/T Hours	BASE HOURLY RATE TOTAL FRINGE BENEFIT PLAN CASH	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS FICA	FEDERAL WITH-HOLDING	STATE WITH-HOLDING	LIST OTHER	GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
				HOURS WORKED EACH DAY								$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							

12/9/2013
WWS-CP1

*IF REQUIRED

*SEE REVERSE SIDE

PAGE NUMBER _____OF

OSHA 10 ~ATTACH CARD TO 1ST CERTIFIED PAYROLL

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker's compensation, income taxes, etc.).

Please specify the type of benefits provided:

1) Medical or hospital care _____ 4) Disability_____

2) Pension or retirement _____ 5) Vacation, holiday_____

3) Life Insurance _____ 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of _____,

I, _____of _____, (hereafter known as

Employer) in my capacity as _____ (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

a) The records submitted are true and accurate;

b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;

c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);

d) Each such person is covered by a worker's compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;

e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and

f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such persons name first appears.

_____ _____ _____

(Signature) (Title) Submitted on (Date)

*****THIS IS A PUBLIC DOCUMENT*****
*****DO NOT INCLUDE SOCIAL SECURITY NUMBERS*****

Weekly Payroll Certification For Public Works Projects (Continued)

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

Week-Ending Date:

Contractor or Subcontractor Business Name:

WEEKLY PAYROLL

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE S	M	T	W	TH	F	S HOURS WORKED EACH DAY	Total ST Hours Total O/T Hours	BASE HOURLY RATE TOTAL FRINGE BENEFIT PLAN CASH	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS FICA	FEDERAL WITH-HOLDING	STATE WITH-HOLDING	LIST OTHER	GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							

*IF REQUIRED

OCCUPATIONAL CLASSIFICATION BULLETIN

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53.

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification.

Below are additional clarifications of specific job duties performed for certain classifications:

- **ASBESTOS WORKERS**
  - Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.
- **ASBESTOS INSULATOR**
  - Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.
- **BOILERMAKERS**
  - Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.
- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**
  - Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.
- **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**
  - Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation

of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **CLEANING LABORER**

  - The clean up of any construction debris and the general cleaning, including sweeping, wash down, mopping, wiping of the construction facility, washing, polishing, dusting, etc., prior to the issuance of a certificate of occupancy falls under the *Labor classification.*

- **DELIVERY PERSONNEL**

  - If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

  - An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer/tradesman and not a delivery personnel.

- **ELECTRICIANS**

  - Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ***License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.**

- **ELEVATOR CONSTRUCTORS**

  - Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. ***License required by Connecticut General Statutes: R-1,2,5,6.**

- **FORK LIFT OPERATOR**

  - Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

  - Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

  - Glazing wood and metal sash, doors, partitions, and 2 story aluminum

storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce.

- **IRONWORKERS**
  - Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce. Insulated metal and insulated composite panels are still installed by the Ironworker.
- **INSULATOR**
  - Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings. Past practice using the applicable licensed trades, Plumber, Sheet Metal, Sprinkler Fitter, and Electrician, is not inconsistent with the Insulator classification and would be permitted.
- **LABORERS**
  - Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.
- **PAINTERS**
  - Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hanging+ for any and all types of building and residential work.
- **LEAD PAINT REMOVAL**
  - Painter’s Rate

1. Removal of lead paint from bridges.

2. Removal of lead paint as preparation of any surface to be repainted.

3. Where removal is on a Demolition project prior to reconstruction.

- Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.

2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

  - Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ***License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- **POWER EQUIPMENT OPERATORS**

  - ates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ***License required, crane operators only, per Connecticut General Statutes.**

- **ROOFERS**

  - Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (tear-off and/or removal of any type of roofing and/or clean-up of any and all areas where a roof is to be relaid)

- **SHEETMETAL WORKERS**

  - Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, facia, louvers, partitions, wall panel siding, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Insulated metal and insulated composite panels are still installed by the Iron Worker. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal

and composite lockers and shelving, kitchen equipment, and walk-in coolers.

- **SPRINKLER FITTERS**

  - Installation, alteration, maintenance and repair of fire protection sprinkler systems. ***License required per Connecticut General Statutes: F-1,2,3,4.**

- **TILE MARBLE AND TERRAZZO FINISHERS**

  - Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

  - **Definitions:**

    - 1) "Site of the work" (29 Code of Federal Regulations (CFR) 5.2(l)(b) is the physical place or places where the building or work called for in the contract will remain and any other site where a significant portion of the building or work is constructed, provided that such site is established specifically for the performance of the contact or project;

      - (a) Except as provided in paragraph (l) (3) of this section, job headquarters, tool yards, batch plants, borrow pits, etc. are part of the "site of the work"; provided they are dedicated exclusively, or nearly so, to the performance of the contract or project, and provided they are adjacent to "the site of work" as defined in paragraph (e)(1) of this section;

      - (b) Not included in the "site of the work" are permanent home offices, branch plant establishments, fabrication plants, tool yards etc, of a contractor or subcontractor whose location and continuance in operation are determined wholly without regard to a particular State or political subdivision contract or uncertain and indefinite periods of time involved of a few seconds or minutes duration and where the failure to count such time is due to consideration justified by industrial realities (29 CFR 785.47)

    - 2) "Engaged to wait" is waiting time that belongs to and is controlled by the employer which is an integral part of the job and is therefore compensable as hours worked. (29 CFR 785.15)

    - 3) "Waiting to be engaged" is waiting time that an employee can use effectively for their own purpose and is not compensable as hours worked. (29 CFR 785.16)

    - 4) "De Minimus" is a rule that recognizes that unsubstantial or insignificant periods of time which cannot as a practical administrative matter be precisely recorded for payroll purposes, may be disregarded. This rule applies only where there are uncertain and indefinite periods of time involved of a short duration and where the failure to count such

time is due to consideration justified by worksite realities. For example, with respect to truck drivers on prevailing wage sites, this is typically less than 15 minutes at a time.

- **Coverage of Truck Drivers on State or Political subdivision Prevailing Wage Projects**

  - Truck drivers **are covered** for payroll purposes under the following conditions:

    - Truck Drivers for time spent working on the site of the work.

    - Truck Drivers for time spent loading and/or unloading materials and supplies on the site of the work, if such time is not de minimus

    - Truck drivers transporting materials or supplies between a facility that is deemed part of the site of the work and the actual construction site.

    - Truck drivers transporting portions of the building or work between a site established specifically for the performance of the contract or project where a significant portion of such building or work is constructed and the physical places where the building or work outlined in the contract will remain.

  For example: Truck drivers delivering asphalt are covered under prevailing wage while" engaged to wait" on the site and when directly involved in the paving operation, provided the total time is not "de minimus"

  - Truck Drivers **are not** covered in the following instances:

    - Material delivery truck drivers while off "the site of the work"

    - Truck Drivers traveling between a prevailing wage job and a commercial supply facility while they are off the "site of the work"

    - Truck drivers whose time spent on the "site of the work" is de minimus, such as under 15 minutes at a time, merely to drop off materials or supplies, including asphalt.

These guidelines are similar to U.S. Labor Department policies. The application of these guidelines may be subject to review based on factual considerations on a case by case basis.

For example:

- Material men and deliverymen are not covered under

prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.

- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

Any questions regarding the proper classification should be directed to:

Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543

Rev. 07/13

Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES

Please Note: If the "Benefits" listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

- Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

- If the "Benefits" section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and (Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics
a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.

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

Glaziers
a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators
(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

AIA® Document A101™ – 2007

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

The following document is the AIA 101 – Standard Form of Agreement Between Owner and Contractor as modified by the University of Connecticut.
Modification Date: September 7, 2016

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year)

BETWEEN the Owner:
(Name, address and other information)

University of Connecticut
Capital Project & Contract Administration
3 North Hillside Road, Unit 6047
Storrs, Connecticut 06269

and the Contractor:
(Name, address and other information)

for the following Project:
(Name, location and description)

The Architect:
(Name, address and other information)

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

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ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, as amended, the AIA A201-2007 General Conditions, as amended, Drawings, Specifications, Bid Clarifications and Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others. Without limiting the foregoing, the Contractor shall furnish and install all materials, labor and equipment required to provide ******* as set forth in the Contract Documents enumerated in Article 9.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Paragraphs deleted)

Date of Commencement shall be fixed in the Notice to Proceed.

§ 3.2 The Contract Time shall be measured from the date of commencement.

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than ( ) days from the date of commencement, or as follows:

(Paragraph deleted)

(Row deleted)

, subject to adjustments of this Contract Time as provided in the Contract Documents.

(Paragraph deleted)

Liquidated Damages of _____ and 00/100 Dollars ($_____) per calendar day shall be assessed as provided in Paragraph 9.11 of the AIA A201-2007 General Conditions, as amended.

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ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents, and are hereby accepted by the Owner. The Contract Sum is the amount set forth in Section 4.1 and includes the amounts for the following alternates, if any, accepted by the Owner.

Alternate prices which reflect the work of the bid package under which this bid proposal was submitted shall remain valid for the life of the project, unless otherwise noted in the Contract Documents and include all costs for a complete installation. All pricing is inclusive of all costs of wages, applicable taxes, benefits, applicable insurance, overhead and profit. Alternate prices are good for both adds and deducts.

§ 4.3 Unit prices, if any are as follows:
All rates are inclusive of all costs of wages, applicable taxes, benefits, applicable insurance, overhead and profit. The rates provided will be negotiated and included as part of a subcontract. The Unit Prices herein shall remain valid for the life of the project and include all costs for a complete installation. Unit prices are good for both adds and deducts.

Item	Units and Limitations	Price Per Unit ($ 0.00)

§ 4.4 Allowances included in the Contract Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 5.1.3 The Owner shall make payments to the Contractor on each Application of Payment within 45 days of the Owner Representative's receipt of a properly submitted, correct and accepted Application, in accordance with the provisions of the AIA A201-2007 General Conditions, Article 9, as amended. The "Owner Representative" shall be as defined in AIA A201-2007 Paragraph 2.1.1.1.

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

Init.
/
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.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less the retainage applicable under Section 5.1.8 hereof. Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less the retainage applicable under Section 5.1.8 hereof;

.3 In addition, if the State Commission on Human Rights and Opportunities ("CHRO") authorizes the award or execution of this contract in advance of CHRO's approval of the Affirmative Action Plan required to be submitted by the Contractor pursuant to Connecticut General Statutes Section 46a-68d, the Owner will withhold an additional two percent (2%) of the total contract price per month from any payment made to such Contractor, until such time as the Contractor has received approval from CHRO of the Affirmative Action Plan. Moreover, if CHRO determines through its complaint procedure and the hearing process provided in Connecticut General Statutes Section 46a-56(c) that a contractor or subcontractor is not complying with anti-discrimination statutes or contract provisions required under Connecticut General Statutes Section 4a-60 or 4a-60(a) or the provisions of Connecticut General Statutes Section 46a-68c to 46a-68f, inclusive, and if so ordered by the presiding officer after such hearing and upon a finding of noncompliance, the Owner shall retain two percent (2%) of the total contract price per month on the contract with the Contractor.

.4 Subtract the aggregate of previous payments made by the Owner; and

.5 Subtract amounts, if any, for which the Owner Representative has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

.1 Add, upon Fifty Percent Completion (as defined hereinafter), a sum sufficient to increase total payments to the full amount of the Contract Sum for which Certificates for Payment have then been issued by the Architect, less the reduced retainage applicable under Section 5.1.8.2 hereof and the CHRO retainage described in Section 5.1.6.3 hereof, with such payment being made **not later than ninety days after submission of the Application for Payment for the Work that results in Fifty Percent Completion; provided, however, that such payment shall only be required hereunder to the extent applicable under Section** 49-41b of the Connecticut General Statutes;

.2 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Owner Representative shall determine for incomplete Work, retainage applicable to such work, the CHRO retainage described in Section 5.1.6.3 hereof, and unsettled claims;
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)

.3 Add, upon acceptance and written consent of Contractor's surety, if any, and a written statement from CHRO releasing the Owner from any obligation to withhold some or all of the amounts retained for CHRO retainage under Section 5.1.6.3 hereof, the Owner shall make payment of such CHRO retainage; and

.4 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

§ 5.1.8 Reduction or limitation of retainage, and other provisions regarding retainage, if any, shall be as follows:
(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)
§ 5.1.8.1 Applications for Payment prior to Fifty Percent Completion shall deduct retainage of seven and one half percent (7.5%) of the payment otherwise requested in such Application for Payment.

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§ 5.1.8.2 Applications for Payment following Fifty Percent Completion shall deduct retainage of five percent (5%) percent of the payment otherwise requested in such Application for Payment.

§ 5.1.8.3 "Fifty Percent Completion" is the stage in the progress of the Work when Certificates for Payment have been issued by the Architect for fifty percent (50%) of the Contract Sum then in effect, to the extent Owner has not, and does not intend to, withhold payment on such Certificates for Payment pursuant to Section 9.6.1. For the purposes of this Section, the Contract Sum includes, without limitation, amounts due for pending construction change orders and other pending change directives described in Section 9.3.1.1 of the AIA A201-2007 General Conditions and excludes any amounts paid by joint check pursuant to Section 9.5.3 AIA A201-2007 General Conditions.

§ 5.1.8.4 At the sole discretion of the Owner, reductions in retainage may be allowed before the Contractor reaches Substantial Completion. Such reductions shall not be allowed without written consent from the Contractor's surety. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 FINAL PAYMENT

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, subject to the provisions of the AIA A201-2007 General Conditions, Article 9, as amended.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Associate Vice President for University Planning, Design and Construction for the Owner and in the case of a project for UCONN Health ("UCH"), its Associate Vice President for Facilities Development & Operations will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

(Paragraphs deleted)

§ 6.2 BINDING DISPUTE RESOLUTION

(Paragraphs deleted)

NOT USED.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2

(Paragraphs deleted)

NOT USED.

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§ 8.3
(Paragraphs deleted)
NOT USED.

§ 8.4
(Paragraphs deleted)
NOT USED.

(Paragraph deleted)
§ 8.5The Contractor's representative shall not be changed without ten days written notice to the Owner.

§ 8.6 Other provisions:
The Contractor is hereby specifically cautioned that unless specifically authorized, in writing, by the University's Executive Vice President for Administration and Chief Financial Officer, or in the case of UCH its Chief Administrative Officer, on a case by case basis, the Contractor shall have no right to use, and shall not use, in any manner, the name of the University of Connecticut, its officials or employees, or the Seal of the University:
(a) in any advertising, publicity, promotion, nor;
(b) to express or to imply any endorsement of Contractor's work product or services.

§8.7 ETHICS AND COMPLIANCE
In accordance with the University's compliance program, the University has in place an anonymous ethics and compliance reporting hotline service – 1-888-685-2637. Any person who is aware of unethical practices, fraud, violation of state laws or regulations or other concerns relating to University policies and procedures can report such matters anonymously. Such persons may also directly contact the University's compliance office at: Office of Audit, Compliance, and Ethics, 9 Walters Avenue, Unit 5084, Storrs, CT 06269-5084; Phone 860-486-4526; Fax 860-486-4527. As a provider of goods and/or services to the University, you are hereby required to notify your employees, as well as any subcontractors, who are involved in the implementation of this contract, of this reporting mechanism.

§ 8.8 JOINT VENTURE
§ 8.8.1 If the Contractor is a joint venture, each joint venture partner shall be jointly, severally and individually responsible to the Owner for the performance of any and all obligations of the Contractor encompassed by this contract or as required by applicable law, and each joint venture partner shall be jointly, severally and individually liable to the Owner for any failures to perform such obligations in accordance with the contract or applicable law. In its dealings with the Owner, each joint venture partner shall have full authority to act in behalf of and bind the joint venture and any other joint venture partner. Each joint venture partner shall be considered to be the agent of the joint venture and of any other joint venture partner.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS
§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction, as amended and attached hereto.

§ 9.1.3 NOT USED.
(Table deleted)
§ 9.1.4 The
(Paragraphs deleted)
Specifications are those contained in the Project Manual, as the same may have been modified or supplemented by Bid Clarifications or Addenda. Without limiting the foregoing, the Specifications include those documents listed in the Table of Contents attached as Exhibit A.
(Table deleted)

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§ 9.1.5 The
(Paragraphs deleted)
Drawings shall be the documents listed on the List of Drawings – attached as Exhibit B.
(Table deleted)

§ 9.1.6 The Bid Clarifications or Addenda, if any, are as follows:

Number	Date	Pages

Portions of Bid Clarifications or Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents are as follows:

The Invitation to Bid dated _____ (the "Invitation to Bid")
Notice and Instructions to Bidders
Contractor's Proposal Form dated _____ ("Contractor's Form of Proposal")
(Paragraph deleted)
Labor Rates (which the parties acknowledge and agree are the Contractor's labor rates for the purposes of Section 7.2.2.3 of General Conditions, AIA A201 – 2007, as amended) attached as Exhibit C (the "Labor Rates")
CPM Schedule (which the parties acknowledge and agree is the schedule for the purposes of Section 3.10.1 of General Conditions, AIA A201 – 2007, as amended) attached as Exhibit D
Project Manual dated _____ (the "Project Manual")
Owner's Contractor Environmental, Health & Safety Manual
Payment and Performance Bonds (attached hereto)

ARTICLE 10 INSURANCE AND BONDS
The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007.

This Agreement is entered into as of the day and year first written above and is executed in at least two originals, of which one is to be delivered to the Contractor and one to the Owner.

This Agreement may be executed in counterparts, and each counterpart shall have the same force and effect as an original and, when taken together, shall constitute one and the same instrument and an effective binding agreement on the part of each of the undersigned. Execution of a facsimile or PDF copy shall have the same force and effect as execution of an original. Signed copies of this Agreement may be faxed and e-mailed with the same force and effect as if the originally executed Agreement had been delivered.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
Executive VP for Administration & CFO	
Duly Authorized: CGS §§ 10a-109d; 10a-109n *(Printed name and title)*	*(Printed name and title)*
Date:	Date:

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AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

The following document is the AIA A201 – General Conditions of the Contract for Construction as modified by the Owner.

Modification Date: July 28, 2016

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name and address)
University of Connecticut
Capital Project & Contract Administration
3 North Hillside Road, Unit 6047
Storrs, Connecticut 06269

THE CONTRACTOR:
(*Name and address*)

THE ARCHITECT:
(Name and address)

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of these General Conditions, as amended, the AIA A101-2007, as amended, Drawings, Specifications, Bid Clarifications and/or Addenda issued prior to execution of this Contract, other documents listed in this Contract and Modifications issued after execution of this Contract, all of which form the Contract, and are as fully a part of the Contract as if attached to this Contract or repeated herein. An enumeration of the Contract Documents, other than a Modification, appears in Article 9 of the AIA A101-2007. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, or (3) a written order for a minor change in the Work issued by the Architect.

§ 1.1.1.1 Whenever the words, "directed", "required", "ordered", "designated", prescribed", or words of like import are used, it shall be understood that the direction", "requirement", "order", "designation", or "prescription" of the Owner Representative is intended and similarly the words "approved", "acceptable", satisfactory", or words of like import shall mean, "approved by", or "acceptable to", or "satisfactory to" the Owner Representative unless otherwise expressly state. The "Owner Representative" shall be as defined in the AIA A201-2007 Section 2.1.1.1.

§ 1.1.1.2 Where "as shown", "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the Contract Documents accompanying this Contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place" that is, "furnished and installed".

§ 1.1.1.3 All personal pronouns used in this Contract, whether used in the masculine, feminine, or neuter gender, shall include all other genders; and the singular shall include the plural and vise versa. Title of Articles and Sections are for convenience only, and neither limit or amplify the provisions of this Contract in itself. The use herein of the word "including", when following any general statement, term, or matter, shall not be construed to limit such statement, term, or matter to the specific items or matters set forth immediately following such word or to similar items or matters, whether or not non-limiting language (such words as "without limitation", or "but not limited to", or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement, term or matter.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other 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, whether on or off the site of the Project, and including all labor, materials, equipment and services provided or to be provided by subcontractors, sub-subcontractors, material suppliers or any other entity for whom the Contractor is responsible under or pursuant to the Contract Documents.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

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§ 1.1.6 THE SPECIFICATIONS
The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

(Paragraphs deleted)
§ 1.1.7 THE PROJECT MANUAL
The Project Manual is a volume assembled for the Work, which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

§ 1.1.8 INSTRUMENTS OF SERVICE
Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.9 INITIAL DECISION MAKER
The Initial Decision Maker is the person identified in the AIA A101-2007 Contract Section 6.1to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Contract under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS
§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 In the event of inconsistencies within or between parts of the Contract Documents or between the Contract documents and applicable standards, codes, and ordinances, the Contractor shall: 1) provide the better quality or greater quantity of work, or 2) comply with the more stringent requirement; either or both in accordance with the Owner Representative's interpretation. The terms and conditions of this Section 1.2.1 however, shall not relieve the Contractor of any of the obligations set forth in Sections 3.2 and 3.7.

§ 1.2.1.1.1 Before ordering any materials or doing any Work, the Contractor and each Subcontractor shall verify measurements at the project site and shall be responsible for the correctness of such measurements. Any difference which may be found shall be submitted to the Architect for resolution before proceeding with the Work.

§ 1.2.1.1.2 If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit detailed drawings of such departure for approval by the Architect before making the change.

§ 1.2.2 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.

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

§ 1.2.4 In performing its obligations under this contract, the Contractor shall comply with all applicable statutes, laws, ordinances, regulations, codes, rules or orders of, or issued by any governmental body having jurisdiction over the Work, location of the Work, or the Contract.

§ 1.2.5 If any item, material, product or equipment is found to be specified in more than one Division Section or Article of the Specifications, the Contractor shall be responsible for determining which subcontractor or supplier shall provide the item.

§ 1.2.5.1 When applied to materials and equipment, the words "furnish", "install", and "provide" shall mean the following:

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The word "provide" shall mean to furnish, pay for, deliver, install, adjust, clean and otherwise make materials and equipment fit for their intended use, as specified in Section 3.5 of the General Conditions.

The word "furnish" shall mean to secure, pay for, deliver to site, unload, uncrate and store materials.

The word "install" shall mean to place in position, incorporate in the work, adjust, clean, make fit for use, and perform all services specified in General Conditions Section 3.5 except those included under the definition of the word "furnish" above.

The phrase "furnish and install" shall be equivalent to the word "provide".

§ 1.2.5.2 The phrase "match existing" shall mean the following:

Where Contract Documents call for exact matching, match existing work exactly in quality and appearance.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 EXECUTION OF CONTRACT

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

(Paragraphs deleted)

§ 1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.6.1 For the purposes of this Contract only, the Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect and the Architect's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect or the Architect's consultants, and unless otherwise indicated the Architect and the Architect's consultants shall be deemed the authors. The Owner will retain all common law, statutory and other reserved rights, including copyrights unless the Contract between the Owner and Architect provides otherwise. All copies of Instruments of Service, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' rights.

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§ 1.7 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Contract or the Contract Documents.

§ 1.8 PROVISIONS REQUIRED BY LAW DEEMED INSERTED

§ 1.8.1 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.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Contract and is referred to throughout the Contract Documents as if singular in number. Except as otherwise provided in Section 4.2.1, the Architect does not have any authority to act on behalf of the Owner. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.1.1 A staff member of the Owner shall be designated as the "Owner Representative". All contact and communication with the Owner shall be through the Owner Representative, or his or her designee. The Owner, on certain projects, may also retain the services of an outside Construction Administrator, who may be authorized to exercise certain contractual powers of the Owner Representative and/or the Architect. Should this occur, the Contractor will be advised in writing, as appropriate, of the scope and nature of this Construction Administrator's role pursuant to these Contract Documents.

§ 2.1.2 NOT USED.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 NOT USED.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall exercise proper precautions relating to the safe performance of the Work. Contractor shall review all such information and notify the Owner of any inaccuracies within twenty (20) days of its receipt.

§ 2.2.3.1 Data concerning site, size, access to site, staging and storing, present obstructions on or near the site, conditions of existing adjacent structures, locations and depths of sewers, conduits or pipes, gas lines, position of sidewalks, curbs and pavements, and other data concerning site conditions, has been obtained from sources Owner believes reliable. Accuracy of such data, however, is not guaranteed and is furnished solely for accommodation of Contractor. Use of such data is made at Contractor's sole risk and expense.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 The Contractor shall purchase such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the

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Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3. This right shall be in addition to and not in restriction or derogation of the Owner's rights under Article 14 hereof.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, after such seven (7) day period give the Contractor a second written notice to correct such deficiencies within a three (3) day period. If the Contractor within such three-day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

§2.5 EXTENT OF OWNER RIGHTS

§2.5.1 The rights stated in Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner (1) granted in the Contract Documents, (2) at law or (3) in equity.

§2.5.2 In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences or procedures for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Contract and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative. The Contractor shall not replace the Contractor's representative without the prior written consent of the Owner.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.1.4 The Contractor represents and warrants the following to the Owner (in addition to the other representations and warranties contained in the Contract Documents) as an inducement to the Owner to execute the Contract Documents, which representations and warranties shall survived the execution and delivery of the Contract Documents and the final completion of the Work;

(a) That it is financially solvent, able to pay its debts as they mature and possesses sufficient working capital to complete the Work and perform its obligations under the Contract Documents;
(b) That it, through its Subcontractors or otherwise, is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform its obligations hereunder and has sufficient experience and competence to do so;
(c) That it is authorized to do business in the State where the Project is located and properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and over the Work and the site of the Project;
(d) That its execution of the Contract Documents and its performance thereof have been duly authorized by all necessary corporate action; and

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(e) That its duly authorized representative has visited the site of the Work, familiarized himself with the local conditions under which the Work is to be performed and correlated his observations with the requirements of the Contract Documents.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor and all Subcontractor tiers have visited the site, become familiar with all existing conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 The Contractor and all Subcontractors shall visit the Project site and become acquainted with all existing conditions and conduct all tests, examinations or inspections including, but not necessarily limited to any subsurface investigations they deem necessary or as required by law, at their sole expense, to satisfy themselves as to existing conditions on the site, including sub-surface conditions. No such tests, examinations or inspections shall be conducted without the Owner's prior written approval and the Owner shall approve of any engineer or consultant engaged to perform such test, examination or inspection.

§ 3.2.3 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect and Owner Representative any errors, inconsistencies or omissions discovered or which should have been discovered by or made known to the Contractor as a request for information in such form as the Architect and Owner Representative may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. After reporting to the Architect any error, inconsistency, or omission which the Contractor may discover in the Contract Documents, the Contractor is not to proceed with any work so affected without the Architect's written response and or clarifications and, if required, Owner approval of Contract adjustments.

§ 3.2.4 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect and Owner Representative any nonconformity discovered, or which should have been discovered, by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.5 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities unless the Contractor recognized, or should have recognized, such error, inconsistency, omission or difference and knowingly failed to report it to the Architect and Owner Representative immediately.

§ 3.2.6 No compensation will be allowed by reason of any difficulties which the Contractor could have discovered or reasonably anticipated, prior to execution of the Contract by visiting the project site and observing existing conditions and/or comparing these to the Contract Documents at the time of shop drawings and/or submittals.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract

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Documents give other specific instructions concerning these matters. The Contractor shall schedule and perform the Work so as not to interfere with any other related work being performed by the Owner in or about the Project site. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for any damages, losses, costs and expenses resulting from the acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The Contractor shall send its qualified representative to periodic progress meetings held at such time and at such place as Architect or the Owner shall designate in accordance with the Contract Documents.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.2.1 In connection with any requests for substitutions, the Contractor:

.1 represents that the Contractor and Subcontractor or any applicable tier have personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;

.2 represents that the Contractor and proposed manufacturer will provide the same or superior warranty coverage for the substitution that the Contractor would for that specified;

.3 certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent;

.4 shall coordinate the installation of the accepted substitution, making such changes as may be required for the Work to be complete in all respects;

.5 shall make requests for substitutions within fifteen (15) days after Contract award or at the preconstruction meeting; and

.6 shall reimburse and compensate the Owner for any costs incurred in connection with, and/or the value of, any services performed by the Architect and/or the Owner Representative associated with addressing the request for substitution.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.4.3.1 The Contractor shall neither permit nor suffer the use of offensive language on or about the Work embraced in this Contract.

§ 3.4.3.2 The Contractor shall neither permit nor suffer lewd conduct on or about the Work embraced in this Contract.

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§ 3.4.3.3 All of Owner's buildings are smoke-free buildings. Additionally, the Contractor shall not permit outdoor smoking, where it creates a hazard, nor the introduction or use of drugs, spirituous or intoxicating liquors, on or about the Owner's property.

§ 3.4.3.4 The Contractor shall be fully responsible to the Owner for the acts of his Subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts of persons directly employed by him.

§ 3.4.3.5 The Contractor shall familiarize himself and act in compliance with the current "President's Policy on Harassment" including its provisions prohibiting sexual harassment.

§ 3.4.3.6 The Contractor is hereby specifically cautioned that unless specifically authorized in writing by the Owner's Executive Vice President for Administration and Chief Financial Officer or in the case of a UConn Health project, the Chief Administrative Officer, on a case by case basis, the Contractor shall have no right to use and shall not use, in any manner, the name of the Owner, its officials or employees, or the Seal of the Owner: (a) in any advertising, publicity, promotion; nor (b) to express or to imply any endorsement of Contractor's work product or services.

§ 3.4.4 Directions, specifications and recommendations by manufacturers for installation, handling, storing, adjustment, and operation of their materials or equipment shall be complied with, but the Contractor shall nonetheless have the responsibility of determining whether such directions, specifications, and recommendations may safely and suitably be employed in the Work, and of notifying the Architect in advance in writing of any deviation or modification necessary for installation safety or proper operation of the item.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Owner is a tax-exempt institution. The Contractor shall be familiar with the current regulations of the Department of Revenue Service. The tax on materials or supplies exempted by such regulations shall not be included as part of the Contract Sum, or any Application for Payment, or request for Change Order or other compensation. A Sales Tax Certificate is available from the Owner's Purchasing Department upon written request.

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

(Paragraph deleted)

§ 3.7.4 If any governmental body having jurisdiction over the Work requires licenses or registrations for the performance of the Work, or any part thereof, the Contractor shall hold such valid licenses or registrations as may be

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required by law to prosecute the Work to completion. If any part of the Work for which such a license or registration is required to be performed by Subcontractors of any tier, the Contractor shall ensure that any such Subcontractor holds such valid licenses or registrations as may be required by law to prosecute said Work to completion.

§ 3.7.5 Concealed or Unknown Conditions. See Section 15.1.8.

§ 3.7.6 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances, except when installation is specified as part of the allowance in Division 1 Specifications; and

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2, except when installation is specified as part of the allowance in the General Requirements (Division 1 of the Specifications).

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT AND PROJECT MANAGER

§ 3.9.1 The Contractor shall employ a competent full time superintendent(s) and necessary assistants who shall be in attendance at the Project site during performance of the Work for the duration of the entire Project. The superintendent shall be satisfactory to the Owner and the Contractor shall not replace the superintendent without the prior written consent of the Owner. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

§ 3.9.2 If not already identified as part of the Owner's pre-qualification process, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner's Representative and Architect the name, qualifications and references of the proposed superintendent(s).

§ 3.9.3 The superintendent(s) shall be satisfactory to the Owner and the Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. If for any reason the superintendent(s) is unsatisfactory, upon request of Owner, other qualified representatives shall be substituted. The Contractor shall not change the superintendent without the Owner's written consent, which shall not unreasonably be withheld or delayed.

§ 3.9.4 The Contractor shall employ a competent project manager and necessary assistants who shall be in attendance at the Project site during performance of the Work for the duration of the entire Project. The project manager shall be satisfactory to the Owner and the Contractor shall not replace the project manager without the prior written consent of the Owner. The project manager shall represent the Contractor, and communications given to

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the project manager shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

§ 3.9.5 If not already identified as part of the Owner's pre-qualification process, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name, qualifications and references of the proposed project manager.

§ 3.9.6 The project manager shall be satisfactory to the Owner and the Contractor shall not employ a proposed project manager to whom the Owner or Architect has made reasonable and timely objection. If for any reason the project manager is unsatisfactory, upon request of Owner, other qualified representatives shall be substituted. The Contractor shall not replace the project manager without the prior written consent of the Owner.

§ 3.9.7 Additional key personnel may be required for this project. The Contractor shall provide additional personnel as required to ensure proper project coordination.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, within ten (10) days of the date reflected on the Letter of Intent to Award, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall be in such format, and contain such information as the Owner may request or outlined in Division 1 of the Specifications. The schedule shall not exceed time limits current under the Contract Documents, shall, with the prior review and approval of the Owner and Architect, be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for simultaneous review and approval by the Owner and Architect. The Owner and Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Bid Clarifications and/or Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.1.1 In addition, the Contractor shall indicate on the drawings, as best as possible, all new and existing pipe and conduit runs which are concealed in the floor slabs, walls, ceilings, etc. The Contractor shall indicate on the drawing the electrical distribution panel and circuit number supplying each item installed or reconnected, with diagrammatic lines showing sequence of connections. All changes shall be identified and circled on the Architect's and Engineer's drawings at the time they occur for each such field change.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

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§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect or Engineer without action. Such action will not be grounds for time extension to the Contract.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect and the Owner Representative in writing of such deviation at the time of submittal and (1) the Owner Representative has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for

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conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.12.11 See Specifications for additional information on Shop Drawings.

§ 3.13 USE OF SITE

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 Nothing contained in the Contract Documents shall be interpreted as giving the Contractor exclusive use of the premises where the Work is to be performed.

§ 3.13.3 The Work in this Contract should not interfere with normal, continuous and safe operation of the buildings and site. If interference appears possible because of new connections to existing work or other reasons, the Work involved must be done at a time and in a manner approved by the Owner Representative as a part of the Contract.

§ 3.13.4 The Contractor shall comply with the following procedures when working in occupied areas including classrooms, hallways, and office spaces:

§ 3.13.4.1 **Notification:** The Contractor shall notify the Owner Representative and the Building Safety Committee Representative two (2) days prior to commencing work in occupied office, classroom and other areas. This notification shall include detailed description of proposed work.

§ 3.13.4.2 **Overhead Work:** There shall be no overhead work, (e.g. demolition, HVAC ductwork, and/or electrical) performed directly over occupied spaces.

§ 3.13.5 The Contractor shall produce a site mobilization plan for the Owner Representative's review and approval before beginning operations on site. This document shall be updated and submitted monthly. No deviations will be allowed without the prior approval of the Owner.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.14.3 Written permission shall be obtained from the Architect/Engineer before cutting beams, arches, lintels or other structural members.

§ 3.14.4 See Specifications for additional information on Cutting and Patching.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials and shall clean and/or remove all stains, spots, marks, blemishes, foreign matter and dirt from surfaces of the Work and from other surfaces not a part of the Work but where such conditions resulted from the Contractor's operations from and about the Project.

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§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect. In the event of legal action arising out of such infringement for which the Contractor is responsible and which action has the effect of stopping the Work, the Owner may require the Contractor to substitute other products of like kind as will make it possible to pursue and complete the Work. Costs and expenses caused thereby shall be borne by the Contractor.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall defend, indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the willful, wanton or negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18. Nothing in this Section shall be construed as obligating the Contractor to indemnify or hold harmless any of the parties indemnified hereunder against liability for damage arising out of bodily injury to persons or damage to property caused by or resulting from the sole negligence of any such indemnified party, or such party's agents or employees.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§3.18.3 The Contractor further agrees to obtain and maintain at it expense such general liability insurance coverage as will insure the provisions of this Section and other contractual indemnity obligations assumed by the Contractor in this Contract.

§ 3.18.4 The Contractor shall defend, indemnify and hold harmless the Owner, the Architect, and the Architect's consultants and their agents and employees from and against all claims, damages, losses, including, but not limited to, attorneys fees, arising out of or resulting from any type of pollution and/or environmental impairment into or upon the land, the atmosphere, or any course or body of water that is above or below ground, which is caused by any negligent or willful or wanton act or omission of the Contractor, subcontractors, or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. The Contractor shall further indemnify and hold harmless the Owner, the Architect, and the Architect's consultants, and the agents and employees of any of them, as set out above for any acts that are outside of the contract specifications, and without the supervision or direction of the Owner, its Architects and Engineers; additionally this same indemnification shall apply to the misuse or malfunction of any equipment rented, owned, or leased by the Contractor, subcontractor, or anyone directly or indirectly employed by any of them or anyone for whose acts they may be liable. Nothing in this Section shall be construed as obligating the Contractor to indemnify or hold harmless any of the parties indemnified

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hereunder against liability for damage arising out of bodily injury to persons or damage to property caused by or resulting from the sole negligence of any such indemnified party, or such party's agents or employees.

The Owner assumes no responsibility or liability from loss or damage to the Contractor's equipment, materials, or supplies.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Contract and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate For Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.2.1 Where it is stated in the Contract Documents that the Contractor shall pay for or reimburse the Owner for services of the Architect, such payment shall be at a rate of two and one half (2.5) times the Architect's Direct Personnel Expense plus any expenses incurred in providing such services. Direct Personnel Expense is defined as the direct salaries of the architect's personnel engaged on the Project and the portion of the cost of their mandatory and customary contributions and benefits related thereto, such as employment taxes and other statutory employee benefits, insurance, sick leave, holidays, vacations, pensions and similar contribution and benefits.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

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§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Owner Representative has authority to reject Work that does not conform to the Contract Documents. Whenever the Owner Representative considers it necessary or advisable for implementation of the intent of the Contract Documents, the Owner Representative will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. The Architect shall advise and assist the Owner Representative in performing any of the functions set forth in this Section.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Owner Representative or the Architect will prepare Change Orders and Construction Change Directives and may authorize minor changes in the Work as provided in Section 7.4..

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10. The undertaking of any inspections by the Architect is not to be construed as supervision of actual construction, nor to make the Architect responsible for providing a safe place for the performance of work by the Contractor of the Contractor's employees, or those of suppliers of subcontractors for access, visits, work, travel, or occupancy by any person.

§ 4.2.10 NOT USED.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until fifteen (15) days after written request is made for them.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The decisions of the Owner Representative, with the advice and consultation of the Architect on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

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ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable from the date of the Letter of Intent to Award, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within fourteen (14) days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection. The Contractor shall submit the list of the subcontractors along with their CT registration number and FEIN or social security number if no FEIN number is available, within ten (10) days of the Letter of Intent to Award.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.2.1 The Contractor shall not contract with a person or entity who appears on the State of Connecticut Debarment List, the Federal Davis Bacon Act Debarment List, both of which are available through:

http://www.ctdol.state.ct.us/

or the Federal List of Excluded Parties Listing System available through http://epls.arnet.gov/

or who is party to a legal dispute with the State of Connecticut.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work and is not ineligible to be contracted with in accordance with Section 5.2.2.1, the Contract Sum and/or Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity (including those who are to furnish materials or equipment fabricated to a special design) previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.2.5 As set forth more fully in the Notice and Instructions to Proposers, if the value of the masonry, electrical, mechanical (other than HVAC) and HVAC work each exceeds $25,000, the Contractor may be required to list the names and prices of Subcontractors for masonry, electrical, mechanical other than HVAC, and HVAC work, as well as other Subcontractors or as may be required by the Bid Documents. Substitution of a Subcontractor for one named in the Bid Document, or substitution of a Subcontractor for any designated sub trade work bid to be performed by the Contractor's own forces, shall not be permitted, except for good cause. The term "good cause" includes but is not limited to a Subcontractor's or where appropriate, 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

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to furnish any performance and payment bonds shown on the Proposal Form; (5) inability to obtain, or loss of, a license necessary for the performance of a 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; and (7) failure to perform its agreement to execute a Subcontract, as set forth in the Bid Documents.

§ 5.3 SUBCONTRACTUAL RELATIONS

§ 5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.2 Any Subcontract must be in the form as provided by the Owner in accordance with Section 4b-96 of the Connecticut General Statutes. Supplements or other forms of Subcontracts are permitted as long as all the basic elements of the Connecticut General Statutes Section 4b-96 form are covered. In the event of any conflict or inconsistency between the Connecticut General Statutes Section 4b-96 Subcontract form as provided by the Owner and the Contractor's standard Subcontract form, the provisions of the Connecticut General Statutes Section 4b-96 Subcontract form shall prevail. Any standard Subcontract form used will be attached as a supplement to the Connecticut General Statutes Section 4b-96 Subcontract form as provided by the Owner.

Within five days after being notified of an award of a general contract by the Owner or, in the case of an approval of a substitute Subcontractor by the Owner, within five days after being notified of such approval, the Contractor shall present to each listed and approved Subcontractor, or approved Substitute Subcontractor, which will be performing masonry, electrical, mechanical other than HVAC, or HVAC work, or which will be performing other subcontract work which the Owner has designated in the Bid Documents as applicable to the following requirements:

1. A Subcontract in the form as described above.
2. A notice of the time limit under this section for executing a Subcontract.

If such Subcontractor fails within five days, Saturdays, Sundays and legal holidays excluded after presentation of a Subcontract by the Contractor to execute a Subcontract in the form hereinafter set forth, the Contractor shall propose another Subcontractor for the Owner's consideration and approval. When seeking approval for a substitute Subcontractor, the Contractor shall provide the Owner with all documents showing (A) the Contractor's proper presentation of a Subcontract to the listed Subcontractor and (B) communications to or from such Subcontractor after such presentation. The Owner 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 prior Subcontractor if the new Subcontractor's price is lower and may adjust such Contract Price if the new Subcontractor's price is higher. The Contractor shall, with respect to each such Subcontractor or approved substitute Subcontractor, file with the Owner a copy of each executed subcontract within ten days, Saturdays, Sundays and legal holidays excluded, of presentation of a Subcontract to such Subcontractor.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

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.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract. Contractor agrees to execute any and all other documents reasonably required to effect the assignment.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than thirty (30) days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

§ 5.5 The Contractor shall promptly advise the Owner in writing of any claim or demand by a Subcontractor claiming that any amount is due to such Subcontractor or claiming any default by the Contractor in any of its obligations to such Subcontractor.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules and construction requirements. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement between the Owner and Contractor. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable. If any part of a Contractor's work depends on proper and timely execution or relies upon the interphasing or coordinating of the work of any other separate Contractor, or the Owner, the Contractor shall allow for this interrelationship in the planning and performance of his work, without interference to any other contractor.

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§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Owner Representative will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. All changes to the Work shall be approved by the Owner Representative. Except as permitted in Section 7.3, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alterations or additions to the Work, whether or not there is, in fact, any unjust enrichment shall be the basis for any claim for an increase in any amounts due under the Contract Documents or a change in any time period provided for the Contract Documents..

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Owner or Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

There shall be no extension in the Contract time unless the Contractor can effectively demonstrate that the Work delayed is on the critical path of the Project Schedule in accordance with Section 8.3.

The signature of the Architect signifies that he has reviewed the change proposed, with accompanied breakdowns and subcontractors change proposals for appropriate quantities and unit costs and recommends the change. However, if the Contractor and the Owner Representative have signed the change order, the Architect's signature is not necessary in order for the Change Order to constitute a modification to the Contract which binds the Owner and the Contractor.

§ 7.2.2 CHANGE ORDER COST COMPONENTS

The contractor's proposal for a change in the Work shall be itemized completely, submitted in a detailed format acceptable to the Owner and shall include the following itemized cost components, as appropriate:

§ 7.2.2.1 Engineered Equipment and Materials:

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Engineered Equipment shall be defined as equipment specified by the contract from a single manufacturer. **Material** (bulk materials) shall be defined as permanent construction materials that become part of the completed installation Engineered Equipment and Material costs shall be considered all-inclusive of the purchase cost of the equipment including all freight costs, purchasing services, expediting, and inspections and shall be substantiated by manufacturer quotes subject to review and approval by the Owner's representative, with the advice of the Architect.

§ 7.2.2.2 Direct Field Labor Hours:
Direct labor work hours for change orders shall be itemized indicating the estimated direct labor to be expended in the actual installation of equipment and materials that will become a permanent part of the finished project. The quantity of hours shall be based upon the contractor's estimate to complete the work based upon actual field conditions subject to review and approval by the Owner's representative, with the advice of the Architect.

§ 7.2.2.3 Direct Field Labor Costs:
Direct field labor costs are defined as cost of the direct labor estimated in the actual installation of equipment and materials that will become a permanent part of the finished project. Direct field labor may include hourly labor classifications for foremen, journeymen, apprentices, laborers, etc. Direct field labor costs may include e contractor's direct labor payroll costs including social security, unemployment (federal and state), workers' compensation insurance, fringe benefits, and any other identified costs directly related to direct labor subject to review and approval by the Owner's representative, with the advice of the Architect.

The contractor's direct labor rates as outlined above are to be substantiated by a detailed direct labor cost breakdown with associated back-up support in a form acceptable to the Owner.

If the project is subject to prevailing wage rates, no wage above the prevailing rate shall be allowed unless such rate is substantiated by documentation of actual wages paid in the proposed amount or subject to labor rates submitted and accepted by the Owner as part of the contract documents.

§ 7.2.2.4 Construction Equipment and Tool Rental:
Contractor owned or rented equipment and major tools costs are allowed as part of the cost of a Change Order if it is demonstrated to the Owners satisfaction that such costs are valid and related to the change in work. Major tools shall be defined as non-hand held tools. Pricing rates for equipment and major tools shall be acceptable if agreed to by the Owner. In such cases, equipment costs shall be submitted for review and approval by the Owner, with the advice of the Architect. Changes that require specialized equipment not already on site shall have costs shown separately and shall include justification.

§ 7.2.2.5 Field Overheads (Indirects):
Field overhead (indirect) labor shall include field (onsite) supervision (superintendent, general foremen, field engineers)

Field overhead (Indirects) are allowed as part of a cost of a Change Order if it is demonstrated to the Owners satisfaction that such costs are valid and related to the change in work. In such cases additional costs of supervision and directly attributable to the change based on supporting data additional shall be submitted for review and approval by the Owner, with the advice of the Architect. The hourly rate for such personnel shall be based upon rates submitted to and approved by the Owner with the advice of the Architect. Changes that require specialized personnel or additional staff shall have costs shown separately and shall include justification.

Field Facilities shall include the following classifications, as applicable:

1. Temporary offices (office furniture, copiers, computers, printers, other office equipment and supplies)
2. Temporary material storage (storage vans and containers, warehouse rental)
3. Utilities (electricity, phones, data lines, restroom facilities)

Field Facilities costs are not allowed as part of the costs of a Change Order except in the event that a change involving an adjustment in contract time is submitted and approved in accordance with Section 8.3 or for changes that do not impact the critical path, it is demonstrated to the Owners satisfaction that such incremental costs are valid and related to the change in work. In such cases, Field Facilities costs shall be submitted for review and approval by the Owner, with the advice of the Architect.

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§ 7.2.2.6 As noted in Section 3.6, the Owner is a tax exempt institution. The tax on materials or supplies exempted by the current regulations of the Department of Revenue Services shall not be included as a cost component of any Change Order or Change Order request/proposal.

§ 7.2.2.7 **Subcontractors:**
Subcontractors shall adhere to the same contract requirements and shall utilize change order pricing methodology that is consistent with the general contractor's contractual agreement with the owner. Include detailed Subcontractor cost proposals as backup to all subcontractor pricing.

§ 7.2.2.8 **General and Administrative Overhead (Home Office) Costs and Profit (Overhead and Profit):**
Overhead and Profit shall be applied as a percentage to the total cost of the change and shall include:

1. All home office expenses;
2. Safety related items, including safety equipment, safety administration, and all related costs associated with the contractor's safety program;
3. Small tools, which are defined as construction tools with a value of up to $500;
4. Consumable materials, which are normally used in the execution of the work and as may be further defined in the general conditions section of the specifications;
5. Indirect costs as related to field administrative personnel (project manager, field safety supervisor, planners, estimators, office manager, secretarial services, document control);
6. Indirect costs as related to support staff;
7. Commercial General, Automobile, Umbrella, Aircraft and Contractor's Pollution Liability Insurance as described in Section 11.1.2;
8. Parking;
9. Safety;
10. Commissioning Requirements;
11. Such other items as are commonly considered part of home office overhead;
12. Company vehicles, gas, mileage and travel time;
13. Union-related contributions, fees, expenses and costs;
14. Any training; and
15. Licenses.

§ 7.2.2.9 The determination of overhead and profit allowance for a contract change shall be based on the total direct cost of the work including material, labor, and equipment cost, as appropriate, utilizing the Contractor/Subcontractor Combined Overhead and Profit Markup Table as follows:

Contractor/Subcontractor Combined Overhead and Profit Markup Table:	
Contractor markup on self performed work	15%
Contractor markup on subcontractor work.	5%
Subcontractor markup on self performed work.	15%
Subcontractor markup on first tier sub-subcontractor work.	5%
Sub-subcontractor markup on self performed work.	10%
Subcontractor markup on Sub-subcontractor subtier work	0%
Sub-subcontractor markup on subtier work.	0%

§ 7.2.2.10 Upon computing of the direct costs and applying the Section 7.2.2.9 mark ups to the direct costs on a compounded basis, the aggregate allowance for overhead and profit on any contract change shall not exceed twenty percent (20%).

§ 7.2.2.11 Overtime, when specifically authorized by the Owner and not as an Extraordinary Measure (as defined in Section 8.2.3.2), shall be paid for by the Owner on the basis of premium payment only, plus the cost of insurance and taxes based on the premium payment period.

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§ 7.2.2.12 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Owner Representative. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.2.2.13 If the Contractor does not expeditiously proceed with the work in dispute, the Owner may, in its sole discretion, cause the work to be performed by other forces, and may issue a Change Order deducting the actual cost of the work to the Owner from the Contract Sum.

§ 7.2.2.14 Bond Costs: 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. Such Bond Costs will be adjusted as a final Change Order to the Contractor with no additional fee or mark-up.

§ 7.2.3 The Contractor shall submit cost proposals only on "Change Order Proposal Request Form" provided in Division 1of the Specifications or on a form and in a format acceptable to the Owner. In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, unit prices, and Subcontracts. Subcontract proposals included in any work shall also be itemized.

§ 7.2.4 Alternates awarded by Change Order after Contract execution are not subject to Contractor , Subcontractor or Subcontractor tiers overhead and profit mark-up.

§ 7.2.5 Agreement upon and execution of any Change Order shall constitute a final settlement of all matters relating to the change in the Work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the construction schedule. In the event a Change Order increases the Contract Sum, Contractor shall include the Work covered by such Change Orders in Application for Payment as if such Work were originally part of the Contract Documents.

§ 7.2.6 Any percentage referred to hereafter for General Conditions, and/or Overhead and Profit included in the adjustment to the Contract Sum shall be applied to the costs of performing the work attributable to the change as stated in 7.3.7.1 through 7.3.7.6. No markup shall be allowed for premiums on bonds and insurance.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Owner Representative or Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly. The signature of the Architect signifies that he has reviewed and recommends the change. However, if the Owner Representative has signed the Change Directive the Architect's signature is not necessary in order for the Change Directive to be valid

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for a proposed adjustment to the Contract Sum and/or Contract Time, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that

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application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. The Contractor must proceed promptly regardless if the directive is signed by the Contractor.

§ 7.3.7 If the contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method for adjustment in the Contract Sum and/or Contract Time shall be determined at the sole discretion of the Owner Representative, on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit in accordance with Section 7.2. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Owner Representative may prescribe, an itemized accounting together with appropriate supporting data. Any increase to Contract time will be limited to only changes that have been demonstrated through a critical path analysis in conformance with Section 8.3 and Division 1 of the Contract Documents to extend the Project end date. Unless otherwise provided in the Contract Documents, costs of performing the Work attributable to the changes for the purposes of this Section 7.3.7 shall be limited to the following as defined in Section 7.2:

.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools and any hand-held equipment, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds, permit fees, and sales, use or similar taxes related to the Work; and

.5 Additional costs of field overhead personnel directly attributable to the change based on supporting data.

§ 7.3.8 If the Contractor does not expeditiously proceed with the work in dispute, the Owner may, in its sole discretion, cause the work to be performed by other forces, and may issue a Change Order deducting the actual cost of the work to the Owner from the Contract Sum.

§ 7.3.9 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Owner Representative. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.10 When the Owner and Contractor agree concerning the adjustments in the Contract Sum and/or Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order, Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect, subject to approval of the Owner Representative, has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

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§ 8.1.2 The date of commencement of the Work is the date established in the Notice to Proceed.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Contract the Contractor confirms that the Contract Time is a reasonable period for performing the Work and that the Contractor is capable of properly completing the Work within the Contract Time.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.2.3.1 The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. The accepted construction schedule shall be updated to reflect actual conditions (sometimes referred to as progress reports) as set forth in Section 3.10.1 of AIA Document A201 or if requested by the Owner. In the event any progress report indicates any delays or potential delays, the Contractor shall advise the Owner of its plan to recover the schedule, providing the Owner with a recovery schedule, and shall further take all steps necessary to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report or recovery schedule constitute an adjustment in the Contract Time or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

§ 8.2.3.2 In the event the Owner determines that the performance of the Work has not progressed or reached the level of completion required by the approved construction schedule for reasons within the responsibility of the Contractor, the Owner shall have the right to order the Contractor to take any and all corrective measures necessary to expedite the progress of construction, including, without limitation, (1) working additional shifts or overtime, (2) supplying additional manpower, equipment, and facilities and (3) other similar measure (hereinafter referred to collectively as "Extraordinary Measures"). Such Extraordinary Measure shall continue until the progress of the Work complies with the stage of completion required by the approved construction schedule. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the construction schedule.

§ 8.2.3.3 The Contractor shall not be entitled to any adjustment in the Contract Price in connection with Extraordinary Measures required by the Owner, if the Owner determines that the conditions creating the need for such Extraordinary Measures were within the responsibility of the Contractor.

§ 8.2.3.4 The Owner may exercise the rights furnished the Owner under or pursuant to this Section as frequently as the Owner deems necessary to ensure that the Contractor's performance of the Work will comply with any approved construction schedule or completion date established in accordance with the Contract.

§ 8.2.4 The Contractor and the Owner agree that the times specified for the performance of the Contract shall include not only the work of the original Contract but any additional work ordered by the Owner which, in the opinion of the Owner Representative, can be performed concurrently with the original work specified and therefore do not warrant the granting of an extension of time.

§ 8.2.5 Except in the event of emergency, no substantial field operations shall be performed outside of regular working hours without the prior approval of the Architect and the Owner. The Contractor shall not be entitled to additional compensation for work performed outside of regular working hours.

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§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, or unavoidable casualties beyond the Contractor's control, then the Contract Time may be extended by Change Order for such reasonable time periods as demonstrated through a Critical Path Analysis in conformance with Division 1 of the Contract Documents and accepted by the Owner Representative.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.2.1 Claims of delay and requests for extension of time shall set forth in detail the circumstances of such claim, the dates upon which claimed delay began and ended, and the number of days' extension of time requested. The Contractor shall provide supporting documentation as the Architect and Owner may require, including a revised Construction Schedule indicating the affect of the circumstances which form the basis for the claim.

§ 8.3.2.2 The contractor shall not be entitled to an extension of time for each and every one of a number of causes which have a concurrent and interrelated effect on the progress of the Work.

§ 8.3.2.3 Claims for extension of time arising out of authorized changes in the Work shall be made in writing prior to or concurrent with the submission of the Contractor's proposal for such change. No extension of time arising out of changes in the Work will be granted after the date upon which the Contractor is authorized to proceed with such change unless specific provision for an extension of time has been incorporated in the authorization.

§ 8.3.2.4 Any additional cost to the contractor arising from such change shall be included in the amended Contract Sum set forth in such Change Order. No claim for damages for delay, arising from such change in the Work, shall be recognized or be deemed valid.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Contract and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

§ 9.2.1 Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Owner Representative may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.2.1.1 Submission of the Schedule of Values shall be made within five (5) days for projects under One Million Dollars ($1,000,000.00) and for all others within thirty (30) days of the Contract execution.

§ 9.2.1.2 The Schedule of Values shall be submitted (typewritten) on an AIA Document G702 form and should be broken down into a minimum of sixteen (16) divisions based on the Construction Specifications Institute (CSI) Guidelines and subdivided further by Materials and Labor.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 By the twenty-fifth of each month, the Contractor shall submit to the Owner Representative and the Architect a Draft Application for Payment for Work in the form of an AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet. The latest edition of each document must be used.

The Owner Representative and the Architect will within ten (10) days after receipt of the Contractor's Draft Application for Payment notify the Contractor in writing of all necessary revisions.

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The Contractor shall make all revisions to the Application for Payment as required by the Owner Representative.

The Contractor shall then submit to the Owner Representative and the Architect an Application for Payment for Work in the form of a notarized AIA Document G702, Application for Payment, supported by AIA Document G703, Continuation Sheet, free of any handwritten, marks, notes, annotations, etc. and an Affidavit of Payment and Release of Claims form (either partial release or final release as appropriate) in a form as provided by the Owner.

By submission of the Affidavit and the Application for Payment the Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown therein is now due.

§ 9.3.1.1 Each payment requisition submitted by the Contractor shall include a statement showing the status of all pending construction change orders, other pending change directives and approved changes to the original contract or subcontract. Such statement shall identify the pending construction change orders and other pending change directives, and shall include the date such change orders and directives were initiated, the costs associated with their performance and a description of any work completed. As used in this subsection, "pending construction change order" or "other pending change directive", means an authorized directive for extra work that has been issued to a contractor or a subcontractor.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 Applications for Payment shall deduct, from the amounts other claimed due, the retainage and other amounts to be withheld pursuant to Section 5.1.6 of the AIA A101-2007. The Contractor shall be prohibited from withholding more than the retainage withheld by the Owner pursuant to Sections 5.1.6.1 and 5.1.6.2 of the AIA A101-2007 from any payment which is otherwise due to any Subcontractor.

§ 9.3.1.4 Whenever the Owner has designated a separate section for a class of work the Contractor shall, when applicable, state as part of its application for partial payment that it considers the work required to be done under any such separate section to be fully completed in accordance with the terms of the Contract. The Owner shall thereupon conduct an inspection of the work in such class, and if it finds that such work has been fully completed in accordance with the terms of the Contract, it shall issue a statement certifying that such work is accepted as fully completed, and shall pay the Contractor in full for such work.

§ 9.3.2 Unless otherwise specifically approved, the Owner will pay only for material and equipment delivered and incorporated in the Work. If approved in advance by the Owner, payment may be similarly made for material and equipment suitably stored on site or off site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.2.1 Payment for stored material either on site or off site will require Owner's prior approval. Approval will be dependent upon demonstration of hardship due to extended time duration between required purchase and actual field installation or the critical nature of the commodity in relationship to the critical path of the construction schedule. Additionally, the Contractor must provide secured storage, insurance coverage for the material during storage, transfer of ownership of the material to the Owner and indemnify the Owner from any delay, cost associated with or resulting from, the loss or damage of such material during such storage. Payment for such material will be paid for at 80% of invoice verified cost. No stored payment will be considered for raw materials. Those items requiring fabrication must be complete so that identification and appropriate documentation can be obtained to insure such items are part of the work identified in this Contract.

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§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.3.4 If payment for stored products is approved, Contractor shall furnish with Application for Payment a vendor invoice establishing value of material and equipment stored along with a statement of amount to be paid to vendor.

§ 9.3.4.1 Such stored items are subject to prior approval for storage and to inspection by Architect and Owner before payment is recommended.

§ 9.3.4.2 Contractor shall give Owner Certificates of Insurance in accordance with Contract Documents for the full value of the items stored. Insurance to be maintained until items are incorporated in the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect following consultation with the Owner Representative may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. The Architect following consultation with the Owner Representative may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

.1 after prior notice, defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims unless full bond coverage, insurance or security acceptable to the Owner is provided by or demonstrated by the Contractor, or unless the Contractor demonstrates to the Owner that the claims do not have a reasonable basis in fact;

.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment in accordance with the provisions of this Contract;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

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.5 injury to persons or damage to the Work or property of the Owner, other Contractors, or others caused by the act of neglect of the Contractor or any of his Subcontractors;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance of the Contract Sum would not be adequate to cover actual or liquidated damages for the anticipated delay unless the Contractor demonstrates to the satisfaction of the Owner that it or others for whom it is responsible are not responsible for such delay;

.7 repeated failure to carry out the Work in accordance with the Contract Documents;

.8 failure to submit Construction Schedules as outlined in Division 1 of the Specifications in the time prescribed;

.9 failure to submit all documents necessary for compliance with CHRO requirements;

.10 failure to submit all copies of all certified payrolls;

.11 failure to provide copies of subcontractors contracts per statute; or

.12 failure to submit any other documentation requested by the Owner necessary for compliance with the requirements of any regulatory agency.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld. The Owner shall not be deemed in default by reason of withholding payment while any of the above grounds remain uncured, nor shall any interest accrue or be payable with respect to any payments so withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.5.4 The Owner shall have the right to apply any such amounts so withheld in such manner, as the Owner may deem proper to satisfy such claims or to secure such protection. Such application of such amounts shall be payments to the Contractor.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has certified the Application for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, or shall so notify the Contractor of the Owner's intent to withhold payment to the extent reasonably necessary to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions of its Subcontractors due to the causes set forth in Section 9.5.1.

§ 9.6.2 For every Contract with the Owner for the construction, alteration or repair of any building or work;

.1 The Contractor within thirty (30) days after payment to the Contractor by the Owner, shall be required to 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 Owner;

.2 The 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 (30) days after each Subcontractor receives a payment from the Contractor which encompasses labor or materials furnished by such Subcontractor.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven (7) days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

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§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Pursuant to Connecticut General Statutes Sections 10a-109a through 10a-109y:

.1 No payments shall be made by the Owner on account of this Contract for this project until the bills or estimates presented for such payments shall have been duly certified to be correct by the Owner;

.2 The obligations of the Owner or the State of Connecticut to make payments to the Contractor for services, labor, or materials provided on this project are limited to those amounts set forth in the Contract Documents and any agreed upon changes or amendments thereto. Neither the Owner nor the State of Connecticut shall or may be liable to make payments in excess of such amount.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven (7) days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven (7) days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven (7) additional days' written notice to the Owner and Architect be entitled to the applicable statutory interest.. Said provision does not apply where the Owner has submitted to the Contractor its intention to withhold payment in accordance with Section 9.6.1 or where the Architect has submitted to the Contractor its intention to withhold certification in accordance with Section 9.5.1.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize without impact or interruptions the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. The Certificate of Substantial Completion shall become valid upon the written approval thereof by the Owner Representative.

§ 9.8.6 **Certifications.** The Contractor at completion of construction shall provide to the Owner a "Certificate of Substantial Compliance" bearing original signatures of an officer of the company stating: "This is to CERTIFY

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that in my professional opinion the complete structure/renovations described above is in substantial compliance with the approved construction documents on file with the Owner. Minor deviations and special stipulations are noted below (if any)".

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits 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 the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (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, (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 until at least thirty 30 days' prior written notice has been given to the Owner, (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, (4) consent of surety, if any, to final payment, (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, (6) all documents necessary for compliance with CHRO requirements and as required to obtain the written statement of release from CHRO referenced in Section 9.8.5, (7) copies of all certified payrolls, (8) certifies that all material installed does not contain asbestos, (9) the Certificate of Substantial Compliance referenced in Section 9.8.6, and (10) any other documentation requested by the Owner necessary for compliance with the requirements of any regulatory agency. 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 claim. If such claim remains unsatisfied after payments are made to the Contractor, the Contractor shall promptly pay to the Owner all money that the Owner may be compelled to pay in discharging such claim, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the

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Owner shall, upon application by the Contractor, the written approval of the Owner Representative and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4
(Paragraphs deleted)
NOT USED.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.11 LIQUIDATED DAMAGES
§ 9.11.1 Time is of the essence to the Contract Documents and all obligations there under. The Contractor acknowledges and agrees that if the Contractor fails to achieve Substantial Completion, or causes any delay to the Substantial Completion of any portion of the Work within the Contract Time, as may be extended by the Owner, the Owner will sustain extensive damages and serious loss as a result of such failure. The exact amount of such damages will be difficult to ascertain. Therefore, the Owner and the Contractor agree as follows:

.1 If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time and as otherwise required by the Contract Documents, the Owner shall be entitled to retain or recover from the Contractor, as liquidated damages and not as a penalty, the amount per calendar day specified in §3.3 of the AIA A101-2007 for every calendar day that the Contractor is in default, commencing upon the first day following the expiration of the Contract Time and continuing until the actual date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable pre-estimate of damages the Owner will incur as a result of delayed completion of the Work.

.2 The Owner shall be entitled to recover as actual damages the Owner's costs, expenses and damages it incurs in connection with the completion of the Work in the event that the Contractor fails to complete the Work, and/or the Contractor's surety fails to perform the Work pursuant to any Performance Bond. The Owner shall be entitled to recover as actual damages any payments it makes to any subcontractor or materials supplier that the Contractor's surety fails to pay pursuant to any Payment Bond.

.3 The Owner may deduct liquidated damages described in Clause 9.11.1.1 from any unpaid amounts then or thereafter due the Contractor under this Contract. Any liquidated damages not so deducted from any unpaid amounts due the Contractor shall be payable to the Owner, together with interest from the date of the demand at the legal rate.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY
§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS
§ 10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. Prior to and as a condition of mobilization on site, the Contractor shall submit a Safety Plan to Owner. To the extent the Owner provides safety manuals or other information, any such manuals and information shall be deemed minimum requirements for the Contractor's fulfillment of its safety obligations. Safety fines may be assessed based on Owner's safety plan and or Occupational Safety and Health Administration ("OSHA") .

§10.1.1.1 In accordance with C.G.S. Section 31-53b, the Contractor is required to submit proof that each employee has completed a course of at least ten hours in duration in construction safety and health approved by the federal OSHA.

§10.1.1.2 The Contractor shall remove all snow and ice as may be required for the proper protection and/or prosecution of the Contractor's work. The Contractor shall coordinate and cooperate with the Owner for such activities.

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§ 10.1.2 **Contractors Safety Program:** The Contractor hereby acknowledges that the job site safety will be of utmost importance. Contractor shall be responsible for initiating, maintaining and supervising safety and anti-substance abuse precautions and programs in connection with the Work. Contractor shall provide all protection to prevent injury to all persons involved in any way in the Work and all other persons, including, without limitation, the employees, agents, guests, visitors, invitees and licensees of the Owner who may visit or be affected thereby. These precautions shall include, but in no event be limited to: (1) those set forth in the most current provisions of the Owner's Contractor Environmental Health and Safety Manual, which is incorporated by reference as a Contract Document; (2) the posting of danger signs and personal notification to all affected persons of the existence of a hazard of whatever nature; (3) the furnishing and maintaining of necessary traffic control barricades and flagman services; (4) the use, or storage, removal and disposal of required explosives or other hazardous materials only under the supervision of qualified personnel and after first obtaining permission of all applicable governmental authorities; (5) and the maintenance of adequate quantities of both hose and operable fire extinguishers at the job site. The Contractor shall set forth in writing its own safety and anti-substance abuse precautions and programs in connection with the Work and if requested by the Owner submit the same to the Owner or its designee for review. The Owner may but shall not be obligated to make suggestions and recommendations to the Contractor with respect thereto.

.1 **Compliance of Work, Equipment and Procedures with all Laws:** All Work, whether performed by the Contractor and its Subcontractors of any tier, or anyone directly or indirectly employed by any of them, and all equipment, appliances, machinery, materials, tools and like items incorporated or used in the Work, shall be in compliance with and conform to: (a) all applicable laws, ordinances, rules, regulations and orders of any public, quasi-public or other governmental bodies relating to the safety of persons and their protection against injury, specifically including, but in no event limited to the Federal Occupations Safety and Health Act of 1970, as amended and all rules and regulations now or hereafter in effect pursuant to said Act and the OSHA Act of the State of Connecticut, as amended and all rules and regulations now or hereafter in effect pursuant to said Act; and (b) all rules, regulations and requirements of the Owner and its insurance carriers relating thereto, including without limitation the O. In the event of conflicting provisions the more stringent shall govern. The Owner reserves the right to assess fines and penalties to the Contractor for violations of the Owner's Contractor Environmental Health and Safety Manual as may be more specifically referred to in the Manual and may deduct such fines and penalties from any payments due the Contractor under the Contract.

.2 **Contractors Designation of Safety Program Administrator:** The Contractor shall designate a qualified member of its organization at the job site in accordance with the requirements of the Owner's Contractor Environmental Health and Safety Manual whose duties shall include enforcement of the Contractor's Safety Program to assure compliance with Article 10 and to prevent accidents. This position may be required to be a full time position dedicated to this Project. This person's name, qualifications and the estimated number of man-hours of effort per week performing this function shall be submitted to the Owner in writing. His or her identity, qualifications and level of effort must be satisfactory to the Owner who shall have the sole discretion to approve or reject same. Any reduction to this schedule must be submitted to the Owner for approval. The Contractor shall further cause each of its Subcontractors of any tier to designate a qualified safety representative to assist the Contractor's Representative in the performance of its duties as described above and the names of such representative shall be given to the Owner.

.3 **Suspension of Contractor's Work:** If in the opinion of the Owner or its designee the Contractor shall fail to provide a safe area for the performance of the Work or any portion thereof the Owner or its designee shall have the right but not the obligation to suspend Work in the unsafe area. Contractor shall be liable for all costs incurred of any nature (including without limitation overtime pay, liquidated damages or other costs resulting from delays) resulting from the suspension.

.4 **Right of Owner to have Contractor Send Worker Home:** The Contractor shall provide to each worker on the job site the proper safety equipment for the duties being performed by that worker and will not permit any worker on the job site who fails or refuses to use the same. The Owner shall have the right but not the obligation to order the Contractor to cause any worker to be sent home for the day or to otherwise temporarily or permanently remove him or her from the job site for his or her failure to comply with safe practices or anti-substance abuse policies. Contractor shall promptly

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comply with such orders from the Owner and shall be liable for any and all costs of whatsoever nature, including attorney's fees paid or incurred by the Owner.

§ 10.1.3 Protection of Work and Property; Responsibility for Loss: The Contractor shall, throughout its performance of the Work, maintain adequate and continuous protection of all property of the Owner and third parties and of the Work and temporary facilities against loss or damage from whatever cause arising out of the performance of the Work and shall comply with the requirements of the Owner and its insurance carriers and with all applicable laws, codes, rules and regulations with respect to the prevention of loss or damage to property as a result of fire or other hazards.

§ 10.1.4 Emergencies: In any emergency affecting the safety of persons or property, or in the event of a claimed violation of any federal or state safety or health law or regulation arising out of or in any way connected with the Work or its performance, the Contractor shall act immediately to prevent threatened damage injury or loss or to remedy said violation whichever is applicable, failing which the Owner or its Designee may immediately take whatever action it deems necessary including, but not limited to, suspending the Work.

The Owner may offset any and all cost or expenses of whatever nature including attorneys' fees paid or incurred by the Owner in taking such action against any sums then or thereafter due to the Contractor. The Contractor shall defend indemnify and hold the Owner, and its officers, agents, employees, harmless against any and all costs, expenses or liability in accordance with Section 3.1.8. If the Contractor shall be entitled to any additional compensation or extension of time claimed on account of emergency work not due to the fault or neglect of the Contractor or its Subcontractors or Sub-subcontractors, it shall be handled as a request for a Change Order as provided in Section 7.2 of this Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall provide and pay for whatever security measures the Contractor deems necessary to protect the Contractor's work until acceptance by the Owner through issuance of a Certificate of Substantial Completion.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 At a minimum, the Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities. Additionally, the Contractor shall maintain all passageways, guard fences, lights and other facilities for protection.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor, at a minimum, shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

.1 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary, the Contractor shall give the Owner advance written notice of at least five (5) days prior to bringing to the site or utilizing such explosives, materials, equipment or methods..

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 and

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indemnify and save the Owner harmless for all damage or injury to referenced persons and property caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable in whole or in part to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

.1 The Contractor shall repair or replace any such damage at no additional cost to the Owner. Such repair or replacement shall be completed within one week of the damage or as directed by the Owner Representative. If the Contractor fails or refuses to repair the damage promptly, the Owner may have the necessary Work performed and charge the cost to the Contractor.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger the safety of persons or property or cause damage or create an unsafe condition.

(Paragraphs deleted)

§ 10.2.8 All materials furnished and all work installed shall comply with the rules and recommendations of the National Board of Fire Underwriters; with all applicable State and local codes, laws, ordinances, rules and regulations; with all requirements of local utility companies and with the recommendations of the Insurance Rating Organization having jurisdiction.

§ 10.2.9 All apparatus, equipment and construction such as ladders, scaffolds, chutes, etc. shall comply with the recommendations of the manual of Accident Prevention in Construction published by the Associated General Contractors of America.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.1.1 Upon request, the Owner, through the Office of Environmental Health and Safety, will provide the Contractor with a written copy of the Hazard Communication Program and chemical inventory for work areas in which they will be working. The Owner, upon request, will make available to the Contractor an opportunity to review the Material Safety Data Sheets ("MSDS") on file for areas where hazardous chemicals are used and stored for work areas they will be working in.

§ 10.3.1.2 Per OSHA's Hazard Communication Standard, Contractors are expected to inform and provide the Owner any MSDSs of materials to be used in their work at the University of Connecticut. Contractors shall provide a chemical inventory and information on the location of chemical use and storage. The Contractor shall be responsible for the removal of all unused portions of chemicals and their waste products from the Project Site. A copy of the Hazard Communication Policy is available for review by the Contractor or prospective Proposers of the Contract at the Office of Capital Project & Contract Administration or at:

http://www.ehs.uconn.edu/Occupational/occuhazard.php

or http://ors.uchc.edu

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such

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material or substance is found to be present, to cause it to be rendered harmless. Upon written request, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up which may have occurred, but must be demonstrated as impacting the critical path of the schedule.

§ 10.3.3 NOT USED.

§ 10.3.4 In no event, however, shall the Owner have any responsibility for any substance or material that is brought to the Project site by the Contractor, any Subcontractor, any materialman or supplier or any entity for whom any of them is responsible. The Contractor agrees not to use any fills or other materials to be incorporated into the Work, which are hazardous, toxic or comprised of any items that are hazardous or toxic. In the event it is determined materials that are hazardous, toxic or comprised of items that are hazardous or toxic have been used as fills or incorporated into the Work, the Contractor, at its sole expense, shall be responsible for immediate removal, proper disposal, and replacement of materials of the Work and surrounding areas so affected.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 Contractor shall verify that all material/equipment installed in any portion of the Work shall be asbestos free. The Owner may perform sampling to verify all suspect material/equipment is asbestos free. If any material/equipment is found to contain asbestos, the Contractor shall pay for the lawful and proper removal and disposal of product(s), and re-install acceptable material/equipment all at its sole expense. Contractor shall visually and in writing provide to Owner or its representative proof that products or equipment to be used are non-asbestos containing, asbestos free, do not contain asbestos, or similar via manufacture statement on product itself or accompanying information.

10.3.6.1 For purposes of this requirement, materials include, but are not limited to, the following:

.1 **Surfacing Treatments**
Fireproofing Acoustical Plaster
Finish Plasters, Skim Coats of Joint Compound, Fibrous Type Paint Applications

.2 **Thermal System Insulation**
Equipment Insulation
Boiler, Breeching, Boiler Rope, Duct or Tank Insulation, Cement or Mortar used for boilers and refractory brick
Piping and fitting insulations including but not limited to Wrapped Paper, Aircell, Millboard, Rope, Cork, Preformed Plaster, Job Molded Plaster and coverings over fibrous glass insulation

.3 **Roofing and Siding Miscellaneous Materials**
Insulation Board Vapor Barriers
Coatings Felts
Flashing Shingles
Cementitious Board (Transite) Galbestos
Non-Metallic or Non-Wood roof Decking

.4 **Other Miscellaneous Materials**
Cove Base Floor Leveling Compound

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Ceiling Tile Vermiculite Insulation
Vibration Isolators Laboratory Tables and Hoods

§ 10.3.7 Most buildings at the University of Connecticut have some Asbestos Containing Materials (ACM) used as building products. Any known ACM has been identified on the Plans and Specifications of this Contract.

§ 10.3.8 Every effort has been made to identify ACM; however, there may be additional ACM present in the area of work. This suspected ACM may become apparent especially during the demolition phases of contracts.

§ 10.3.9 The Contractor shall make every attempt to accomplish work in such a manner as to not disturb ACM or suspected ACM. If the Work cannot be accomplished without disturbing ACM or suspected ACM, or if ACM abatement is specifically incorporated as part of this contract, the Contractor must have the applicable training, licenses, or any other qualifications necessary to perform such work safely and in accordance with Federal, State and Local regulations.

§ 10.3.10 The Contractor shall bring to the immediate attention of the Owner Representative the location of suspected ACM that will be disturbed by work required under this Contract. No work shall be attempted that could result in a release of ACM to the environment.

§ 10.3.11 Asbestos surveys for most buildings of the Owner which are part of this Contract are available for Contractor's review in the Architectural and Engineering Services building or for UCHC projects at the Facilities Development & Operations office..

§10.3.12 Exposure levels for lead in the construction industry are regulated by 29 CFR 1926.62. Construction activities disturbing surfaces containing lead-based paint (LBP) which are likely to be employed, such as sanding, grinding, welding, cutting and burning, have been known to expose workers to levels of lead in excess of the Permissible Exposure Limit (PEL). Contractor shall conduct demolition and removal work specified in the Contract Documents in conformance with these regulations. In addition, construction debris/waste may be classified as hazardous waste. Disposal of hazardous waste material shall be in accordance with 40 CFR Parts 260 through 271 and Connecticut Hazardous Waste Management Regulations Section 22a-209-1; 22a-209-8(c)-11; and 22a-449(c)-100 through 110.

§ 10.3.13 Where a child under the age of six resides, the work shall also be in accordance with Connecticut Regulations Section 19a-111-1 through 11.

§ 10.3.14 **If this is a renovation project**, testing for lead-based paint has been conducted at selected facilities of the Owner. Results of LBP testing are for information purposes only. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of LBP. The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.

§ 10.3.15 Except for UCHC projects, lead based paint testing results are available at the Architectural and Engineering Services building. Contractors proposing on this project are requested to visit this office and review lead testing documents.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

10.5 LOCKOUT/TAGOUT PROCEDURES REQUIRED BY OSHA

§ 10.5.1 OSHA regulations 29 CFR 1910.147 (The Control of Hazardous Energy) requires employers to develop procedures for the lockout or tag out of machines or equipment. The purpose is to prevent injuries by ensuring that hazardous forms of energy are isolated (locked or tagged out) before employees perform any servicing or maintenance activities, which could result in the unexpected energization, start-up or release of stored energy. This includes electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy sources.

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§ 10.5.2 The Owner has a written Lockout/Tag out Policy, as required under 29 CFR 1910.147. The policy is available for review by the Contractor or prospective Proposers of this Contract upon request.

§ 10.5.3 Prior to commencing any work under this Contract that will or may involve exposure to potentially hazardous energy; the Contractor shall notify the Owner Representative of the lockout/tag out procedures to be used. Lockout/tag out procedures shall be exchanged between the Contractor and the Owner Representative at the Pre-Construction Conference.

§ 10.5.4 All work carried out under this Contract that will or may involve exposure to potentially hazardous energy shall be carried out in accordance with all applicable Federal, State and local rules and regulations, including OSHA regulation 29 CFR 1910.147 (The Control of Hazardous Energy) and 1926.417 (Locking and Tagging of Circuits).

10.6 SOLVENT BASED PRODUCTS

§ 10.6.1 The use of solvent-based products, including paints and adhesives within occupied areas of buildings shall not be allowed as part of this project, unless specifically directed in other provisions of the Contract Documents. The use of solvent-based products in non-occupied areas shall be carried out using adequate ventilation that prevents migration of vapors into occupied areas. If solvent-based products are to be used in occupied areas, then work shall only be accomplished on nights or weekends and with prior approval with the Owner Representative; continuous ventilation should be provided as required to mitigate odors on building occupants using adequate ventilation. The Contractor's representative shall notify the Owner Representative, the Department of Environmental Health and Safety and the Building Safety Committee Representative two (2) days prior to the intended date of such work.

10.7 CONFINED SPACE ENTRY

§ 10.7.1 Certain areas at the University of Connecticut such as manholes, tanks, vessels, trenches, ducts, etc. meet the OSHA definition of a confined space (pursuant to 29 CFR 1910.146) in that they: 1) are large enough and so configured that an employee can bodily enter and perform assigned work; 2) have limited or restricted means for entry or exit; and 3) are not designated for continuous employee occupancy.

§ 10.7.2 According to this OSHA regulation, employers are required to implement a confined space entry permit program if its employees will enter confined spaces which have one or more of the following characteristics: 1) contain or have the potential to contain a hazardous atmosphere, 2) contain a material that has the potential for engulfing and entrant, 3) have an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or by a floor which slopes downward and tapers to a smaller cross-section, or 4) contain any other recognized safety or health hazard. Such a space is considered to be a permit-required confined space.

§ 10.7.3 The Owner has a written confined space entry policy, which implements a permit program. The policy is available for review by the Contractor or prospective Proposers of this Contract at the Architectural and Engineering Services building.

§ 10.7.4 Prior to commencing work that may require entry into a confined space; the Contractor shall consult with the Owner Representative and the Environmental Health and Safety Department to become apprised of the locations, the nature of the hazards, and safe entry procedures of known permit-required confined spaces.

§ 10.7.5 The contractor shall coordinate entry operations with the Owner through the Owner Representative when both Owner and Contractor personnel will be working in or near permit spaces.

§ 10.7.6 Any work carried out under this Contract that will require entry into a confined space shall be carried out in accordance with all applicable Federal, State, and Local rules and regulations, including OSHA regulations 29 CFR 1910.146 (Permit required confined spaces), 1926.21(b) (6) (Safety Training and Education – Employer responsibility (confined spaces)), 1926.352(g) (Fire prevention in enclosed spaces) and 1926.353(b) (Welding, cutting and heating in confined spaces).

10.8 EXCAVATION AND TRENCHING

§ 10.8.1 The Owner has a written Excavation and Trenching Policy, which can be found in the Owner's Contractor Environmental Health and Safety Manual.

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§ 10.8.2 Any work carried out under this Contract that will require excavation or trenching shall be carried out in accordance with all applicable Federal, State and Local rules and regulations, including OSHA regulation 29 CFR 1926 Subpart P (Excavations).

§ 10.8.3 At a minimum, the Contractor shall comply with established Owner's Contractor Environmental Health and Safety Manual, which have been previously provided to bidders and/or are available for review upon request. These policies are hereby incorporated by reference herein, including but not limited to: Policies on Lockout/Tagout; Confine Space Entry; Code of Conduct; Sexual Harassment; Racism and Acts of Intolerance; Smoking.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall demonstrate and provide evidence of insurance in an industry accepted certificate of insurance and maintain with a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;

.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

.4 Claims for damages insured by usual personal injury liability coverage;

.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

.7 Claims for bodily injury or property damage arising out of completed operations; and

.8 Claims involving contractual liability applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

.1 **Worker's Compensation Insurance**: Worker's Compensation Insurance in Statutory Limits of the Worker's Compensation Laws of the State of Connecticut, and other extensions, with Coverage B – Employer's Liability of not less than limits of $1,000,000 – Each Accident, $1,000,000 – Policy Limit and $1,000,000 – Each Employee. Coverage under the Broad Form All State extension shall also be included.

.2 **Commercial General Liability Insurance**: $1,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage. Coverage shall include Premises and Operations, Independent Contractors, Products and Completed Operations, Contractual Liability and Broad Form Property Damage coverage. If a general aggregate is used, the general aggregate limit shall apply separately to the project or the general aggregate limit shall be twice the occurrence limit. The coverage shall contain no special limitations on the scope of protection afforded to the State. Said policy shall also state that it is primary insurance, and that the Owner, the State of Connecticut, the Contractor, and such other persons or interests as the Owner may designate as additional insured in connection with the performance of the Work, including hazards of operations (including explosion, collapse and underground coverage), elevators, independent contractors, employees as additional insured, completed operations for a period of three (3) years after final completion of the Work.

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.3 **Automobile Liability Insurance:** Automobile Liability Insurance covering all owned, non-owned and hired automobiles, trucks and trailers of the respective parties required to provide and maintain this insurance. Such insurance shall provide coverage not less than that of the Standard Comprehensive Automobile Liability policy in limits not less than, as respects Contractor and all tiers of Subcontractors, $1,000,000 Combined Single Limit each occurrence for Bodily Injury and Property Damage.

.4 **Umbrella Liability Insurance:** Umbrella liability (following form) in the amount of $5,000,000 per Occurrence.

.5 **Aircraft Liability:** If aircraft of any kind is used by the Contractor, any tier of Subcontractor or by anyone else on their behalf, the Contractor or Subcontractor shall maintain or cause the operator of the aircraft to maintain aircraft public liability insurance insuring passengers and the general public against personal injury, bodily injury or property damage arising from aircraft owned, used, operated or hired in connection with the Work by the Contractor, Subcontractor or anyone else in limits of $50,000,000 Combined Single Limit for any one occurrence, each aircraft.

.6 **Contractor's Pollution Liability:** If the work of this project includes the abatement, removal, cleanup or handling of any asbestos, PCB's, lead based paint, or other pollutants or hazardous materials, then the Contractor shall also provide evidence that Pollution Liability Insurance, including completed operations and Contractual Liability coverage of not less than limits of $5,000,000 has been procured and is in force on the project. However, if the Contractor demonstrates that coverage for claims arising out of the abatement, removal, cleanup or other handling of asbestos, PCB's, lead based paint, or other pollutants or hazardous materials is covered by the Contractor's general liability insurance, a separate Contractor's Pollution Liability Policy will not be required.

.7 Builder's Risk: If the Project is for new construction, rather than for renovations to an existing structure or facilities, the Contractor shall purchase and maintain Builder's Risk Insurance, ISO CP 30 10 00 special form, in the amount of the initial contract amount plus values of subsequent modifications or change orders on a replacement cost basis. The Builder's Risk coverage shall be written on a Special Covered Cause of Loss form and shall include theft, vandalism, malicious mischief, collapse, temporary buildings, transit, debris removal, increased cost of construction, architect fees and expenses, soft costs, flood and earthquake. Builder's Risk shall include portions of work located away from site but intended for use at the site. Contractor shall obtain consent of the insurance company and delete any provisions with regard to restrictions within any occupancy clause. Equipment break down coverage shall be included and shall cover insured equipment during installation and testing.

.8 It is agreed that the Owner, the State of Connecticut, their officers, officials, agents, employees, boards and commissions shall be additional named insureds under the coverages described in Clauses 11.1.2.2; 11.1.2.3; 11.1.2.4; 11.1.2.5; 11.1.2.6; 11.1.2.7 and that said coverage(s) is provided for all operations, uses, occupations, acts and activities of the insureds under the Contract Documents and under any amendments, modifications, extensions or renewals of said Contracts regardless of whether liability is attributable to the named insureds or a combination of the named insureds and the additional named insureds.

.9 If the Contractor is a joint venture, the joint venture and each individual partner of the joint venture must be designated in each policy as named insureds.

.10 A Certificate of Insurance shall clearly indicate the Project name, Project number or some easily identifiable reference to the relationship to the Owner.

.11 Each liability policy shall contain a Cross Liability Endorsement.

.12 Coverage, written on an occurrence basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

.13 All insurance secured by Contractor or Subcontractors pursuant to the Owner's requirements under the provisions of this Section 11.1.2 shall be in policies subject to the Owner's approval, as to form, content, limits of liability, cost and issuing companies. Such companies shall have and maintain an A.M. Best rating of not less than A-(VII), or otherwise acceptable to Owner.

.14 If the Contractor maintains insurance against physical loss or damage to Contractor's construction equipment and tools, such insurance shall include an insurer's waiver of rights of subrogation in favor of Owner.

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§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled, terminated or materially changed, altered or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief and shall identify on their faces the project name and contract number to which they apply. The Certificate(s) of Insurance must also provide clear evidence that the Contractor's Insurance Policies contain at least the minimum limits of coverage and special provisions prescribed in Article 11.

§ 11.1.4 Form Certificates acceptable by the Owner shall be Accord 25(2001/08) together with Endorsement CG 20 37 07 04.

§ 11.1.5 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE
NOT USED.

§ 11.3 PROPERTY INSURANCE
§ 11.3.1 Property insurance on an all-risk basis, including coverage for the perils of earthquakes and floods, has been purchased by the Owner. Insurance required by Section 11.3 is not intended to cover machinery, tools and equipment of the Contractor which is used in the performance of the Work, but is not incorporated into the permanent improvements, nor any materials and equipment paid for by the Owner and stored off-site, for which the Contractor shall procure property insurance satisfactory to the Owner. The Contractor shall, at is own expense, provide coverage for its machinery, tools and equipment subject to these provisions.
§ 11.3.1.1 NOT USED.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then procure and maintain insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the Owner's property insurance, including any Builder's Risk insurance provided by the Owner, requires deductibles, the Contractor shall pay costs not covered because of such deductibles.

§ 11.3.1.4 NOT USED.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

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§ 11.3.2 BOILER AND MACHINERY INSURANCE
The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE
NOT USED.

§ 11.3.4 NOT USED.

§ 11.3.5 NOT USED.

§ 11.3.6 NOT USED.

§ 11.3.7 WAIVERS OF SUBROGATION
The Owner and Contractor waive all rights of subrogation against (1) each other and any of their subcontractors of all tiers, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors of all tiers, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3, the boiler and machinery insurance maintained by the Owner or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Contract between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five (5) days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Contract. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND; PAYMENT BOND AND GUARANTYBOND
§ 11.4.1 The Contractor shall furnish to the Owner and deliver at the time of contract signing Performance and Payment Bonds pursuant to the requirements of Connecticut General Statutes Section 49-41 et seq. and the requirements of this Section 11.4. In the cases where the Contract Sum exceeds $100,000, the Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Each

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such Bond shall be in compliance with the form which has been adopted by the Owner as its required form of payment or performance bond and shall be provided by a Surety company licensed to do business in the State of Connecticut and that is acceptable to the Owner, and is named in the current list of "Surety Companies Acceptable on Federal Bonds" as published in the "Treasury Department Circular 570". The Surety company's underwriting limitation, as further set forth in "Treasury Department Circular 570", must not be less than the full amount required by the bond itself. The amount of each bond shall be equal to One Hundred Percent (100%) of the Contract Sum. The Payment and Performance Bonds shall name as "Obligee" the Owner.

§ 11.4.1.1 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.4.1.2 Each surety bond and surety contract between the Contractor named as a principal on the bond and the surety that issued the bond shall contain the following language: "In the event that the surety assumes the contract or obtains a bid or bids for completion of the contract, the surety shall ensure that the contractor chosen to complete the contract is prequalified pursuant to section 4a-100 of the Connecticut General Statutes in the requisite classification and has the aggregate work capacity rating and single project limit necessary to complete the contract.

§ 11.4.2 If the Contractor or any of its subcontractors is a non-resident contractor, the Contractor and/or subcontractor shall comply with the requirements of Connecticut General Statutes Section 12-430(7) ("the statute"), to the extent applicable. If the Contractor is a verified contractor as defined in the statute, the Contractor shall provide to the Owner written verification of that status from the State Commissioner of Revenue Services. If the Contractor is a unverified contractor as defined in the statute, the Contractor shall provide to the Owner proof that the Contractor has posted with the Commissioner of Revenue Services a surety bond in an amount equal to five percent (5%) of the contract price and which is otherwise in compliance with the requirements of the statute.

§ 11.4.3 If the Contractor proposes a Subcontractor default coverage program, the Contractor must demonstrate a cost savings of no less than 18% as compared to the actual Subcontractor traditional bond cost, including a reasonable percentage for changes as agreed upon by the Owner.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Owner Representative with the advice of the Architect has not specifically requested to examine prior to its being covered, the Owner Representative with the advice of the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Owner Representative with the advice of the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing, inspections, uncovering and replacement, and compensation for the Architect's and Owner Representative services made necessary thereby, shall be at the Contractor's expense.

If prior to the date of Substantial Completion, the Contractor, a Subcontractor or anyone from whom either is responsible uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

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§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly at Contractor's sole expense after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4 or may exercise any other commercially reasonable remedies to compensate Owner for any expenses losses or damage caused by such nonconforming work.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

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§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made at an appropriate time as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities having jurisdiction. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's and Owner Representative services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

NOT USED.

§ 13.7 TIME LIMITS ON CLAIMS

NOT USED.

§ 13.8 NON-DISCRIMINATION, AFFIRMATIVE ACTION, GOVERNOR'S EXECUTIVE ORDERS, AND OTHER MISCELLANEOUS PROVISIONS

§ 13.8.1 NONDISCRIMINATION. References in this section to "Contract" shall mean this Contract and references to "Contractor" shall mean the Contractor.

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(a) For purposes of this Section, the following terms are defined as follows: (i) "Commission" means the Commission on Human Rights and Opportunities; (ii) "Contract" and "contract" include any extension or modification of the Contract or contract; (iii) "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor; (iv) "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; (v) "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations; (vi) "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; (vii) "marital status" means being single, married as recognized by the State of Connecticut, widowed, separated or divorced; (viii) "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; (ix) "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 (x) "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, (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).

(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, 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 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, gender identity or expression, mental retardation, 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 Connecticut General Statutes §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes §§ 46a-56, 46a-68e and 46a-68f; 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 Connecticut General Statutes § 46a-56. If the contract is a public works contract, the Contractor agrees and warrants that he will

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make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works 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.

§ 13.8.2 STATE EXECUTIVE ORDERS

This Contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the

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workplace, all of which are incorporated into and are 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 No. 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 Owner shall provide a copy of these orders to the Contractor.

§13.8.3 ETHICS AND COMPLIANCE

In accordance with the Owner's compliance program, the Owner has in place an anonymous ethics and compliance reporting hotline service – 1-888-685-2637. Any person who is aware of unethical practices, fraud, violation of state laws or regulations or other concerns relating to Owner policies and procedures can report such matters anonymously. Such persons may also directly contact the Owner's compliance office at: Office of Audit, Compliance, and Ethics, 9 Walters Avenue, Unit 5084, Storrs, CT 06269-5084; Phone 860-486-4526; Fax 860-486-4527. As a provider of goods and/or services to the Owner, you are hereby required to notify your employees, as well as any subcontractors, who are involved in the implementation of this contract, of this reporting mechanism.

§13.8.4 CAMPAIGN CONTRIBUTION RESTRICTIONS

For all State contracts as defined in P.A. 10-1 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 Contract 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 (SEEC Form 11):

SEEC FORM 11
CONNECTICUT STATE ELECTIONS ENFORCEMENT COMMISSION
Rev. 1/11

NOTICE TO EXECUTIVE BRANCH STATE CONTRACTORS AND PROSPECTIVE STATE CONTRACTORS OF CAMPAIGN CONTRIBUTION AND SOLICITATION LIMITATIONS

This notice is provided under the authority of Connecticut General Statutes §9-612(g)(2), as amended by P.A. 10-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (italicized words are defined on the reverse side of this page).

CAMPAIGN CONTRIBUTION AND SOLICITATION LIMITATIONS

No *state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor*, with regard to a *state contract* or *state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee (which includes town committees).

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

On and after January 1, 2011, no state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor, with regard to a state contract or state contract solicitation with or from a state agency in the executive branch or a
quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall **knowingly** *solicit* contributions from the state contractor's or prospective state contractor's employees or from a *subcontractor* or *principals of the subcontractor* on behalf of (i)

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an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor,
Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

DUTY TO INFORM

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

PENALTIES FOR VIOLATIONS

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

Civil penalties—Up to $2,000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of up to $2,000 or twice the amount of the prohibited contributions made by their principals.

Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or not more than $5,000 in fines, or both.

CONTRACT CONSEQUENCES

In the case of a state contractor, contributions made or solicited in violation of the above prohibitions may resulting the contract being voided.

In the case of a prospective state contractor, contributions made or solicited in violation of the above prohibitions shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State shall not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to "Lobbyist/Contractor Limitations."

DEFINITIONS

"State contractor" means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. "State contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Prospective state contractor" means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section 4a-100. "Prospective state contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Principal of a state contractor or prospective state contractor" means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is

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a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract*, (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

"State contract" means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee. "State contract" does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan, a loan to an individual for other than commercial purposes or any agreement or contract between the state or any state agency and the United States Department of the Navy or the United States Department of Defense.

"State contract solicitation" means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

"Managerial or discretionary responsibilities with respect to a state contract" means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

"Dependent child" means a child residing in an individual's household who may legally be claimed as a dependent on the federal income tax of such individual.

"Solicit" means (A) requesting that a contribution be made, (B) participating in any fund-raising activities for a candidate committee, exploratory
committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

"Subcontractor" means any person, business entity or nonprofit organization that contracts to perform part or all of the obligations of a state contractor's state contract. Such person, business entity or nonprofit organization shall be deemed to be a subcontractor until December thirty first of the year in which the subcontract terminates. "Subcontractor" does not include (i) a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or (ii) an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Principal of a subcontractor" means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a subcontractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a subcontractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a subcontractor, which is not a business entity, or if a subcontractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any subcontractor who has managerial or discretionary responsibilities with respect to a subcontract with a state contractor, (v) the spouse or a dependent child who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the subcontractor.

§ 13.8.5 WHISTLEBLOWING:

This Contract is subject to the provisions of § 4-61dd of the Connecticut General Statutes. In accordance with this statute, if an officer, employee or appointing authority of the 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 any employee of the Contracting state or quasi-public agency or the Auditors of Public Accounts or the Attorney

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General under the provisions of subsection (a) of such statute, 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 this 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 Owner may request that the Attorney General bring a civil action in the Superior Court for the Judicial District of Hartford to seek imposition and recovery of such civil penalty. In accordance with subsection (f) of such statute, each large state Contractor, as defined in the statute, shall post a notice of the provisions of the statute relating to large state Contractors in a conspicuous place which is readily available for viewing by the employees of the Contractor.

§ 13.8.6 COMPLIANCE WITH OWNER POLICIES AND GUIDELINES

At a minimum, the Contractor shall comply with established Owner policies and guidelines, which have been previously provided to bidders and/or are available for review upon request. These policies are hereby incorporated by reference herein, including but not limited to: Policies on Lockout/Tagout; Confined Space Entry as referenced in the Contractor's Environmental Health and Safety Manual; Code of Conduct; Sexual Harassment; Racism and Acts of Intolerance; Smoking.

§ 13.9 PREFERENCE IN EMPLOYMENT

§ 13.9.1 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 three months prior to the date hereof have been residents of the labor market areas, as established by the Labor Commissioner in which said work is to be done; and if no such qualified persons are available, then to citizens who have continuously resided in the county in which the work is to be performed for at least three 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. In no event shall said provisions be deemed to abrogate or supersede in any manner any provision regarding residence requirements contained in a Collective Bargaining Agreement to which the Contractor is a party.

§ 13.10 MINIMUM WAGE RATES

§ 13.10.1 If this project involves new construction of a building or other structure or improvement and the total cost of all Work to be performed by Contractors and Subcontractors is $400,000 or more or if the project involves remodeling, refurbishing, rehabilitation, alteration or repair of a building or other structure or improvement and such total cost is $100,000 or more then:

.1 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 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 payday.

§ 13.10.2 The State of Connecticut Labor Department Wage Schedule where required shall be provided with these documents typically with the Bidding Documents, or will be incorporated in the Contract Documents as an Addendum. The Contractor agrees to accept the current prevailing wage scale as well as any annual adjustment to the prevailing wage scale as provided by the Connecticut Department of Labor. Wage Rates will be posted each July 1st on the Department of Labor's website: www.ctdol.state.ct.us. Such prevailing wage adjustment will not be considered a basis for an annual contract amendment. The schedule is deemed to reflect customary or prevailing wages for this project and is hereby incorporated and made a part of the Contract Documents. Wage Rates shall be paid pursuant to Sections 31-53 and 31-54 of the Connecticut General Statutes and any regulations issued there under.

§ 13.11 HOURS OF LABOR PERMITTED

§ 13.11.1 Pursuant to Section 31-57 of the Connecticut General Statutes, no person shall be employed to work or be permitted to work more than eight hours in any day or more than forty hours in any week on any work provided for in the Contract. The operation of such limitation of hours of work may be suspended during an emergency upon the approval of the Owner Representative.

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§ 13.12 EXAMINING AND COPYING CONTRACTOR'S RECORDS

§ 13.12.1 The Contractor shall permit the Owner or its duly authorized representative to examine and copy books and records of the Contractor relative to charges for extra work, alleged breaches of contract, settlement of claims, or any other matter involving the Contractor's demand for added compensation from the Owner. The Contractor shall also permit such examination and copying of his records as the Owner may deem necessary, excepting papers and records preceding the execution of the Contract that are not a matter of record with the Owner, in order to determine that the Contractor has complied with all laws and regulations pertaining to the Contract, such as but not limited to Labor Compliance, Affirmative Action Program and Equal Employment Opportunity.

§ 13.12.2 The Contractor further agrees that he shall keep all records relating to this Contract until the expiration of six (6) years after final payment under this Contract is made, or six (6) months after settlement of any disputes whichever may be later.

§ 13.12.3 The Contractor further agrees that he and his Subcontractors shall permit the Owner, at its own expense, by its duly authorized representatives, to inspect and audit all their data, records and files pertaining to this Contract.

§ 13.13 SYSTEM LAYOUT DRAWING

§ 13.13.1 System layouts indicated on the on the drawings are generally diagrammatic and locations and arrangements of items are approximate. Exact routing of conduit, wiring, location of fixtures, outlets, panels, piping, valves and all other equipment shall be governed by the structural conditions and obstructions. The entire layout shall be followed as closely as possible and the right is reserved by the Owner to reasonably change the locations to accommodate any conditions which may arise during the progress of the work without additional compensation to the Contractors.

§ 13.14 GUARANTY OF PERFORMANCE

§ 13.14.1 If the Contractor has submitted the financial statement of a parent or other affiliated entity in its Proposers Qualification Statement, or if pre-qualified, its application for pre-qualification and has also indicated in that submission that such parent or affiliate will guarantee the performance of the Contract, then the parent or affiliate shall execute, simultaneously, with the Contractor's execution of the Contract, a Guaranty in a form provided by and acceptable to the Owner.

§ 13.15 JOINT VENTURE

§ 13.15.1 If the Contractor is a joint venture, each joint venture partner shall be jointly, severally and individually responsible to the Owner for the performance of any and all obligations of the Contractor encompassed by this contract or as required by applicable law, and each joint venture partner shall be jointly, severally and individually liable to the Owner for any failures to perform such obligations in accordance with the contract or applicable law. In its dealings with the Owner, each joint venture partner shall have full authority to act in behalf of and bind the joint venture and any other joint venture partner. Each joint venture partner shall be considered to be the agent of the joint venture and of any other joint venture partner.

§13.16 WORKER GEOGRAPHIC DISTRIBUTION

§13.16.1 If the Project is a Covered Project (as defined hereinafter), the Contractor shall comply with the provisions of this Section 13.16.

§13.16.2 The Contractor shall submit to the Owner a plan for encouraging the hiring of Workers (as defined hereinafter) with Residence (as defined hereinafter) in the State of Connecticut.

§13.16.3 Following the close of each Quarter (as defined hereinafter), the Contractor shall submit a Worker Geographic Distribution Report (as defined hereinafter) to the Owner in a form satisfactory to the Owner. The "Worker Geographic Distribution Report" is a report that shall provide the following information for each Worker paid, during the most recently closed Quarter, for work on the Project:

.1 The numbers of hours of Project work for which such Worker was paid during such Quarter.
.2 The Wages (as defined hereinafter) paid to such Worker during such Quarter.
.3 The Residence of such Worker as of the close of such Quarter.

§13.16.4 The Worker Geographic Distribution Report shall not contain any personally identifiable information about a Worker.

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§13.16.5 The following terms shall have the meaning assigned below for the purposes of this Section 13.16.

.1 "Covered Project" is a project that is both subject to Section 31-53(a) of the Connecticut General Statutes and for which the total cost of all work to be performed by all contractors and subcontractors is $1,000,000 or greater.

.2 "Quarter" means a calendar quarter of each calendar year.

.3 "Residence" is the state and town in which a Worker resides, as reflected in the payroll records of such Worker's employer.

.4 "Subcontractor" is any subcontractor or sub-subcontractor of the Contractor, which subcontractor or sub-subcontractor employs Workers on the Project.

.5 "Wages" are the wages that are subject to Section 31-53(a) of the Connecticut General Statutes (including any amounts paid to an employee welfare fund).

.6 "Worker" is an employee of the Contractor or a Subcontractor (as defined hereinabove), which employee is working on the Project and whose wages for such work is subject to Section 31-53(a) of the Connecticut General Statutes.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of sixty (60) consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped; or

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped.

.3 Not Used.

.4 Not Used.

§ 14.1.2 Not Used.

§ 14.1.3 If one of the reasons described in Section 14.1.1 exists, the Contractor may, upon seven (7) days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery.

§ 14.1.4 If the Work is stopped for a period of sixty (60) consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven (7) additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate, without prejudice to or waiving any other right or remedy of the Owner, the Contract if the Contractor

.1 refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents;

.5 Fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all requirements of the Contract Documents;

.6 Refuses or fails to prosecute the Work or any separable part, with the diligence that will insure its completion within the time specified in this Contract including any duly authorized extension, or fails to compete the Work within said period; or

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.7 Fails to comply with laws, rules, regulations, or directives regarding job site safety; or to comply with the provisions of the Owner's Contractor Environmental Health and Safety Manual , or orders or directives regarding safety issued by the Owner pursuant to the Contract.

§ 14.2.2 When any of the above reasons exist, the Owner, with advice of the Architect and upon certification by the Initial Decision Maker, determines that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven (7) days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4;

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work; and

.4 Terminate the Contractor's right to proceed with a separate part of the Work if the Owner so elects.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be retained by the Owner. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect and Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause and without prejudice to or waiving any other right or remedy of the Owner, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, without prejudice or waiving any other right or remedy of the Owner, terminate the Contract in whole or in part for the Owner's convenience and without cause. Termination by the Owner under this Section shall be by a Notice of Termination delivered to the Contractor specifying the extent of termination and the effective date.

§ 14.4.2 Upon receipt of a Notice of Termination for convenience, the Contractor shall immediately, in accordance with instructions from the Owner, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Section:

.1 Cease operations as specified in the notice;

.2 Place no further orders and enter into no further Subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

.4 Proceed to complete the performance of Work not terminated;

.5 Take actions that may be necessary or that the Owner may direct for the protection and preservation of the terminated Work.

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§ 14.4.3 Upon such termination, the Contractor shall recover as its sole remedy, payment for Work properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for items properly and timely purchased or fabricated off the Project site, delivered and stored in accordance with the Owner's instructions plus demobilization costs. The Contractor hereby waives and forfeits all other claims for payment and damages, including without limitation, anticipated profits.

§14.4.4 The Owner shall be credited for (1) payments previously made to the Contractor for the terminated portion of the Work; (2) claims which the Owner has against the Contractor under the Contract and (3) the value of the materials, supplies, equipment or other items that are to be disposed of by the Contractor that are part of the Contract Sum.

§14.4.5 The payment to the Contractor pursuant to this Section may not exceed the total Contract Price as reduced by:

.1 The amount of payments previously made
.2 The Contract price of work not terminated.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension or time, and/or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by the Contractor must be initiated by written notice to the Owner Representative as described in Section 1.1.1.1 and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by the Contractor must be initiated within twenty-one (21) days after occurrence of the event giving rise to such Claim or within fourteen (14) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims may also be reserved by the Contractor in writing within the time limits set forth in this Section 15.1.2. If a Claim is reserved, the Resolution of Claims and Disputes procedures described in Article 15 shall not commence until a written notice from the Contractor is received by the Owner Representative. No such claim shall be valid unless so made. Any notice of Claim or reservation of Claim must clearly identify the alleged cause and the nature of the Claim and include data and information then available to the claimant that will facilitate prompt verification and evaluation of the Claim.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

§ 15.1.4.1 If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§15.1.4.2 If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be made in accordance with the provisions of this Article 15.

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§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. No such claim shall be valid unless made in accordance with the provisions of this Article 15. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

NOT USED.

§ 15.1.7 Injury or Damage to Person or Property. If the Contractor suffers injury or damage to person or property because of an act or omission of the Owner Representative, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding twenty-one (21) days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 15.1.8 Claims for Concealed or Unknown Conditions: If, upon or subsequent to the Contractor's and its Subcontractors' site visits and performance of the tests, examinations and inspections required by Section 3.2.2, the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor will promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 5 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different in the respects noted above and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. Any claim by the Contractor in opposition to such determination must be made within 21 days after the Architect has given notice of the recommendation. The Owner Representative will have the final authority to accept or reject the Architect's recommendations, which decision by the Owner Representative shall be subject to further proceedings pursuant to Article 15.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims by the Contractor, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the AIA 101-2007 Section 6.1 of the Contract. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, regardless of (1) whether such matters relate to execution and progress of the Work, or (2) the extent to which the Work has been completed. The decision by the Initial Decision Maker in response to a Claim shall not be a condition precedent to arbitration or litigation in the event (1) the position of Initial Decision Maker is vacant, (2) the Contractor has not provided evidence or (3) the Initial Decision Maker has failed to take action required under Section 15.2.2 within thirty (30) days after the Claim is made.

§ 15.2.2 The Initial Decision Maker will review Claims by the Contractor and within thirty (30) days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

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§ 15.2.3 In evaluating Claims of the Contractor, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim of the Contractor or to furnish additional supporting data, such party shall respond, within ten (10) days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.4.1 If a Claim of the Contractor has not been resolved after consideration of the foregoing, the Initial Decision Maker will render a written decision on the claim, including any change in the Contract Sum or Contract Time or both, which decision shall be final and binding but subject to meeting and mediation pursuant to Section 15.3 of this document and arbitration or litigation pursuant to Connecticut General Statutes Section 4-61 and Section 15.4 of this Contract to the extent applicable.

§ 15.2.5 NOT USED.

§ 15.2.6 NOT USED.

§ 15.2.6.1 NOT USED.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 NOT USED.

§ 15.3 MEDIATION

§ 15.3.1 Claims of the Contractor except those waived as provided for in Section 9.10.5 shall be submitted to the meeting and mediation process described in the Sections which follow, prior to and as a precondition to the Contractor pursuing any other available remedy. Claims by the Owner, at the option of the Owner, may be submitted to such meeting process and/or mediation process, and, in such event, Contractor shall be required to submit to and participate in such a meeting and/or mediation. The meeting shall be between the parties and attended by individuals with decision-making authority regarding the dispute, to attempt in good faith to negotiate a resolution of the dispute.

§ 15.3.2 The meeting referenced in Section 15.3.1 shall be held promptly, but not less than fourteen (14) calendar days after a party's request for the meeting. The Contractor shall not submit any claim to mediation in accordance with the provisions of Sections 15.3.1 through 15.3.6 until fourteen (14) calendar days after the date of the meeting.

§ 15.3.3 In connection with any such mediation, a request for mediation shall be made in writing, delivered to the other party to the Contract. The request may be made concurrently with the filing of applicable binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of sixty (60) calendar days from the date of filing, unless stayed for a different period of time by agreement of the parties or as modified by court order.

§ 15.3.4 The parties will jointly appoint a mutually acceptable mediator, seeking assistance in such regard from a mutually agreed upon dispute resolution entity if they have been unable to agree upon such appointment within twenty (20) calendar days from the submittal of the request for mediation. If the parties are unable to agree on the dispute resolution entity, the mediation shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of this Contract.

§ 15.3.5 The parties agree to participate in good faith in the mediation and negotiations related thereto for a period of sixty (60) calendar days from the date of submittal, or until the parties reach impasse as evidenced by a letter from a

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party to the mediator, whichever first occurs. If the parties are not successful in resolving the dispute through mediation, then the parties may pursue other legal remedies available to them.

§ 15.3.6 Should the Owner request, the Contractor agrees to participate as a party in any mediation proceeding between the Owner and the Architect or other Consultant for the Project in which construction deficiencies, contract breaches, or other alleged wrongful acts by the Contractor are alleged.

§ 15.4 ARBITRATION OR LITIGATION OF CLAIMS
§ 15.4.1 NOT USED.
§ 15.4.1.1 NOT USED.

§ 15.4.2 NOT USED.

§ 15.4.3 NOT USED.

§ 15.4.4 Should the Owner have a claim against the Contractor, the parties agree that the Owner, whether or not it elects to proceed with the meeting process or mediation described in Section 15.3, shall have the option of either prosecuting the claim against the Contractor in an appropriate court of general jurisdiction, or by arbitrating the claim by filing a demand for arbitration pursuant to the rules of a dispute resolution entity agreed upon by the parties, except that if the parties cannot agree upon a dispute resolution entity, the rules of the American Arbitration Association shall apply.

§ 15.4.5 Should the Contractor have a claim against the Owner which has not been resolved by mediation or any other procedure set forth in this Contract, the Contractor's rights to assert its claim against the Owner shall be subject to the provisions of Connecticut General Statutes Section 4-61.

§ 15.4.6 CONSOLIDATION OR JOINDER
§ 15.4.6.1 Should either the Contractor institute an arbitration to the extent authorized by Section 4-61 of the Connecticut General Statutes or the Owner institute an arbitration as set forth herein, the Contractor agrees that any such arbitration may be consolidated, at the Owner's discretion, with any arbitration proceeding involving the Owner and the Architect or other Consultant for the Project in which construction or design deficiencies, breaches of contract, or any other alleged wrongful acts by the Contractor or Architect are alleged.

§ 15.4.6.2 NOT USED.

§ 15.4.6.3 NOT USED.

ARTICLE 16 CODE OF CONDUCT
§ 16.1 CODE OF CONDUCT
§ 16.1.1 In furtherance of its longstanding commitment to fundamental human rights, to the dignity of all people, and to the environment, the Owner has developed the Code of Conduct for University of Connecticut Vendors (the "Vendor Code of Conduct"). The Contractor hereby acknowledges receipt of the Vendor Code of Conduct. A copy of the Vendor Code of Conduct is available at http://csr.uconn.edu/. The Vendor Code of Conduct is hereby incorporated herein by reference to the extent the Contractor is required to comply with the same pursuant to this section.

The Contractor agrees to comply with the "Principal Expectations" described in the Vendor Code of Conduct. The Contractor further agrees to comply with the "Preferential Standards" described in the Vendor Code of Conduct, to the extent a commitment to so comply, or a representation of compliance, was provided by the Contractor to the Owner in writing. Any such commitment or representation is hereby incorporated herein by reference. The

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Contractor agrees to provide the Owner with such evidence of Contractor's compliance with this section as the Owner reasonably requests and to, at the request of the Owner, provide a comprehensive, annual summary report of the Contractor's corporate social and environmental practices.

ARTICLE 17 BACKGROUND CHECKS

§ 17.1 The Contractor shall comply with the Owner's Capital Projects Background Screening Guidelines, receipt of which the Contractor hereby acknowledges. The Contractor warrants that it will not assign any employee, independent contractor or agent to perform services under this Contract unless that employee, independent contractor or agent is cleared for work on the project by the Contractor, in a manner consistent with the Owner's Capital Projects Background Screening Guidelines, for performing such services. Without limiting the foregoing, the Contractor shall immediately remove any employee, independent contractor or agents performing services under this Contract on campus if it becomes known to the Contractor that such person may be a danger to the health or safety of the campus community, or at the request of the Owner based on a concern of community or individual safety.

§ 17.2 Without limiting the obligations of the Contractor under § 3.18 of this Contract, the Contractor shall defend, indemnify and hold harmless the state of Connecticut, the Owner and all of their employees, agents and/or assigns for any claims, suits or proceedings resulting from a breach of the foregoing warranty and/or that are caused in whole or in part by the actions or omissions of the Contractor, its employees, or other persons that the Contractor causes to be on the campus.

ARTICLE 18 OWNER POLICIES

The Contractor shall, at no additional cost to the Owner, comply with all policies and procedures of the Owner. In the event the Owner establishes new policies or procedures following execution of the contract, or makes modifications to policies or procedures in existence at the time of contract execution, the Contractor shall comply with such new or modified policies or procedures upon written notice.

ARTICLE 19 SOVEREIGN IMMUNITY

§ 19.1 The parties acknowledge and agree that nothing in this Contract shall be construed as a waiver by the State of Connecticut or the Owner of any rights or defenses of sovereign immunity, which it may have had, now has, or will have with respect to all matters arising out of this Contract. To the extent that this provision conflicts with any other provision hereunder, this provision shall govern.

This Agreement may be executed in counterparts, and each counterpart shall have the same force and effect as an original and, when taken together, shall constitute one and the same instrument and an effective binding agreement on the part of each of the undersigned. Execution of a facsimile or PDF copy shall have the same force and effect as execution of an original. Signed copies of this Agreement may be faxed and e-mailed with the same force and effect as if the originally executed Agreement had been delivered.

This document acknowledging agreement to the General Conditions contained herein is entered into as of _____, 2017 and is executed in at least two originals.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
Executive VP for Administration & CFO	
Duly Authorized: CGS §§ 10a-109d; 10a-109n	

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PROJECT MANUAL

Project # LL170420

High Head Generator System

Construction Documents
Volume 1 of 1

UCONN
UNIVERSITY OF CONNECTICUT

State of Connecticut

University of Connecticut
Facilities Operations and Building Services
Susan Herbst
President

Prepared By:

DTC
2321 Whitney Avenue
Hamden, Connecticut 06518

August 29, 2018

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SECTION 010000 – GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 PROJECT INFORMATION

A. Project Identification: High Head Generator System. Project # LL170420.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following: Removal and proper disposal of the existing indoor 375KW generator system, including 1000 gallon below ground diesel fuel tank, all ATS's, panels, wiring, and accessories. Furnish and install a new pad-mounted outdoor 750KW diesel generator with sub-base fuel tank and full tank of fuel, ATS's, panels, wiring, and accessories. Existing Square D Switchboard modification(s) at the Tower Loop Pump Station. New service upgrade at the High Head Pump Station, including new pad-mounted transformer, pad, grounding, service entrance panelboard, sub-panels and wiring. Furnish and install active harmonic filters at each pump stations. Contractor to provide portable generator rentals and fuel to perform shutdowns and switchovers until project is complete per contract documents. Contractor to provide all trenching, backfill, re-paving, cutting, patching, and firestopping as required for a complete project.

1.3 TIME OF COMPLETION

A. Work required by the project shall commence immediately upon receipt of a Notice to Proceed. Substantial Completion as defined in the Contract Documents must be achieved and evidenced by a Certificate of Substantial Completion no later than six (6) months after award of contract. Contractor shall cooperate and coordinate with the University. No Work may be conducted during University exam periods.

1.4 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weather tight condition throughout construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building, installed equipment and its occupants during the construction period. Contractor's Parking: Contractors working for the University of Connecticut at the regional campus will work with the University Representative to determine where contractors are allowed to park during the course of the Project. Contractors working for the University of Connecticut at Storrs Campus are required to obtain a parking permit through the Parking Services Office. For additional information please contact the Parking Services Office at 860-486-4930. The Contractor is responsible for payment of all fees for parking permits. Parking fees may be prorated monthly. The University will

provide a maximum of three (3) contract parking places in the vicinity of the work. Additional parking required by the Contractor will be designated at a location specified by the Owner's Representative. Construction vehicles are exempt from this requirement.

1.5 WORK RESTRICTIONS

A. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 4:30 p.m., Monday through Friday, unless otherwise indicated. Permission must be requested and approved in writing to perform work outside the normal working hours or on a State Holiday. Owner will occupy site and building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.

1.6 ALTERNATES

A. Schedule: A schedule of alternates is included at the end of this Section.

1.7 MISCELLANEOUS PROVISIONS

A. Preconstruction Conference: The successful bidder shall attend a preconstruction conference and organizational meeting at the University of Connecticut Office of Architectural and Engineering Services, with the University Representative prior to any field work to review responsibilities and personnel assignments and to insure that Specifications, drawings and all conditions are understood to properly complete this Contract.

B. Noise Control: The Contractor shall make every effort to minimize noise disruption to occupants of buildings and adjacent buildings.

C. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily.

D. Nuisance Dust Control: The following provisions shall apply during demolition or construction phases of work. The Contractor shall take all measures necessary to accomplish this goal. These measures will include as minimum polyethylene sheeting or wet methods of fugitive dust control.

E. Temporary Fencing: Secure the jobsite with Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide concrete bases for supporting posts.

F. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

G. Final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate Number 1: In lieu of permanently installed generator system, provide portable camlock switchboard.

B. Alternate Number 2: Provide Maintenance Service in accordance with Specification Section 263213.14.3.7.

C. Alternate Number 3: Provide Factory Witness Testing in accordance with Specification Section 263213.14.3.9.

END OF SECTION 010000

SECTION 011110 – ENVIROMENTAL HEALTH & SAFETY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Establishing protocols and providing procedures to protect worker's health and safety specifically when workers are handling, or otherwise may be exposed to, contaminants present in the Underground Storage Tank.
2. Preparing a site-specific Health and Safety Plan (HASP).
3. Training requirements.
4. THE ESTABLISHMENT OF PROTOCOLS AND PROCEDURES TO ADDRESS POTENTIAL AND/OR ACTUAL RISK OF EXPOSURE TO SITE-SPECIFIC HAZARDS POSED TO CONTRACTOR'S EMPLOYEES AND SUBCONTRACTORS IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

B. Related Requirements:

1. Section 017620 – Excavation and Handling of Controlled Materials
2. Section 026500 – Underground Storage Tank Cleaning, Removal, and Disposal
3. Section 312100 – Disposal of Controlled Materials

1.3 DEFINITIONS

A. Certified Hazardous Material Manager (CHMM): A person certified by the Institute of Hazardous Materials Management.

B. Certified Industrial Hygienist (CIH): A person certified by the American Board of Industrial Hygiene.

C. Certified Safety Professional (CSP): A person certified by the Board of Certified Safety Professionals.

D. Chemical Protective Clothing (CPC): Clothing worn to shield or isolate individuals from the chemical, physical, and biological hazards that may be encountered during construction operations involving contaminated building materials and Controlled Material.

E. Contractor-designated Health and Safety Manager (HSM): Qualified person responsible for the development of the Contractor's HASP, who shall be a CIH, CSP, or CHMM. The HSM shall have review and approval authority over the HASP, and the HASP shall bear the signature of said

HSM indicating that the HASP meets the minimum requirements of 29 CFR 1910.120, 29 CFR 1910.1001, 29 CFR 1910.1101, and 29 CFR 1926.65.

F. Contractor-designated On-site Health and Safety Officer (HSO): Certified person having full authority to carry out and ensure compliance with the Contractor's HASP. In accordance with 29 CFR 1926, one who is trained and capable of identifying existing or potential hazards within the Project limits, or working conditions which are or may present a hazard, and who has authority to take prompt corrective action to eliminate such hazards. **NOTE:** The Contractor shall designate an HSO who shall be on site full-time during all work associated with UST removal, petroleum impacted soil excavation activities (if encountered). If the Contractor's HSO is not on site at any time whatsoever, all work shall be stopped. The Contractor's HSO shall not be removed from the project without the written approval of the Owner.

G. HASP: Contractor's Site-specific Health and Safety Plan. The HASP shall establish health and safety protocols that address the relative risk of exposure to regulated substances in accordance with 29 CFR 1910.120, 29 CFR 1910.1001, 29 CFR 1910.1101, and 29 CFR 1926.65. Such protocols shall only address those concerns directly related to site conditions.

H. Personal Protective Equipment (PPE): Equipment worn to minimize exposure to a variety of hazards. Examples of PPE include such items as gloves, foot and eye protection, protective hearing devices (earplugs, muffs), hard hats, respirators, and full body suits.

1.4 REGULATORY REQUIREMENTS

A. The following statutes, laws, regulations, and standards are cited for the information and guidance of the Contractor. The list below is not all-inclusive. The Contractor shall be responsible for a thorough knowledge and full implementation of all requirements for removal, management, transportation, and disposal of the materials managed under this Section.
   1. 29 CFR 1910 "Safety and Health Regulations for General Industry".
   2. 29 CFR 1910.120 "Hazardous Waste Site Operations and Emergency Response" (HAZWOPER), where appropriate.
   3. 29 CFR 1910.1200 "Hazard Communication (HAZCOM)".
   4. 29 CFR 1926 "Safety and Health Regulations for Construction".
   5. Publications, Practices for Respiratory Protection, z88.2-1992 – American National Standards Institute (ANSI).
   6. All other applicable Local, State and Federal regulations applicable to the work.

1.5 SUBMITTALS FOR REVIEW

A. At least four (4) weeks prior to starting any construction activities, Contractor shall submit two (2) copies of their Corporate Health & Safety Plan (CHASP) to the Owner.

B. At least three (3) weeks before the start of the UST removal activities, the Contractor shall submit three (3) copies of their Site-specific HASP for this project to the Owner for review. If the HASP does not bear the signature and license number of the HSM, it will be rejected and not reviewed. The Owner shall review the HASP for conformance with the specifications within two (2) weeks after submittal and shall provide written comments to the Contractor as to deficiencies in and/or exceptions to the HASP, if any, to assure consistency with the specifications, applicable

standards, policies and practices, and appropriateness given potential or known site conditions. Items identified in the HASP which do not conform to the specifications will be brought to the attention of the Contractor, and the Contractor shall revise the HASP to correct the deficiencies and resubmit it to the Owner for determination of compliance with this Section. The Contractor shall not be allowed to commence work activities involving UST removal activities or where site conditions exist that may pose a risk to worker health and safety and/or the environment, until the HASP has been reviewed and accepted by the Owner. No claim for delay in the progress of work will be considered for the Contractor's failure to submit a Site-specific HASP that conforms to the requirements of the Contract.

C. The HASP shall include copies of the Contractor-designated HSO's and HSM's training certificates as well as a demonstration of the required experience, as indicated in Part 2(2.1)(C)(3) of this Section.

PART 2 - PRODUCTS

2.1 HASP

A. General Requirements: The Contractor shall prepare a HASP covering all Project site work regulated by 29 CFR 1910.120, 29 CFR 1910.1001, 29 CFR 1910.1025, 29 CFR 1910.1101, and 29 CFR 1926.62, 29 CFR 1926.65(b) to be performed by the Contractor and all subcontractors under this Contract. The HASP shall establish in detail, the protocols necessary for the recognition, evaluation, and control of all hazards associated with each task performed under this Contract. The HASP shall address site-specific safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection. The level of detail provided in the HASP shall be tailored to the type of work, complexity of operations to be performed, and hazards anticipated. Details about some activities may not be available when the initial HASP is prepared and submitted. Therefore, the HASP shall address, in as much detail as possible, all anticipated tasks, their related hazards and anticipated control measures.

B. The HASP shall interface with the Contractor's Corporate Safety and Health Program. All topics regulated by 29 CFR 1910.120(b)(4), and those listed below, shall be addressed in the HASP. Where the use of a specific topic is not applicable to the Project, the HASP shall include a statement to justify its omission or reduced level of detail and establish that adequate consideration was given the topic.

C. **Elements**: The following elements shall be included in the site-specific HASP.

1. Site Description and Contamination Characterization: The Contractor shall provide a site description and contaminant characterization in the HASP that meets the applicable requirements of 29 CFR 1910.120, 29 CFR 1910.1001, 29 CFR 1910.1101, and 1926.65.

2. Safety and Health Risk Analysis / Activity Hazard Analysis: The HASP shall address the safety and health hazards on this site for every operation to be performed during UST removal activities. The Contractor shall review existing records and data to identify potential chemical and physical hazards associated with the site and shall evaluate their impact on field operations. Sources, concentrations (if known), potential exposure pathways, and other factors as noted in CFR 1910.120 and paragraph (c)(7) of 29 CFR 1926.65, employed to

assess risk shall be described. The Contractor shall develop and justify "Action Levels" for implementation of engineering controls and PPE upgrades and downgrades for controlling worker exposure to the identified hazards. If there is no permissible exposure limit (PEL) or published exposure level for an identified hazard, available information from other published studies may be used as guidance. Any modification of a regulatory PEL must be fully documented.

The HASP shall include a comprehensive section that discusses the tasks and objectives of the site operations and logistics and resources required to complete each task associated with UST removal activities. The hazards associated with each task shall be identified. Hazard prevention techniques, procedures, and/or equipment shall be identified to mitigate each of the hazards identified.

3. Staff Organization, Qualifications and Responsibilities: The HASP shall include a list of personnel expected to be engaged in site activities and certify that said personnel have completed the educational requirements stipulated in 29 CFR 1910.120, 29 CFR 1910.1001, 29 CFR 1910.1025, 29 CFR 1910.1101, 29 CFR 1926.1101, 29 CFR 1926.62, and 29 CFR 1926.65, are currently monitored under a medical surveillance program in compliance with those regulations, and that they are fit for work under "level C" PPE conditions.

   For some operations, "Level B" PPE may be necessary. The HASP shall include a list of personnel that may be required to use Level B PPE.

   The Contractor shall assign responsibilities for safety activities and procedures. An outline or flow chart of the safety chain of command shall be provided in the HASP. Qualifications, including education, experience, certifications, and training in safety and health for all personnel engaged in safety and health functions shall be documented in the HASP. Specific duties of each on-site team member shall be identified.

   The HASP shall also include the name and qualifications of the individual proposed to serve as HSO. The HSO shall have full authority to carry out and ensure compliance with the HASP. The Contractor shall provide a competent HSO on site who is capable of identifying existing and potential hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate or control them. The Contractor's HSO shall be on site full-time during all work associated with UST closure activities. If the Contractor's HSO is not on site at any time whatsoever, all work shall be stopped.

   The qualifications of the HSO **SHALL** include completion of OSHA 40-hour HAZWOPER training (including current 8-hour refresher training); 8-hour HAZWOPER supervisory training; a minimum of one (1) year of working experience with the regulated compounds that have been documented to exist within the Project limits; a working knowledge of Federal and State safety regulations; specialized training in personal and respiratory protective equipment program implementation; the proper use of air monitoring instruments, air sampling methods, and procedures; and certification training in first aid and CPR by a recognized, approved organization such as the American Red Cross.

   The primary duties of the HSO shall be those associated with worker health and safety. The Contractor's HSO responsibilities shall be detailed in the written HASP and shall include, but not be limited to the following:

   (A) Directing and implementing the HASP.

(B) Ensuring that all Project personnel have been adequately trained in the recognition and avoidance of unsafe conditions and the regulations applicable to the work environment to control or eliminate any hazards or other exposure to illness or injury (29 CFR 1926.21). All personnel shall be adequately trained in procedures outlined in the Contractor's written HASP.

(C) Authorizing Stop Work Orders, which shall be executed upon the determination of an imminent health and safety concern.

(D) Contacting the Contractor's HSM and the Owner immediately upon the issuance of a Stop Work order when the HSO has made the determination of an imminent health and safety concern.

(E) Authorizing work to resume, upon approval from the Contractor's HSM and the Owner.

(F) Directing activities, as defined in the Contractor's written HASP, during emergency situations; and

(G) Providing personal monitoring where applicable and as identified in the HASP.

4. Employee Training: The Contractor shall develop a training program to inform employees, supplier's representatives, and visitors on behalf of the Contractor of the special hazards and procedures (including PPE, its uses and inspections) to control these hazards during field operations. This program shall be consistent with the applicable requirements of 29 CFR 1910.120, 29 CFR 1910.1001, 29 CFR 1910.1025, 29 CFR 1926.1101, 29 CFR 1926.62, and 29 CFR 1926.65.

5. Personal Protective Equipment: The plan shall include the requirements and procedures for employee protection and shall include a detailed section on respiratory protection. The Contractor shall describe in detail and provide appropriate PPE to ensure that workers are not exposed to levels greater than the Action Level for identified hazards for each operation stated for each work zone. The level of protection shall be specific for each operation and shall be in compliance with all applicable requirements of 29 CFR 1910 and 29 CFR 1926. The Contractor shall provide, maintain, and properly dispose of all PPE.

6. Medical Surveillance Program: All on-site Contractor personnel engaged in 29 CFR 1910.120, 29 CFR 1910.1001, 29 CFR 1910.1025, 29 CFR 1926.1101, 29 CFR 1926.62, and 1926.65 operations shall have medical examinations meeting the requirements of 29 CFR 1910.120(f) and/or other applicable OSHA regulatory requirements for compounds associated with heating oil, petroleum products, etc. prior to commencement of work.

   The HASP shall include certification of medical evaluation and clearance by the physician for each employee engaged in 29 CFR 1910.120, 29 CFR 1910.1001, 29 CFR 1910.1025, 29 CFR 1926.1101, 29 CFR 1926.62, 1926.65 operations (as applicable) at the site.

7. Site Layout and Control: The HASP shall include a map, work zone delineation (support, contamination, reduction, exclusion zones; soil "Work Areas"; waste storage areas; & decontamination stations), on/off-site communications, site access controls, and security (physical and procedural).

8. Communications: Written procedures for routine and emergency communications shall be included in the Contractor's HASP.

9. Personal Hygiene, Personal and Equipment Decontamination: Decontamination facilities and procedures for PPE, sampling equipment, and heavy equipment shall be discussed in detail in the HASP.

10. Emergency Equipment and First Aid Requirements: The Contractor shall provide appropriate emergency first aid kits and equipment. The Contractor shall provide at least one person that has certified first aid / CPR training on site at all times during site UST closure operations.

11. Emergency Response Plan (ERP) and Spill Containment Program: The Contractor shall establish procedures in order to take emergency action in the event of immediate hazards (i.e., a chemical agent leak or spill, fire, or personal injury). Personnel and facilities supplying support in emergency procedures will be identified. The emergency equipment to be present on site and the emergency response procedures, as required by 29 CFR 1910.120, paragraph (1)(1)(ii), shall be specified in the ERP. The ERP shall be included as part of the HASP. The ERP shall include written directions to the closest hospital as well as a map showing the route to the hospital.

12. Logs, Reports, and Record Keeping: The Contractor shall maintain safety inspections, logs, weekly reports, accident/incident reports, medical certifications, training logs, monitoring results, etc. All exposure and medical monitoring records are to be maintained according to 29 CFR 1910 and 29 CFR 1926. The format of these logs and reports shall be developed by the Contractor to include training logs, daily logs, weekly reports, safety meetings, medical surveillance records, and a phase-out report. These logs, records, and reports shall be maintained by the Contractor and be made available to the Owner.

    The Contractor shall immediately notify the Owner of any accident or incident. Within two (2) working days of any reportable accident, the Contractor shall complete and submit to the Owner an accident report.

13. Confined space entry procedures: Confined space entry procedures, both permit required and non-permit required, shall be discussed in detail.

14. "Tailgate health & safety briefings": The HASP shall provide for daily tailgate health and safety briefings to be held at the start of each workday to ensure that employees are apprised of the HASP, the specific tasks for that particular day, and the appropriate health and safety procedures.

15. Inspections/audits: The HSM or HSO shall conduct inspections or audits to determine the effectiveness of the HASP. The Contractor shall correct any deficiencies in the effectiveness of the HASP.

PART 3 - EXECUTION

3.1 IMPLEMENTATION

A. The Contractor shall implement and maintain the HASP throughout the performance of work associated with the UST closure activities. In areas identified as having a potential risk to worker health and safety, and in any other areas deemed appropriate by the HSO, the Contractor shall be prepared to immediately implement the appropriate health and safety measures, including but not limited to the use of PPE, and engineering and administrative controls.

B. If the Owner observes deficiencies in the Contractor's operations with respect to the HASP, they shall be assembled in a written field directive and given to the Contractor. The Contractor shall immediately correct the deficiencies and respond, in writing, as to how each was corrected. Failure to bring the work area(s) and implementation procedures into compliance will result in a Stop Work Order and a written directive to discuss an appropriate resolution(s) to the matter. When the Contractor demonstrates compliance, the Owner shall remove the Stop Work Order. If a Stop Work Order has been issued for cause, no delay claims on the part of the Contractor will be honored.

C. Disposable CPC/PPE, i.e. disposable coveralls, gloves, etc.: Handling, storage, and disposal of CPC/PPE used during UST closure activities shall be handled in accordance with the provisions of the applicable section governing that work.

3.2 REVISIONS

A. The HASP shall be maintained on site by the Contractor and shall be kept current with construction activities and site conditions under this Contract. The HASP shall be recognized as a flexible document which shall be subject to revisions and amendments, as required, in response to actual site conditions, changes in work methods and/or alterations in the relative risk present. All changes and modifications shall be signed by the Contractor's HSM and shall require the review and acceptance by the Owner prior to the implementation of such changes.

B. Should any unforeseen hazard become evident during the performance of the work, the HSO shall bring such hazard to the attention of the Contractor and the Owner as soon as possible. In the interim, the Contractor shall take action, including stopping work and/or upgrading PPE as necessary to re-establish and maintain safe working conditions and to safeguard on-site personnel, visitors, the public, and the environment. The HASP shall then be revised/amended to reflect the changed condition.

C. The Contractor shall demonstrate to the Owner monthly that the HASP has been kept current and is being implemented.

3.3 FAILURE TO COMPLY

A. Failure to fully comply with this Section, the HASP, and all applicable OSHA regulations will result in immediate cessation of activities until compliance with the HASP and applicable regulations is achieved.

END OF SECTION 011110

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

1. A unit price is an amount stated on the Proposal Form or in the Specifications as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the quantities of Work required by the Contract Documents are increased or decreased.

2. Unit Prices include all necessary material, overhead, profit, and applicable taxes.

3. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

B. Related Requirements:

1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
2. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Loading, transportation and disposal of non-hazardous petroleum impacted soil to an approved landfill licensed to accept such material.
1. Unit Price: $_____/Ton (based on estimated qty of 5 Ton)

B. Unit Price No. 2: Delivery and placement of additional gravel fill to replace petroleum impacted soil removed from a UST grave.
1. Unit Price: $_____/Cubic Yard (based on estimated qty of 5 CY)

C. Unit Price No 3: Rock excavation Section 31200 Paragraph 3.4B.
1. Unit Price: $_____/Cubic Yard Measured In-place (based on estimated qty of 10 CY)

END OF SECTION 012200

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:
   1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
   2. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.

   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   2. Substitutions for Convenience: Changes proposed by Contractor that are not required in order to meet other Project requirements but may offer advantages to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

   1. Substitution Request Form: Use CSI Form 13.1A or similar.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

      a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable. Provide documentation that supports such submission
      b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
      c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size,

durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project name and contact names, current phone numbers and addresses of architects and owners who were directly involved with accepting the product substitution.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Safety Data Sheet that demonstrates that the product does not contain any hazardous material as defined in Section 01-7839 Project Record Documents.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Savings to the Owner, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify the Owner of their recommendation to accept or reject the submission. Upon Owner decision, Architect will notify Contractor of acceptance or rejection of proposed substitution within seven (7) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Executed substitution form and/or a Change Order.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. If applicable, engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than Thirty (30) days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Requested substitution provides sustainable design characteristics that specified product provided.
c. Requested substitution is fully documented and properly submitted.
d. Requested substitution does not contain any hazardous material.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
k. Requested substitution does not require additional design changes to be performed by the architect/engineer in order to incorporate the substitution into the work.

B. Substitutions for Convenience: Such request shall be submitted by the Contractor ten (10) days prior to contract execution. Should an approval of any substitutions for convenience be submitted for consideration after contract execution, it shall be at the sole discretion of the Owner whether to consider it or not. If the substitution is not accepted than the Contractor is obligated to supply the originally specified product at no additional cost to the Owner. If the substitution is accepted all coordination and liability is the sole responsibility of the Contractor. Contractor shall follow all requirements as outlined for Substitution for Cause.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on **AIA Document G710, "Architect's Supplemental Instructions" (ASI).** The Contractor shall proceed with minor changes in the work shown on ASI's.

1.4 PROPOSAL REQUESTS

A. Initiated Proposal Requests: Architect or Owner will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

B. Proposal Requests (PR) or Bulletins issued by the Architect or Engineer are not instructions either to stop work in progress or to execute the proposed change. The Contractor shall only proceed with the work or change when a CCD or PCO is counter-executed by the Owner.

C. Construction Change Directive (CCD): Where the lack of timely authorization would impact the critical path schedule of the work or where the entitlement to additional cost is not clear or is not in total agreement by the parties, the Owner may issue a Construction Change Directive on a modified AIA Document G714 form. The Contractor shall immediately proceed with the change in the Work as indicated and directed in the CCD. Issuance of a CCD to the Contractor shall also be considered an issuance of the directive to the subcontractor(s) to proceed with the work.

1. Contents: The CCD will contain a complete description of the change in the Work. It will also designate the method to be followed to determine the adjustment in the Contract Sum and/or the Contract Time, if any. The Contractor may be requested to provide an order of magnitude (not to exceed) cost estimate for the change in the work. However, an executed CCD shall not be the sole backup to a Proposed Change Order (PCO) nor shall the execution of a CCD as a Lump Sum be considered binding as such when transposing into a change order.
2. Documentation: Contractor's order of magnitude estimate of the work on Contractor letterhead reflecting at a minimum the following:
   a. Breakdown of how the cost estimate was established.
   b. Material/Equipment quotes.
   c. Subcontractor proposed costs and services to be performed.
3. Execution: If issued as a Time and Materials and/or Not to Exceed, the documentation and monitoring of the work shall be reflected on daily Additional Work Tickets and consist at a minimum, the following:
   a. Filling out of daily additional work tickets documenting the additional work performed from beginning to completion of the work.
   b. The date of the day the work is performed.
   c. Project Name
   d. Contracting Firm's name.
   e. Person's name who is monitoring and tracking the work being performed.
   f. Number of workers and their Trade Labor category.
   g. Number of hours worked by each worker.
   h. Signature of the person monitoring the work certifying that the information contained on the Daily Additional Work Tickets is true and accurate. Failure of the Contractor to sign the tickets will not relieve them of liability.
   i. Signature of the Owner verifying the work performed on the ticket.

1.5 ADMINISTRATION OF CHANGE ORDERS

A. Contractor shall utilize the most current Owner Proposed Change Order (PCO) and Labor Rate Sheet templates which can be obtained through the Owner's website (http://paes.uconn.edu/Contractors.html). No other format shall be utilized.

B. Submit to the Architect and Owner a complete itemized PCO within seven (7) working days from the date reflected on the Proposal Request or when response to an RFI has been received. If the PCO and backup is incomplete the Architect will notify the Contractor within seven (7) days to revise and resubmit. Contractor is to identify revisions to the submitted PCO document by enumerating as the PCO number -R1, -R2, R3 etc. and date of the revision being submitted.

   If a Proposal Request was not issued for the change, submit a PCO within seven (7) days from the date the initial discovery for change was formally documented.
   1. Include within the PCO template a list of quantities of labor and/or products required or eliminated and/or pre-approved unit costs, with total amount of purchases and credits that encompass the changes identified and affected by the proposal request. If requested, furnish survey data to substantiate quantities.
   2. Forms must be drafted and signed by the authorized agent of the Contractor or subcontractor represented on the PCO. Contractor shall not formulate, calculate and submit proposed costs for a change on behalf of the sub-tier contractors and suppliers.

All sub-tier contractors and suppliers shall submit their costs on supporting company letterhead.

3. Electronic signatures from the submitting Company and its Representative identified on the PCO form is preferred. Failure of the Contractor or Subcontractor to sign the form, shall not relieve the Contractor of their obligations to perform nor allow for a claim under the contract.
4. Failure of the Contractor to timely submit complete itemized PCO's, such failure shall not relieve the Contractor of their obligations to perform nor to allow for a claim under the contract.
5. Markup shall be calculated with combined overhead and profit in a single percentage as identified as allowed within the General Conditions of the contract for both the Prime Contractor and Sub-tier Contractors.

C. The basis for each PCO shall be identified and a copy of the following shall be provided:
   1. Entitlement
      a. On the format required by the Owner, summarize and describe the need for the change and the basis of the entitlement for an increase and/or extension to the contract sum or contract time;
      b. Identify all pertinent project information, sequential tracking, and original issue date and revision dates (if any)*;*
      c. Classification of the PCO as being predominately due to Unforeseen Field Conditions or the actions or requests of the Contractor, the Owner or AE Firm; and
      d. List the proposed change value for each effected Prime Subcontractor and lower tier Subcontractor(s).

   2. Supporting Documentation for Entitlement
      Include a copy of the document that initiated the PCO, which may include one or more of the following:

      a. A copy of an executed Proposal Request (PR) from the AE Firm or Owner with all attachments;
      b. A copy of a Bulletin from the Architect or Engineer of Record;
      c. A copy of a Sketch(s) issued by the AE Firm clearly outlining the change;
      d. A copy of an inspection report or notes by an official having jurisdiction's that identifies a directive for a change;
      e. A copy of any pertinent Field Directives, RFI's, e-mails or other correspondence regarding the change, if applicable; and
      f. A copy of the executed CCD form, (where applicable).
      g. Where a request for an extensions of time is included, a copy of the CPM project schedule reflecting the direct impact to the critical path and any other documents required by the Owner shall be provided.

   3. Supporting Documentation for Costs
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Copies of all supporting quotes from the material suppliers and sub tier work (detailed below). The PCO supporting documentation should identify the

companies submitting the information and the individuals who prepared the quotations.

c. Calculate the labor required to complete the work utilizing the contractually approved hourly rates of the submitting Contractor and their subcontractor's self-performed trade labor category as established in the contract. Where there are not preapproved labor rates for the Contractor or subcontractor's self-performed trade labor category of work, submit labor rates in the format required by the Owner for review and approval.
   1. Hourly labor rates shall not include Overhead and Profit (O&P), small tools, or any other general conditions costs as identified in the contract under Sec. 7.2.2.8 of the AIA 201 between the Owner and Contractor.
      a) Note that the definition of "small tools" includes equipment utilized in the normal course of work including 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 that 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.
      b) Additional Supervisory or General Foreman hours shall not be included in the cost calculation for the change unless additional crews are necessary and added and/or a compensable time extension is granted.
      c) Approved Labor Rates are for the life of the contract term and therefore not adjustable unless the contract completion date is extended beyond the month of June within the year the contract was to be completed.
      d) Forms must be drafted and signed by the authorized agent of the Contractor or subcontractor who is self-performing the trade work represented on the labor rate sheet. Contractor shall not misrepresent proposed labor rates from the sub-tier contractors.

d. Provide a detailed and itemized break-down of all anticipated material and equipment costs, with the unit cost per item multiplied by the number of units. Additional documentation is required as follows:
   1. Supporting quote from a material supplier reflecting the units and unit cost(s) for each item type;
   2. Supporting quote from the equipment supplier, with the hourly rental rate multiplied by the number of hours. One of the following shall be submitted in support of the equipment costs:
      a) When equipment is rented from a third-party, supporting rental quote from the supplier reflecting daily/weekly/monthly equipment costs (whichever applies) for equipment.
      b) When equipment is owned and used directly on the change work by the Contractor or subcontractor, the daily rate shall not exceed the rate calculated by taking the monthly rental rate as identified by a nationally recognized construction cost estimating guide or service and divided by 20 days. The weekly or monthly rate (respectively) shall not exceed the weekly/monthly rate calculated by a nationally

recognized construction cost estimating guide or service. Year, make and model of the equipment must be provided and used as the basis for establishing the rental rate.

e. If the PCO is made on a "unit cost" basis as part of the established contract, provide a copy of approved unit costs reflected in the contract, or if the unit cost was not identified in the contract, provide a complete breakdown of how the unit cost was arrived at with supporting documentation as prescribed above.

f. If the work was previously performed based on issuance of a CCD on a Time & Material and/or Not to Exceed basis, provide:
   1. Daily Additional Work Tickets as outlined above.
   2. Actual material and rental supplier invoicing.
   3. Subcontractor billings with actual material and rental supplier invoicing.

g. To the extent that work is subcontracted to Lower Tier Subcontractors, anticipated labor, materials and equipment of sub-subcontractor costs shall be substantiated and consistent with the guidelines prescribed above.

h. Costs calculated and represented are not to be rounded up or down.

D. Allowance Adjustment: See Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

E. Unit-Price Adjustment: See Division 01 Section "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's acceptance of the information contained in a Proposed Change Order, Architect will issue a Change Order for signatures of Owner, Architect and Contractor on AIA Document G701.
   a. Follow requirements for PCO's as outlined above.
   b. Each Change Order shall list and reflect the following:
      1. Each PCO # included within the change order;
      2. Each CCD# (when applicable to an identified PCO);
      3. Brief description of the work included within the PCO;
      4. Dollar value of the PCO
      5. Total of all PCO's represented

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. Requests for Information (RFIs).
4. Project Meetings.
    a. Pre-construction conference
    b. Pre-installation conference
    c. Progress meetings
    d. Coordination meetings

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Owner, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms contracted for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use of CSI Form 1.5A or similar. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Background screens on each individual performing any type of work on the project that will be coming to the project site for any length of time.

B. Key Personnel: Provide at the pre-construction meeting a list of key personnel assignments, including project manager, superintendent, safety engineer and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list business addresses and telephone numbers, including office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Keep list current and available at all times.

2. The Owner requires as a minimum, the following Key Personnel be assigned to this project. Each position shall be with an individual knowledgeable in the work that they will be providing under this contract and who is employed full-time under the Contractor, dedicated to the position listed.

   a. Project Manager (on site a minimum of once a week for duration of the project through closeout)
   b. Project Superintendent (on-site full time for duration of the project through closeout)
   c. Safety Engineer shall be responsible for all work safety on the site throughout the duration of the work. The Contractor has sole responsibility for maintaining a safe and secure work site, how they achieve the security and safety of the workers and property is at their discretion. However at a minimum the Owner expects the Safety Engineer to visit the site once a week and during high risk activities and at intervals as identified in the contract documents. Safety Engineer shall document his/her visits and reflect any issues or findings within such report. Reports shall be available within 24 hours of the inspection. Project Engineer (Project specific)

3. Each individual listed above shall have not less than five (5) years experience performing work of a similar nature to this project and in a comparable position to the position assigned on this project. Resumes will be required on all key personnel prior to acceptance. Removal of any personnel denoted as Key Personnel from the project will require Owner’s prior approval.

4. Each individual listed or identified at a later date shall have a background check performed as outlined in the University’s Contractor Background Checks Policy that can be viewed at the following weblink: http://paes.uconn.edu/Contractors.html.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate

construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. At a minimum, weekly inspections of project by the safety officer are required. Safety inspector reports shall be made available at the Owner's request within 24 hours.
3. Inspections of the project by the official(s) having jurisdiction at intervals required by the respective general permit requirements. Regardless as to who applied for a permit, the Contractor is responsible to comply and perform all requirements associated with any permit issued against the Project.
    a. http://publicsafety.uconn.edu/fmbio/
    b. Operating permit
    c. Health and Safety permit
    d. Environmental permit(s)
4. The Contractor is responsible to abide by the terms of all Environmental Permit requirements including but not limited to:
    a. Flood Management Permit (when applicable)
    b. Construction Stormwater General Permit (when applicable)
    c. Inland Wetlands and Water Resource Permit (when applicable)
        1) Turbidity testing and reporting
    d. New Source Review permit (when applicable)
    e. Waste Water Discharge permit (when applicable)
    f. Environmental Title V Air permit (when applicable)
5. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
6. Coordinate demolition of different components to ensure maximum performance and safety.
    a. Upon immediate demolition, cap the ends of the pipes to contain the off gases coming from within the pipe to eliminate potential false gas leak reports and ensure safety to other areas not being impacted.
7. Make adequate provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Listing, delivery and processing of submittals.

5. Project meetings
6. Progress meetings.
7. Project closeout activities.
8. Startup and adjustment of systems.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: **PRIOR TO START OF WORK ACTIVITY:** Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

   a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
   b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
   c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
   d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
   e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
   f. Indicate required installation sequences.
   g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations

of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.

2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:

    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    c. Fire-rated enclosures around ductwork.

7. Electrical Work: Show the following:

    a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
    b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
    d. Location of pull boxes and junction boxes, dimensioned from column center lines.

8. Fire-Protection System: Show the following:

    a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Division 01 Section "Submittal Procedures."

1.7 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified and sent directly to the Architect.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
3. Habitual submissions of RFI's not having any serious purpose and/or having no sound basis and/or is consistently incomplete and/or is already answered within the Contract documents, the Contractor shall reimburse the Owner for the Architect's additional time reviewing and answering such RFIs.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: AIA Document G716 or similar and in a form acceptable to the Owner and Architect

1. Attachments shall be electronic files in Adobe Pro PDF format.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven (7) days for Architect's response for each RFI. RFIs received by Architect after 3:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
3. Architect's action on RFIs is not intended to change the Contract Time or the Contract Sum.

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Owner in writing within seven (7) days of receipt of the RFI response with a proposed order of magnitude cost.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly or as directed by Owner's representative. Use CSI Log Form 13.2B **or a form acceptable to the Architect and Owner**. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.

1. Identification of related Minor Change in the Work.
2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.8 PROJECT MEETINGS

A. Preconstruction Conference: The successful bidder shall attend a preconstruction conference and organizational meeting at the Owner's Office of Planning, Architectural and Engineering Services, with the Owner prior to any field work to review responsibilities and personnel assignments and to insure that Specifications, drawings and all conditions are understood to properly complete this Contract.

1. The meeting will be scheduled by the Owner's Representative.
2. Attendees: The Owner, authorities having jurisdiction, Environmental Health and Safety Representative, Parking Services Representative, Environmental Compliance representative, Commissioning Agent, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties may attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including but not limited to the following where applicable:

    a. Contractor shall have the following prepared and ready for review atthe pre-construction meeting:

1) Emergency Contact Information as required by the Owner's EHS manual page 46. Utilize form provided in the document.
2) List of all known Contractors, Subcontractors and Suppliers who will be working on or supplying material and equipment to the project including name, mailing addresses, contact number and Federal and State Identification numbers (such list shall be updated and resubmitted with the monthly certified payroll submissions and the final closeout documents).
3) Contractor's Health and Safety Plan specific to the project.
4) Contractor's Quality control plan specific to the project.
5) Executed acknowledgement of receipt and review of the Owner's Environmental Health and Safety Manual as required by the Owner's EHS manual page 48. Utilize provided form
6) Executed Confined Space as required by the Owner's EHS manual page 44-45. Utilize provided forms.
7) Executed Owner Product Standard Asbestos Certification Form as required by the Owner's EHS manual page 43. Utilize provided form.
8) Copy of the transmittal letter of the project specific Affirmative Action Plan submission to CHRO and CPCA. Transmittal must reflect the project name and number and date transmitted.
9) Detailed CPM Construction Schedule specific to the project.
10) List of Certification Submittals required by the contract documents
    a) Telecommunication technician certifications (where applicable)
    b) Millwork certification (where applicable)
    c) Contract Arborist (where applicable)
11) Any proposed Changes to the Site Logistics Plan
12) Erosion Control Plan
13) Background Screening Control Plan (where applicable)

b. Items for discussion not limited to:
1) Contractor's CPM Construction schedule.
2) Phasing.
3) Logistics Plan review
4) Critical work sequencing and long-lead items.
5) Labor Market Regulations.
6) Designation of key personnel and their duties.
7) Lines of communications and emergency phone numbers.
8) Procedures for processing field decisions and Change Orders.
9) Procedures for RFIs.
10) Procedures for testing and inspecting.
11) Procedures for processing Applications for Payment.
12) Distribution of the Contract Documents and correspondence.
13) Submittal procedures.
14) Sustainable design requirements.
15) Preparation of record documents.
16) Use of the premises, including dust and noise control.
17) Parking and parking permits
18) Work restrictions including working hours.
19) Owner's occupancy requirements.
20) Responsibility for temporary facilities and controls.
21) Procedures for disruptions and shutdowns.

22) Construction waste management and recycling.
23) Office, work, and storage areas.
24) Equipment deliveries and priorities.
25) . Owner's Vendor Code of Conduct Policy
26) Security.
27) Progress cleaning.
28) Owner's Environmental Health and Safety Manual, Safety procedures, including the Owner's Hazard Communication Program and policies on pest control, asbestos, lead-based paints, lockout/tagout procedures, excavation and trenching, disposal of PCB containing light ballasts, use of solvents, solvent or epoxy based paints, confined space entries and use of open flames.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

B. Project Meeting: The Contractor shall schedule and conduct meetings and conferences at Project site unless otherwise indicated. Project Meetings shall at a minimum be performed bi-weekly.

1. Attendees: Coordinate with the Owner and Architect a set day and time for the project meetings. Identify in collaboration with the Owner and Architect any other key individuals whose presence is required. This meeting is not intended to be inclusive with any Pre-installation Conference or Progress Meeting requirements. List all required attendees.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees at least two working days prior to the scheduled meeting. Discuss items of significance that could affect progress, including but not limited to the following:
   a. Review of the previous meeting minutes. Record corrections and any agreements/disagreements
   b. Progress of the work.
   c. Compare construction progress with the Project's approved Construction Schedule.
      1) Review progress since the last meeting.
      2) Identify activities on the critical path that are ahead of schedule, or behind schedule, in relation to the contractually accepted construction schedule.
      3) Provide recovery steps on how construction behind schedule will be brought back into schedule.
      4) Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
   d. Review Contractor's site safety reports.
   e. Review any critical work sequencing and long-lead items.
   f. Review sustainable design/LEED requirements.
   g. Review of any management or supervisory responsibilities:
      1) Contractor conduct.
      2) Staffing / Man Power.
      3) Protection of construction personnel and adjacent sites.
      4) Dust and noise control.
      5) Progress cleaning.
      6) Temporary facilities and controls.
      7) Moisture and mold control.
      8) Construction waste management and recycling.

9) Unacceptable behavior.
10) Security
11) Hazard Communication Program

h. Review of Submittal log.
i. Review of RFI log.
j. Review of proposed change order (PCO) log.
k. Review of Change Order log.
l. Review any labor or wage issues.
m. Review any Payment issues.
n. Review the next two weeks look ahead schedule.
1) Identify any testing and inspections to be performed.
2) Any work restrictions including working hours.
3) Scheduling of disruptions and shutdowns
4) Equipment deliveries and priorities.
o. Review any other critical issues.

3. Minutes: Entity responsible for conducting meeting will clearly identify themselves as the author of the minutes, record and distribute meeting minutes. The meeting will record significant discussions and agreements achieved. With each meeting held, minutes shall reflect the author, all invited attendees, any additional attendees who attended the meeting and those invited attendees that did not attend the meeting. Distribute the meeting minutes to everyone concerned for review, including but not limited to Owner and Architect, within three (3) days of the meeting.

4. Minutes from the previous meeting shall be reviewed at the start of each subsequent meeting. Document any clarifications, corrections, or exceptions to the contents of the minutes and identify the attendee requesting the adjustments. Resolve any disagreements that may arise with the contents and document accordingly and document within the minutes. Minutes shall not require acceptance prior to the next scheduled meeting, unless the project has reached final completion and final payment is in process.

C. Pre-installation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including but not limited to requirements for the following:

a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals, shop drawings, product data, and quality control samples.

h. Sustainable design requirements.
i. Review of mockups.
j. Possible conflicts.
k. Compatibility requirements.
l. Time schedules.
m. Weather limitations.
n. Manufacturer's written instructions.
o. Warranty requirements.
p. Compatibility of materials.
q. Acceptability of substrates.
r. Temporary facilities and controls.
s. Space and access limitations.
t. Safety.
u. Regulations of authorities having jurisdiction.
v. Testing and inspecting requirements.
w. Installation procedures.
x. Coordination with other work.
y. Required performance results.
z. Protection of adjacent work.
aa. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Entity responsible for conducting meeting will record and distribute meeting minutes. Meeting minutes shall identify who the author is and date the meeting was held. Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings with Contractor’s subcontractors at the Project Site at regularly (minimum bi-weekly) scheduled intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or accept minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction activities behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required

to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including but not limited to the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Status of stainable design documentation, if required.
5) Deliveries.
6) Off-site fabrication problems.
7) Access.
8) Site utilization.
9) Temporary facilities and controls.
10) Progress cleaning.
11) Quality and work standards.
12) Status of correction of deficient items.
13) Field observations.
14) Status of RFIs.
15) Status of proposal requests.
16) Pending changes.
17) Status of Change Orders.
18) Pending claims and disputes.
19) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information. Meeting minutes shall identify who the author is and the date the meeting was held. Contractor shall distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report. Submit report no later than 3 days after each progress meeting date.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

E. Coordination Meetings: Conduct Project coordination meetings at regular intervals convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: Every party currently involved in coordination or planning for the construction activities involved. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting. Meeting minutes shall identify who the author is and the date the meeting was held.

1.9 GENERAL ADMINISTRATION

A. Certified Payroll: Pursuant to CGS Sec. 31-53, original certified payrolls with a statement of compliance shall be submitted.

1. On a monthly basis, all certified payrolls for the project shall be received from their subcontractors by the Contractor. The Contractor is responsible to track, monitor and report for compliance with the Department of Labor and Owner requirements.

   a. Documents are to be submitted in the format acceptable to the Connecticut Department of Labor.
   b. Verify all certified payrolls are being received from all subcontractors and sub-tier subcontractors performing work on the project for the period of time being reported.
   c. Confirm payroll information has been included not limited to paycheck number.
   d. Ensure each payroll reporting is filled out completely even if the worker is the "owner" of the company performing the work. Reporting as owner performance with no payment information is not in conformance with CTDOL requirements.
   e. Verify that the Subcontractor has a current compliant Connecticut Worker's Compensation policy.
      1) Obtain the subcontractor's workers compensation policy.
      2) Policies that state "Interstate' do not meet the statutory requirements.
   f. Verify the appropriate Agent for the Subcontractor submitting the payroll has certified each of them.
   g. Obtain and verify current OSHA 10 certifications for any all workers who performed on the project. Include a copy of each workers OSHA 10 certification, when first reporting them on certified payrolls.
   h. Ensure all certified payrolls for the month have been received for work performed by the various subcontractors and sub-tiers, inclusive of all weeks within the month **worked or not worked.**
   i. Ensure that the last required submission of certified payrolls are identified as the "Final" submission.
   j. Utilize the Worker Geographic Report data template and record each weekly Certified Payroll submission from each subcontractor for work performed or not under the project for that particular week. Record alphabetically.
   k. Refer to the following weblink for the most current acceptable format template: **http://paes.uconn.edu/Contractors.html**

2. Contractor shall submit all certified payrolls (including their own) and supporting documents to the Owner in the following manner:
   a. Submit electronically to: PAEScertifiedpayroll@uconn.edu
   b. Submit monthly at the same time as when the pencil draft of the application for payment is submitted for approval.
   c. Provide in the Subject line of the email the following information in the order represented:

1) Project #
2) Contractor Name
3) Period Reporting On

Example: 901211 Turner April 2016 Certified Payrolls

d. Organize the documents in the following manner prior to uploading the document into the email:
   1) Contractor's Worker Geographic Distribution Report
   2) Contractor's certified payrolls with each week of the month in sequential order;
   3) Subcontractors certified payrolls organized alphabetically by subcontractor and then within each subcontractors submission, by each sequential week of the month being reported;
   4) Ensure that each side of a payroll page (if double sided) has been scanned to include their certification for that payroll reporting;
   5) In the body of the email, identify any non-compliance issues relating to the payrolls being reported on to the Owner.

3. Failure to consistently submit complete complying certified payrolls to the Owner in the format outlined, any costs incurred by the Owner to perform the requirements, shall be a reimbursement from the Contractor to the Owner.

B. Worker Geographic Distribution Report (Report): Following the close of each consecutive month's certified payrolls and in conjunction with the certified payroll submission, the Contractor who is directly contracted with the Owner shall submit a project specific Worker Geographic Distribution Report on all workers who worked on the project for the period of time represented on the report. The monthly Worker Geographic Distribution Report shall summarize and include all Contractor and subcontractors' worker data information provided it in a format required by the Owner.

1. Certified payrolls applicable shall accompany the monthly Report.
2. Owner format shall be used and not altered in any way without explicit approval from the Owner. Refer to the following weblink for the most current acceptable format template: **http://paes.uconn.edu/Contractors.html**
3. Failure to submit Worker Geographic Distribution Report in the format required, any costs the Owner incurs to perform the requirements outlined shall be reimbursed by the Contractor.

C. CHRO Reporting: Submit to the Commission on Human Rights and Opportunities (CHRO) on a monthly basis their Small Contractor/Minority Business Enterprise Utilization, Payment Status and Materials Consumption Reports (i.e., Form CHRO cc-257, cc-257a, cc-257b, cc-258a and cc-259). ORIGINAL reports shall be sent by the 25th day following the end of each calendar month to:

1. Commission on Human Rights and Opportunities (CHRO)
   25 Sigourney Street, 7th Floor
   Hartford, CT 06106

Provide **a copy** of the transmittal sent to CHRO to the following Owner contact:
veronica.cook@uconn.edu.

Do not send any CHRO reports with the certified payroll or to anyone else other than those identified, unless otherwise directed by the Owner. Upon request, the Contractor shall provide documentation to the Owner of compliance with small business and minority business enterprise contracting goals.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Contractor's Project Milestone Construction schedule.
   2. Contractor’s CPM schedule
   3. Construction CPM schedule updating reports.
   4. Daily construction reports.
   5. Material location reports.
   6. Site condition reports.
   7. Special reports.

B. Related Requirements:
   1. Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.
   2. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
   3. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
   1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
   2. Predecessor Activity: An activity that precedes another activity in the network.
   3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Owner.

C. Milestone: An action or event marking a significant stage or stages in the life of a construction project. Significant milestones may include but not limited to (where applicable):

1. Projected start date. Provide sufficient time for the Owner and Contractor to execute the contract.
2. Pre-Construction Meeting
3. Critical and non-critical Submittal submissions and approvals (provide sufficient time for reviews as outlined in the contract)
4. Mobilization with temporary fencing system and project signage installation.
5. Construction start date
6. Site work start date
7. Demolition start date
8. Demolition completion date
9. Site work completion date
10. Utilities upgrades start date
11. Utilities upgrades completion date
12. Structural Foundations start date
13. Structural Foundations completion date
14. Elevator Shaft start date
15. Elevator Shaft completion date
16. Building Core start date
17. Building Core completion date
18. Skeleton Framing completion date
19. Façade installation start date
20. Façade installation completion date
21. Roof framing completion date
22. Window installation start date
23. Window installation completion date
24. Water Tight Building date
25. Mechanical infrastructure start date
26. Plumbing infrastructure start date
27. Electrical infrastructure start date
28. Interior framing start date
29. Interior wall enclosure start date
30. Interior wall enclosure completion date
31. Ceiling installation start date
32. Ceiling installation completion date
33. Finish installation start date
34. Substantial Completion
35. Final Completion

D. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

E. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

F. Event: The starting or ending point of an activity.
   1. Retain definition in "Float" Paragraph below for most projects using CPM-type schedule. Designating ownership of float can save arguments later. See Evaluations.

2. Float: The measure of leeway in starting and completing an activity. The excess time included in a construction schedule to accommodate such items as severe unusual inclement weather and associated delays, equipment failures, and other such unscheduled events. It is the contingency time associated with a path or chain of activities and represents the amount of time by which the early finish date of an activity may be delayed without impacting the critical path and delaying the overall completion of the Project. Any difference in time between the Contractors' approved early completion date and the Contract Completion Date shall be considered a part of the Project float. Float time belongs to both the Owner.Free Float: The time (in days) by which an activity may be delayed or lengthened without adversely impacting upon the early start day of any activity following in the chain.

3. Total Float: The difference (in days) between the maximum time available within which to perform an activity and the duration of an activity. It represents the time by which an activity may be delayed or lengthened without impacting the Time for Completion or the Contract Completion Date.

4. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required schedule submittals in the following format:
   1. Working electronic copy of construction schedule file, where indicated.
   2. Acceptable software:
      a. Microsoft office for small uncomplicated projects determined by the Owner.
      b. Primavera 6 for large more complicated projects determined by the Owner
   3. Retain one of two subparagraphs below
      a. PDF (ADOBE PRO) electronic file.
      b. Three (3) paper copies.

B. Contractor's Project Milestone Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
   Retain subparagraph below if Architect, Owner, or Construction Manager will use scheduling software to revise Contractor's data or to integrate scheduling data from multiple contracts or separate contracts.
   1. Milestone schedule shall be submitted upon receipt of Letter of Intent as a condition to award and shall be in a size required to display entire schedule for entire construction period
   2. Submit an electronic copy of schedule, using software acceptable to the Owner, and labeled to comply with requirements for submittals.
   3. Contractually accepted Contractor's Project Milestone Construction schedule shall not be altered from what was initially accepted. Contractor's Project Milestone Construction schedule can only be adjusted by fully executed change order.

C. Contractor's CPM Schedule: Subsequent schedule that details all activities associated with the work. The Contractor's CPM schedule represents the Contractor's plan for achieving the contractual completion of the project. Updates to and the submission of the Contractor's CPM schedule shall not represent acceptance by the Owner and/or Architect.

D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
   1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
   2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
   3. Total Float Report: List of all activities sorted in ascending order of total float.
   4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
   5. Resource Loading Report: List all activities initial resource loadings as compared to actual for the month.

E. Construction Schedule Updating Reports: Submit with Applications for Payment.

F. Daily Construction Reports: Submit at monthly application for payment intervals.

G. Material Location Reports: Submit at monthly application for payment intervals.

H. Site Condition Reports: Submit at time of discovery of differing conditions.

I. Special Reports: Submit at time of unusual event.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate Owner’s contractors and/or Contractor’s subcontractors.

B. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from entities involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to the date required for Substantial Completion.
   1. Substantial Completion date shall not be changed for reasons not caused by the Owner. Should the time allotted within the letter of intent for contract required documents to be submitted by the Contractor, be exceeded due to Contractors failure to provide such

accurate timely documents within the time frame identified the Contractor shall not be entitled to an extension to the date outlined for Substantial Completion .

2. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Revise "Activity Duration" Subparagraph below to suit Project. Long activity durations provide less detail and, therefore, less information with which to manage a project. As an alternative to specifying activity duration, indicate minimum and maximum number of activities, which will result in a similar effect.
2. Activity Duration: Define activities so no activity is longer than twenty (20) days, unless specifically allowed by the Owner.
3. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than sixty (60) days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
4. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
5. Startup and Testing Time: Include no fewer than fifteen (15) days for startup and testing.
6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow a minimum of fifteen (15) days for Architect's administrative procedures necessary for Punch List and certification of Substantial Completion.
7. Punch List and Final Completion: Include not more than thirty (30) days for completion of punch list items and final completion.

C. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Utility interruptions, Substantial Completion, and final completion.

D. Two Week Look ahead schedule: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

E. Recovery Schedule: When periodic update indicates the Work is behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

F. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. CPM Schedule: Prepare Contractor's construction schedule of sufficient detail to indicate all significant construction activities. The level of detail should be such that no activity should exceed twenty (20) days. Where similar activities continue beyond the twenty (20) day limit, these activities should be broken into subgroups, specific areas, or phases so that the twenty (20) day maximum duration is maintained.

1. Develop network diagram in sufficient time to submit CPM schedule for review no later than twenty (20) calendar days after date established of contract execution.

    a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Owner's approval of the schedule.
2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
3. Subparagraph below coordinates between working days of time and calendar days. Under AIA Document A201, the Contract Time is in calendar days.
4. Use "one calendar day" as the unit of time for individual activities. Indicate nonworking days, restricted days as outlined in Section 01-1000 Summary and holidays incorporated into the schedule in order to coordinate with the Contract Time.

B. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    a. Date of Notice to Proceed
    b. Preparation and processing of submittals.
    c. Mobilization and demobilization.
    d. Purchase of materials.
    e. Delivery.
    f. Fabrication.
    g. Utility interruptions.
    h. Installation.
    i. Special Equipment
    j. Testing.
    k. Commissioning
    l. Telecommunications installations
    m. Furniture installations (where applicable) and Owner installations
    n. Punch list and final completion.
    o. Activities occurring following final completion.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. Day of the week, date and the time of day the report is filled out.
2. List of subcontractors at Project site.
3. List of separate contractors at Project site.
4. Approximate count of personnel by subcontractor trade labor work at Project site.
5. Equipment at Project site.
6. Material deliveries.
7. High and low temperatures and general weather conditions, including presence of rain or snow.
8. Accidents.
9. Meetings and significant decisions.
10. Unusual events (see special reports).
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Daily additional work tickets
16. Photographs taken
17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

D. Daily Additional Work Tickets: Prepare daily additional work tickets recording the following information for a change in the work issued by a CCD. Tickets shall be documented separately for each trade labor category being performed that day and shall reflect at a minimum the following:
1. Date and day of the week
2. Change work being performed and percentage progress

3. Number of workers working on the change consistently and their respective work labor category
4. Number of hours worked working on the change consistently per trade labor category.
5. Materials delivered and used specifically for the change work.
6. Equipment delivered and/or used specifically and consistently for the change work. If equipment already exists on site and is used to perform the change work, number of hours the equipment is used shall be documented.

2.4 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one (1) day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating and response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's CPM Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled project and progress meetings.
   1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated two week look ahead schedule concurrently with the report of each such meeting. In the event the updated Schedule exceeds the Construction Completion date recognized in the contract, the Contractor must accompany the update with a recovery schedule.
   2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
   3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of the updated schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
   1. Post copies in Project meeting rooms and temporary field offices.
   2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs.

B. Related Requirements:

1. Division 01 Section "Submittal Procedures" for submitting photographic documentation.
2. Division 01 Section "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.

1.3 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
1. Digital Photographs: Submit image files within three days of taking photographs.
2. Digital Camera: Minimum sensor resolution of 8 megapixels.
3. Format: JPG2 with a minimum 3200 by 2400 pixels, uncompressed or layered in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped with key plan location number, in a folder named by date of photograph, accompanied by key plan file.
4. Identification: Provide the following information with each image description in file metadata tag:
    a. Name of Project.
    b. Name and contact information of the photographer.
    c. Name of Contractor.
    d. Date photograph was taken.
    e. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    f. Unique sequential identifier keyed to accompanying key plan.

B. Construction Photographs: Submit digital images in JPG2 format of photos taken within the month with the pencil draft of invoice being submitted for review.

1.4 USAGE RIGHTS

A. Provide or transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified photographer to take construction photographs.

B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.
2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to the Owner.

D. Web Cameras: Are required / are not required for this project. System shall provide for time lapse videography with web view access at a minimum.

E. Preconstruction Photographs: Before commencement of demolition for renovation projects or starting new construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.

1. Flag construction limits before taking construction photographs.
2. Take not less than 20 photographs to show existing conditions adjacent to property before starting the Work.
3. Take not less than 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
5. Contractor has the option of video-taping as opposed to digital photos.

F. Periodic Construction Photographs: Take no less than 20 photographs daily or at significant start and finish points of construction phases with the cutoff date associated with each

Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

1. Significant Critical activities include but not limited to:
   a. Commencement of the Work
   b. Depth and connections of all utilities of subgrade construction.
   c. Above-grade structural framing.
   d. Exterior building enclosure.
   e. Interior Work, through date of Substantial Completion.

G. Owner-Directed Construction Photographs: From time to time, Owner may instruct photographer about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.

H. Time-Lapse Sequence Construction Photographs: Take photographs as indicated, to show status of construction and progress since last photographs were taken.

1. Frequency: Take photographs hourly or as required by industry standards, coinciding with the cutoff date associated with each Application for Payment.

I. Vantage Points: As identified in the Key Plan and accepted by the Owner, follow select vantage points. During each of the following construction phases, Final Completion Construction Photographs: Take color photographs after date of Substantial Completion for submission as project record documents. Keyplan will inform photographer of desired vantage points or as directed by the Owner.

1. Do not include date stamp.

J. Additional Photographs: Owner may request photographs in addition to periodic photographs specified.

1. Three days' notice will be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:

   a. Special events planned at Project site.
   b. Immediate follow-up when on-site events result in construction damage or losses.
   c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
   d. Substantial Completion of a major phase or component of the Work.
   e. Extra record photographs at time of final acceptance.
   f. Owner's request for special publicity photographs.

END OF SECTION 013233

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals, including;

1. Contractor’s construction schedule
2. Submittal schedule
3. Shop Drawings
4. Coordination Drawings and Layout
5. Daily Construction Reports
6. Product Data
7. Samples
8. Site Mobilization Plan
9. Safety Plan
10. Background Screenings

B. Related Requirements:

1. AIA Document A101 Contract Article 5 "Payments" for submitting Applications for Payment and the schedule of values.
2. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. Portable Document Format (PDF-Adobe Pro): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 30-60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's CPM construction schedule which is due within twenty (20) days from contract execution.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Project Name and Project Number
    b. Scheduled date for first submittal.
    c. Specification Section number and title.
    d. Submittal category: Action; informational.
    e. Name of subcontractor.
    f. Scheduled date for Architect's final release or approval.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Processing Time: Allow time for any submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt, Commissioning Agent's receipt and Official having jurisdiction receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow fourteen (14) days from receipt for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow fourteen (14) days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow twenty-one (21) days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow fourteen (14) days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

C. Paper Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Name of subcontractor.
    f. Name of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals

shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

i. Number and title of appropriate Specification Section.
j. Drawing number and detail references, as appropriate.
k. Location(s) where product is to be installed, as appropriate.
l. Other necessary identification.

4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Owner.

5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without review submittals received from sources other than Contractor.

a. Transmittal Form for Paper Submittals: Use AIA Document G810 or similar format.

D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating paper submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.R1).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.

4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:

a. Project name.
b. Date.
c. Name and address of Architect.
d. Name of Contractor.
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Specification Section number and title.
h. Related physical samples submitted directly.

i. Indication of full or partial submittal.
j. Transmittal number.
k. Submittal and transmittal distribution record.
l. Remarks.

E. Options: Identify options requiring selection by Architect.

F. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, and installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections. Transmit each submittal from Contractor to Owner using a transmittal form.

1. Submit electronic submittals as PDF-Adobe Pro electronic files.

a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Action Submittals: Submit five (5) paper copies of each submittal unless otherwise indicated. Architect will coordinate reviews and incorporate comments received from officials having jurisdiction and return four (4) copies, one to Owner, two to Contractor and one to the official having jurisdiction.

3. Informational Submittals: Submit five (5) paper copies of each submittal unless otherwise indicated. Architect will not return copies.

4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Notation of coordination requirements.

4. For equipment, include the following in addition to the above, as applicable:

    a. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

    a. Four (4) paper copies of Product Data unless otherwise indicated. Owner will retain one (1) copy and Architect will retain one (1) copy; remainder will be returned.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
3. Submit Shop Drawings in the following format:

    a. Five (5) opaque copies of each submittal. Owner will retain one (1) copy, official having jurisdiction will retain one (1) copy and Architect will retain two (2) copies; remainder will be returned.

D. Samples: Submit physical Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of applicable Specification Section.

3. For projects where electronic submittals are required, provide corresponding electronic submittal in addition to physical Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; mock-ups, swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three (3) sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.

1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.

E. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

G. Application for Payment and Schedule of Values: Comply with requirements specified in Division 00 Section "Payment Procedures."

H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

J. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

K. Site Mobilization / Logistics Plan

1. Prior to the start of operations on the site, the Contractor shall submit to the Owner, a Site Mobilization Logistics Plan which shall indicate pertinent dates and times, logistics, construction fence, laydown area, traffic flow and compliance with the General Requirements to a level of detail commensurate with the complexity of the construction and the sensitivity of the Owner’s ongoing activities on site.

L. Safety Plan

1. Prior to, and as a condition of mobilization on site, the Contractor shall submit a Safety Plan consisting of no less that the following information:

a. Material Safety Data Sheets for all potentially harmful substances.
b. A list of Contractor, Subcontractor, and Owner personnel to be notified in the event of an emergency.
c. A list of Contractor’s personnel to be notified by the Owner in the event of an emergency during “off” hours.
d. Evacuation Plans.
e. Emergency medical procedures.
f. Locations of emergency medical equipment.

g. Completed Contactor Receipt Acknowledgement Form from the last page of the University of Connecticut, Contractor EHS Manual (http://www.ehs.uconn.edu/ppp/Contractor_EHS_Manual.pdf)

M. Contractor's Background Screenings

1. Prior to, and as a condition of mobilization on site, the Contractor shall submit a Background Screening Control Plan process on each worker for each project regardless of past screenings and shall be consistent with the requirements of the University's Capital Project's Background Screening Guidelines. The University's Capital Project's Background Screening Guidelines can be found: http://paes.uconn.edu/Contractors.html

   a. Identify the background screening company who will be conducting the screenings for all workers under this project. And the process they will be using to perform the screenings.
   b. Identify how the Contractor will control access to the Construction Site to restrict non-screened or non-approved workers from entering the work site and performing work.

2. Provide a report monthly listing all workers who have been approved for work, disqualified for work and who are pending review.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three (3) paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, design loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect. Project

Closeout and Maintenance Material Submittals: See requirements in Division 01 Section "Closeout Procedures."

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return the submittal to contractor, Owner will receive final approved submittal from the Architect. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Requirements:
1. Divisions 01 section Close out
2. Divisions 02 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where

indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

   1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as

appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.
3. Any other delegated design work required within the contract documents.

D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit project specific quality-control plan within ten (10) days of Notice to Proceed, and not less than five (5) days prior to preconstruction conference. Submit in format acceptable to Owner. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
3. Owner-performed tests and inspections indicated in the Contract Documents.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and re-inspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Certification that conditions, products, and installation will satisfy all aspects of the warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Certification that conditions, products, and installation will satisfy all aspects of the warranty
5. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced and certified in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven (7) days in advance of dates and times when mockups will be constructed.
3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.

    a. Allow seven (7) days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed unless otherwise indicated.

K. Integrated Exterior Mockups: Construct integrated exterior mockup as indicated on Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

1.9 QUALITY CONTROL

A. Owner Responsibilities: The Owner will provide independent inspections, tests, and similar quality control services specified to be performed by independent agencies and not by the

contractor, except where they are specifically indicated as the contractor's responsibility or are provided by another identified entity. Costs for these services are not included in the Contract Sum.

1. The Owner will employ and pay for services of an independent agency and furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor**,** and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify the Owner and testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect**,** and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Owner, Architect**,** and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owners Representative, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner**,** as indicated in Statement of Special Inspections attached to this Section.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Owner and Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:
   1. Division 01 Section "Substitution Procedures" for requests for substitutions.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
   3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in Division One Section "Substitutions".
2. Architect's Action: Review action shall follow all requirements specified in Division One Sections on "Substitutions" and "Submittals".

    a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations and not by previous Project experience. Procedures governing product selection include the following:

1. Proprietary Specification Requirements: Where Specifications name only a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

2. Semi proprietary Specification Requirements: Where Specifications name three or more products or manufacturers, provide one of the products indicated. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Where products or manufacturers are specified by name, accompanied by the term “or equal,” or “or approved equal” comply with the provisions concerning “substitutions” to obtain approval for use of an unnamed product.

3. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contact requirements. Comply with provisions concerning “substitutions” to obtain approval for use of an unnamed product.

4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.

5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.

    a. Manufacture’s recommendations may be contained in published product literature, or by the manufacturer’s certification of performance.

6. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

7. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

    a. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.

8. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

9. Allowances: Refer to individual Specification Sections and provisions in Section 01-2100, Allowances, for allowances that control product selection, and for procedures required for processing such selections.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Proposed changes are in keeping with the intent of Contract Documents.
3. The request is timely, fully documented and properly submitted.
4. The request is directly related to an “or equal” clause or similar language in the Contract Documents.
5. The specified product or method of construction cannot be provided within the Contract Time.
    a. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
6. The specified product or method of construction cannot receive necessary approval by a governing authority.
7. A substantial advantage is offered the Owner, in terms of cost, time, energy conversation or other considerations of merit, after deduction offsetting responsibilities the Owner may be required to bear.

a. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.

8. The specified product or method of construction cannot be provided in a manner that is compatible with other material, and where the Contractor certifies that the comparable product will overcome the incompatibility.
9. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed comparable product can be coordinated.
10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed comparable product provide the required warranty.
11. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
12. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
13. Samples, if requested.

B. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid submittal, nor does it constitute approval.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS:

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.

B. Related Requirements:

1. Division 01 Section "Summary" for limits on use of Project site.
2. Division 01 Section "Submittal Procedures" for submitting surveys.
3. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

B. Cutting and Patching Plan: Submit plan describing procedures at least fourteen (14) days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

    a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.5 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying and GIS services of the kind indicated.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades for review of plan. Review

areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in sustainable design requirement Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. And coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Verification of measurements and locations shall be performed by a licensed surveyor who will collect the GIS coordinates that will be included in the final as-built documentation.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Owner. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Owner before proceeding.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Document slope and locations of material and product below and above ground on all utilities. Such documentation shall be performed by a licensed surveyor who will collect the GIS coordinates that will be included in the final as-built documentation.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels or create high vibrations.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect as approved by the Architect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

5. Follow all Owner sustainable design requirements, not limited to LEED.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove of non-hazardous liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Construction Waste Management and Disposal.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in "General Commissioning Requirements."

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017620 – EXCAVATION AND HANDLING OF CONTROLLED MATERIALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Work under this item shall include all materials, equipment, tools and labor required to excavate, load, transport, stockpile and manage Controlled Materials (all soil excavated from the site including petroleum impacted soil from the UST excavation (if encountered), as defined in these specifications.

B. This item shall include construction, maintenance and dismantling of a Temporary Waste Stockpile Area.

C. This item shall apply to Controlled Materials, generated by the Contractor and all subcontractors, associated with petroleum impacted soil related to the UST closure (if encountered). All soil excavated from the site shall be considered Controlled Materials until it has been fully characterized in accordance with these specifications.

1.2 RELATED SECTIONS

A. Section 011010 – Environmental Health and Safety

B. Section 026500 - Underground Storage Tank Cleaning and Removal

C. Section 312100 - Disposal of Controlled Materials

PART 2 - PRODUCTS

2.1 MATERIALS

A. Polyethylene sheeting used for covering stockpiled Controlled Materials shall be grid reinforced, and have a minimum thickness of 8-10 mils; or shall be an approved equal.

B. Polyethylene sheeting used for underlayment beneath stockpiled Controlled Materials shall be high density, grid and/or geotextile reinforced, and have a minimum thickness of 8-10 mils; or shall be an approved equal.

C. Sandbags used to secure polyethylene sheeting covers shall have a minimum weight of 20 pounds.

PART 3 - EXECUTION

3.1 PREPARATION

A. The Contractor shall coordinate with the Engineer to identify limits and access for the Temporary Waste Stockpile Area. The Contractor shall be responsible for registering under the DEEP General Permit for Contaminated Soil and/or Sediment Management, if required.

B. Prior to the start of excavation, the Contractor shall construct the Temporary Waste Stockpile Area in a location to be verified by the engineer prior to construction.

C. The Contractor shall locate, identify and protect from damage utilities that shall remain, as shown on the contract drawings.

D. Protect benchmarks from damage by excavating equipment and vehicular traffic. Benchmarks that are damaged or destroyed will be repaired or replaced by the Owner at the Contractor's expense.

E. Characterization of stockpiled material designated for off-site disposal or reuse on site shall be completed by the Engineer. It is the Contractor's responsibility to select the soil disposal facility and provide the Engineer with appropriate disposal facility sampling requirements.

3.2 EXCAVATION OF CONTROLLED MATERIALS

A. All soil excavated from the site is considered Controlled Material and will require Special Handling per the requirements of these specifications and any applicable Federal, State or local regulations.

B. Upon removal of the existing UST, petroleum impacted soil (if encountered) will be excavated and placed in the Temporary Waste Stockpile Area. Once the Engineer has deemed that the impacted soil has been adequately removed (based on visual and field screening results), confirmation sampling will be completed. The UST excavation will remain open, until the Engineer deems that the remaining soil is analytically acceptable.

C. Contractors that work with, or have the potential to be exposed to Controlled Materials during construction activities shall use personal protective equipment, implementation of engineering controls, air and personnel monitoring, and decontamination procedures, as necessary.

D. Transport all excavated site soil to the Temporary Waste Stockpile Area.

E. Notify Engineer of unexpected subsurface conditions and discontinue work in affected area until notified to resume work.

F. The Contractor shall keep paved areas including, but not limited to, areas adjacent to excavations, roadways leading to and from the project site, parking areas, and public roadways

free from dirt, dust, Controlled Materials, or other materials. If such materials are deposited, spilled, or spread, such material shall be removed promptly, and properly disposed of to the satisfaction of the Engineer no later than the end of each working day or as directed by the Engineer.

3.3 CONFIRMATORY SOIL SAMPLING

A. The Engineer shall obtain confirmatory soil samples from sidewalls and bottom of the UST excavation for laboratory testing to confirm successful removal of the petroleum impacted soil. The excavation shall remain open until the Engineer notifies the Contractor that the analytical results are below the cleanup levels. The Contractor shall not backfill or disrupt the excavations until instructed by the Engineer.

B. Additional excavation may be required if the confirmation sample results exceed the Connecticut Department of Energy and Environmental Protection (DEEP) soil cleanup criteria. The Engineer shall obtain additional confirmation samples from the new limits of any extended excavations.

3.4 STOCKPILING OF CONTROLLED MATERIAL

A. Controlled Materials stockpiled in the Temporary Waste Stockpile Area will be sampled by the Engineer in order to classify such Controlled Materials for final disposition or possible reuse in the tank grave.

B. Excavation and handling of Controlled Materials performed by the Contractor or subcontractors within the Project Limits shall be performed in a manner which considers the health and safety of operating personnel, the community, and the surrounding environment in conformance with the Specifications.

C. All Controlled Materials excavated from the UST excavation and soil excavated from other areas of the site during the project shall be stockpiled separately within the designated waste stockpile area only. Comingling of these soils will not be allowed. Materials shall be kept covered at all times with polyethylene sheeting when the stockpile is not being worked. Polyethylene sheeting shall be secured/weighed down with sandbags, roped tires, a combination thereof in such a manner as to prevent the plastic from being dislodged by wind or other incidental disturbances. If stockpile covers are displaced, the Contractor shall immediately replace and re-secure the sheeting. If soil stockpile covers are damaged, the Contractor shall immediately replace damaged sheeting with new sheeting. It shall be the Contractor's responsibility to maintain all aspects of the Temporary Waste Stockpile Area and to prevent release of contaminants from the stockpile to the environment throughout the duration of the project.

3.5 EQUIPMENT DECONTAMINATION

A. All equipment shall be provided to the work site free of contamination. The Engineer may prohibit from the site any equipment, which in his opinion has not been thoroughly decontaminated prior to arrival. Any decontamination of the Contractor's equipment prior to arrival at the site shall be at the expense of the Contractor. The Contractor is prohibited from decontaminating on the project site that equipment which is not thoroughly decontaminated prior to arrival.

B. The Contractor shall furnish labor, materials, tools, and equipment for decontamination of all equipment and supplies, which are used to handle Controlled Materials. Decontamination shall be conducted at an area designated by the Engineer for such purpose. Frequency of decontamination shall be determined by the Engineer, and may be required prior to equipment and supplies leaving the project site and/or between stages of the work.

C. Dry decontamination procedures are recommended. Residuals from dry decontamination activities shall be collected and managed as Controlled Materials. If dry methods are unsatisfactory as determined by the Engineer, the Contractor shall modify decontamination procedures as required subject to the Engineer's approval.

3.6 DUST CONTROL

A. The Contractor shall implement a fugitive dust suppression program to prevent the off-site migration of particulate matter and/or dust resulting from excavation, loading, transportation, and filling operations associated with Controlled Materials. It shall be the Contractor's responsibility to supervise fugitive dust control measures and to monitor airborne particulate matter. The Contractor shall:

1. Employ reasonable fugitive dust suppression techniques.
2. Visually observe the amounts of particulate and/or fugitive dust generated during the handling of soil. If the apparent amount of fugitive dust and/or particulate matter is not acceptable to the Engineer, the Engineer may direct the Contractor to implement corrective measures at his discretion, including, but not necessarily limited to, the following:
    a. Sweep and/or apply water to pavement surfaces;
    b. apply water to equipment and excavation faces; and
    c. apply water during soil excavation, loading and dumping.

3.7 PROTECTION

A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

END OF SECTION 017620

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warrantee Requirements
4. Submittal of Warranties.
5. Revenue Services Requirements
6. Final cleaning.
7. Repair of the Work.

B. Related Requirements:

1. Division 01 Section "Photographic Documentation" for submitting final completion construction photographic documentation.
2. Division 01 Section "Execution" for progress cleaning of Project site.
3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
4. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Division 01 Section “Demonstration and Training” for requirements for instructing Owner’s personnel

1.3 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Divisions 02 through 33 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Divisions 02 through 33 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by University Representative. Label with manufacturer's name and model number where applicable.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain University Representative signature for receipt of submittals.

5. Submit test/adjust/balance records.
6. Submit sustainable design submittals required in Division 01 sustainable design requirements Section and in individual Division 02 through 33 Sections.
7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings when specified in Division 01 Section "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
2. Submit an updated final Application for Payment statement, accounting for final additional charges to the Contract Sum.
3. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
4. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
5. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.
6. Submit consent of surety to final payment.
7. Submit a final liquidated damages settlement statement.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Upon completion of reinspection, the University Representative with advice of the Architect will prepare a Certificate of Final Acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
3. If necessary, reinspection will be repeated.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format or format approved by Owner:

    a. PDF electronic file. Architect will return annotated file.

1.9 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract

Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

E. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.10 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. All work shall be covered by the standard one (1) year guarantee as set forth in the General Conditions. The Contractor shall visit the project site at 11 months into the guarantee period to determine the scope of any required guarantee work. The Contractor shall contact the University Representative prior to this visit so that the University Representative may attend.

C. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

D. Specific requirements for warranties for the Work and products and installations that are specified to be warrantee are included in the individual Sections of Divisions 2 through 33.

E. Disclaimers and limitations: Manufacturer’s disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

F. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Address to: Executive Director of Architectural and Engineering Services, Office of Architectural and Engineering Services, University of Connecticut Box Unit-3038, Storrs, Connecticut 06269-3038

3. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
4. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name and number, and name of Contractor.
5. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
6. All required guarantees/warranties will be by the respective company made out to the University of Connecticut.
7. All guarantees/warranties supplied by subcontractors or manufacturers shall be countersigned by the General Contractor.

G. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.11 REVENUE SERVICES REQUIREMENTS

A. Upon receipt of the Certificate of Substantial Completion, the Contractor shall submit the following information required by the Connecticut Department of Revenue Services.

1. The identity and addresses of all subcontractors performing work on the project.

2. The Connecticut tax registration numbers of the General Contractors and all subcontractors.

3. The Federal Social Security account numbers, or Federal Employer Identification numbers, or both, if applicable, for the General Contractor and all subcontractors.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Clean catch basins affected by construction activities.
c. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
d. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
e. Remove tools, construction equipment, machinery, and surplus material from Project site.
f. Remove snow and ice to provide safe access to building.
g. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
j. Remove labels that are not permanent.
k. Clean and polish tile and other glazed surfaces affected by construction activity.
l. Clean and polish finish hardware affected by construction activity.
m. Clean exposed surfaces of diffusers, registers, and grills affected by construction activity.
n. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency that were affected by construction activity.
o. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Division 01 Section "Temporary Facilities and Controls." Prepare written report.

D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not fury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

1. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

3.3 CERTIFICATIONS

A. The Contractor, at complete of construction, shall provide to the University a "Certificate of Substantial Compliance" bearing original signatures of an officer of the company stating: "this is to CERTIFY that, in my professional opinion, the complete structure/renovations described above is in substantial compliance with the approved construction documents on file with the University of Connecticut. Minor deviations and special stipulations are noted below (if any)"

B. Prior to Owners' approval and acceptance, mechanical and electrical systems shall be fully operational.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

B. Related Requirements:

1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

2. Divisions 02 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
b. Enable inserted reviewer comments on draft submittals.

2. Three paper copies, separately bound. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves.

C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Name and contact information for Commissioning Authority, (if applicable).
8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
9. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names

used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.

9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."

G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:

1. Division 01 Section "Closeout Procedures" for general closeout procedures.
2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:

1) Submit one (1) paper-copy set of marked-up record prints.
2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

1) Submit one (1) paper-copy set of marked-up record prints.
2) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy of each submittal.

E. Reports: Submit written report monthly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding archive photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Construction Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.

n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect and or Construction Manager.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders and record Drawings where applicable.

B. Format: Submit Record Specifications as paper copy.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders] and record Drawings where applicable.

B. Format: Submit record Product Data as paper copy.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as paper copy.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Owner Representative’s reference during normal working hours.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: For instructor.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.

c. Name of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Date of video recording.

2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
3. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

B. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.7 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.
    k. Seasonal and weekend operating instructions.
    l. Required sequences for electric or electronic systems.

m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning.
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

1.8 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
   1. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

   1. Schedule training with Owner with at least seven days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

   1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD modewith vibration reduction technology.

   1. Submit video recordings on CD-ROM or thumb drive.
   2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
   3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
   4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

      a. Name of Contractor/Installer.
      b. Business address.
      c. Business phone number.
      d. Point of contact.
      e. Email address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

    a. Produce segments to present a single significant piece of equipment per segment.
    b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

    1. Furnish additional portable lighting as required.

E. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

SECTION 026500 – UST CLEANING, REMOVAL, & DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

Under this Section of the Specifications the Contractor will furnish all labor, equipment, appliances/materials, and perform all operations in connection with the removal, cleaning, and disposal of the underground petroleum storage tank (UST) and tank appurtenant piping.

A. This work includes: uncovering, removing contents from, cleaning, inerting, excavating, transportation and disposal of one steel fuel oil UST. The quantity of contents contained within the UST is unknown. These contents will require removal and disposal/recycling.

B. This work includes: uncovering, removing contents from, cleaning, excavating, transportation and disposal of product piping and capping or plugging of the remaining piping.

C. This work includes site restoration including backfilling the UST excavations and restoring surface improvements to their original condition.

D. Project description and related work specified elsewhere:

1. Section 011100 – Environmental Health and Safety
2. Section 017620 – Excavation and Handling of Controlled Materials
3. Section 312100 – Disposal of Controlled Materials

1.2 SUBMITTALS

A. Bidders shall submit with their bid documents the name, address, telephone number, and fax number of the proposed treatment/disposal facility for disposal of product, sludge, and cleaning fluids, which shall include the name and phone number of an authorized representative of the facility. This submittal shall also include a copy of the facilities waste disposal acceptance criteria and a copy of the facility’s operational permit.

B. No facility may be substituted for the one designated in the Contractor's submittals unless approved by the Owner in writing.

PART 2 - PRODUCTS

A. Polyethylene sheeting to be placed at the limits of the excavation prior to backfill, shall have a minimum thickness of 6-mil.

PART 3 - EXECUTION

3.1 LIQUID/SLUDGE REMOVAL AND TANK CLEANING

A. The Contractor shall be responsible for the removal, transportation, and disposal of any product and sludge removed from the UST and appurtenant piping at a licensed facility. Product shall be removed from the piping between the UST and the equipment (generator).

B. The Contractor shall protect existing site surfaces, materials, and structures from inadvertent contamination during this work. Should such contamination occur, the Contractor shall not be reimbursed for costs associated with replacement or proper disposal of such contaminated materials.

C. The Contractor shall remove all free liquids and residual sludges from the UST prior to removal from the grave. Any release of petroleum or contaminated material from the UST will be the sole responsibility of the Contractor and at the sole expense of the Contractor.

D. After removal of all remaining product within the UST, the Contractor shall remove all water and residual sludges from the UST and piping, purge vapors, and properly clean the UST and appurtenant piping (through to the generator) and materials in accordance with U.S. Environmental Protection Agency, U.S. Department of Labor - Occupational Safety and Health Administration, Connecticut Department of Energy and Environmental Protection (CT DEEP), State fire safety agency regulations and policies, as well as NFPA 30, NFPA 327, API Recommended Practice 1604, "Removal and Disposal of Used Underground Petroleum Storage Tanks", and API Publication 2015, "Cleaning Petroleum Storage Tanks.", and other applicable industry standards and guidelines.

E. The Contractor upon removal of all remaining liquids and sludges from the UST and associated piping and shall transport, manifest, waste characterize, and dispose of these materials in a manner consistent with all applicable Federal, State, and municipal waste disposal regulations.

F. All contaminated wastes generated from tank and pipe cleaning work, such as sludges, water, rags, absorbent media, disposable clothing, PPE, etc., as well as salvageable petroleum product, shall be properly handled, packaged, manifested, and disposed off site at the Contractor's expense and in accordance with Federal, State, and municipal regulations. The Contractor shall use cleaning methods designed to minimize the volume of waste generated as a result of cleaning operations.

G. The Contractor is responsible for all work and costs involved with off-site transportation and disposal of tank liquids.

3.2 TANK EXCAVATION

A. The Contractor shall provide all the tools, materials, services, and equipment necessary to properly excavate the UST and associated piping and appurtenances in preparation for tank cleaning and disposal activities.

B. Once the UST and piping are cleaned, the Contractor shall excavate around the UST to uncover the UST for removal. The Contractor shall remove any hold-down straps, lift the tank out of the excavation, place on a level surface, and block the tank to prevent movement. If contaminated soil or groundwater conditions exist, the exterior of the tank shall be cleaned, and cleaning wastes contained for proper disposal. Any existing tank hold-down slabs or anchors shall be demolished and removed. The piping shall be drained and removed.

C. The Contractor shall excavate the UST and shall excavate and stockpile clean fill and clean soil separately. The clean fill/soil shall be stockpiled on site as directed by the Engineer designated by the Owner unless it is suspected that the soil may be contaminated based upon visual observations, field screening, and/or laboratory analysis. Soil that is suspected to be contaminated shall be brought to the Temporary Waste Stockpile Area (segregated from other site soils not originating from the UST area) for characterization and off-site disposal.

D. The Contractor shall be responsible for maintaining the structural stability of the excavations to ensure the safety of the workers and the integrity of the surrounding structures and utilities.

E. The Contractor shall provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavation and shall remove all such water as fast as it may collect, in such a manner that it does not interfere with the progression of the work. The Contractor shall make every effort to prevent surface water from collecting within the excavations by providing positive drainage away from the excavation, use of berms, trenches, etc.

F. Where contaminated soil is present below the groundwater table, at the discretion of the Engineer, the Contractor shall discontinue excavation. Excavations in which contaminated soil is encountered below the groundwater and left in place shall be lined with 6-mil thick polyethylene sheeting prior to backfill.

3.3 UNDERGROUND STORAGE TANK CONFIRMATORY SAMPLING

A. The Engineer will be responsible for confirmatory soil sampling. Confirmatory soil samples will be collected from the UST excavation in accordance with CT DEEP guidance. Soil samples from the UST excavation will be collected and analyzed for diesel oil constituents including extractable total petroleum hydrocarbons (ETPH), aromatic volatile organics (VOCs), and semi-volatile organics (SVOCs).

B. The UST excavation will remain open until laboratory results and direction from Engineer confirm remaining soil is acceptable. The contractor shall secure the excavation to prevent unauthorized entry and/or collapse prior to being backfilled.

3.4 TANK DISPOSAL

A. The Contractor shall properly dispose of the UST and all appurtenant piping removed from the site in accordance with Federal, State, and municipal regulations governing such.

B. The Contractor shall prominently label the UST with product content and date of removal. The UST shall be removed from the site the same day the tank is excavated, and transported to a certified tank disposal/recycling facility.

C. The UST shall be transported to a disposal/recycling facility in accordance with all applicable Federal, State, and municipal regulations. The Contractor shall prepare the proper bill(s) of lading. The certificate of receipt for proper disposal shall be submitted to the engineer within 72 hours of tank removal.

3.5 DOCUMENTATION

The Contractor shall submit environmental documentation of the project to the Construction Manager as project related information becomes available. The environmental documentation for submittal includes, but is not limited to the following:

1. A detailed accounting of the closure of the UST. This will include at a minimum documentation of the wastes generated from the work; an accounting for disposal of the wastes generated detailing the name and address of each disposal facility and their EPA RCRA identification number; clear copies of waste manifests, scale receipts, and disposal receipts, and copies of all characterization sampling.

2. Any incident reports that may involve the work, accidents occurring at the site, and a copy of the project logs which include site entry by Contractor personnel and visitors to the site.

3. All documents necessary to demonstrate compliance with applicable Federal, State, and municipal regulations for work completed.

END OF SECTION 026500

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: Indicate type, use, location, and termination locations.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cerro Wire LLC.

2. Encore Wire Corporation.
3. Southwire Company.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. RoHS compliant.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

E. Conductor Insulation:
1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

2.2 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ILSCO.
2. O-Z/Gedney; a brand of Emerson Industrial Automation.
3. Thomas & Betts Corporation; A Member of the ABB Group.

C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper.
2. Type: One hole with standard barrels.
3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type XHHW-2, single conductors in raceway.

B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.

C. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.

D. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

E. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.

2. Perform each of the following visual and electrical tests:

    a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
    b. Test bolted connections for high resistance using one of the following:

        1) A low-resistance ohmmeter.
        2) Calibrated torque wrench.
        3) Thermographic survey.

    c. Inspect compression-applied connectors for correct cable match and indentation.
    d. Inspect for correct identification.
    e. Inspect cable jacket and condition.
    f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
    g. Continuity test on each conductor and cable.
    h. Uniform resistance of parallel conductors.

C. Cables will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes grounding and bonding systems and equipment.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency and testing agency's field supervisor.

B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

    a. Plans showing as-built, dimensioned locations of system described in "Field Quality Control" Article, including the following:

        1) Test wells.
        2) Ground rods.
        3) Ground rings.
        4) Grounding arrangements and connections for separately derived systems.

    b. Instructions for periodic testing and inspection of grounding features at test wells based on NETA MTS.

        1) Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
        2) Include recommended testing intervals.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Burndy; Part of Hubbell Electrical Systems.
2. ERICO International Corporation.
3. ILSCO.

2.3 CONDUCTORS

A. Bare Copper Conductors:

1. Solid Conductors: ASTM B3.
2. Stranded Conductors: ASTM B8.
3. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
4. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

B. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 8 inches (6.3 by 200 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless [compression]-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

D. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.

E. Cable-to-Cable Connectors: Compression type, copper or copper alloy.

F. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.

G. Conduit Hubs: Mechanical type, terminal with threaded hub.

H. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.

I. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.

J. Service Post Connectors: Mechanical type, bronze alloy terminal, in short- and long-stud lengths, capable of single and double conductor connections.

K. Straps: Solid copper, copper lugs. Rated for 600 A.

L. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

M. Water Pipe Clamps:

1. Mechanical type, two pieces with stainless-steel bolts.

a. Material: Tin-plated aluminum.
b. Listed for direct burial.

2. U-bolt type with malleable-iron clamp and copper ground connector.

2.5 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet (19 mm by 3 m).

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.

1. Bury at least 30 inches (750 mm) below grade.

C. Grounding Conductors: Green-colored insulation.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 GROUNDING SEPARATELY DERIVED SYSTEMS

A. Generator: Install grounding electrode(s) at the generator location. The electrode shall be connected to the equipment grounding conductor and to the frame of the generator.

3.4 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches (150 mm) from the foundation.

3.5 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Metallic Fences: Comply with requirements of IEEE C2.

1. Grounding Conductor: Bare copper, not less than No. 8 AWG.
2. Gates: Shall be bonded to the grounding conductor with a flexible bonding jumper.
3. Barbed Wire: Strands shall be bonded to the grounding conductor.

3.6 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
2. Use exothermic welds for all below-grade connections.

C. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260543 "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches (300 mm) deep, with cover.

1. Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

E. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

F. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.

D. Grounding system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

F. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
3. Pad-Mounted Equipment: 5 ohms.

G. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Structural steel for fabricated supports and restraints.
4. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

a. Slotted support systems, hardware, and accessories.
b. Clamps.
c. Hangers.
d. Sockets.
e. Eye nuts.
f. Fasteners.
g. Anchors.
h. Saddles.
i. Brackets.

2. Include rated capacities and furnished specialties and accessories.

B. Shop Drawings: For fabrication and installation details for electrical hangers and support systems.

1. Hangers. Include product data for components.
2. Slotted support systems.
3. Equipment supports.

C. Delegated-Design Submittal: For hangers and supports for electrical systems.

1. Include design calculations and details of hangers.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-(10-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c. in at least one surface.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. B-line, an Eaton business.
b. Thomas & Betts Corporation; A Member of the ABB Group.
c. Unistrut; Part of Atkore International.

2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
3. Material for Channel, Fittings, and Accessories: Galvanized steel.
4. Channel Width: Selected for applicable load criteria.
5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

B. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.

D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) B-line, an Eaton business.
2) Hilti, Inc.
3) MKT Fastening, LLC.

2. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
3. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325 (Grade A325M).

4. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA 1.
2. NECA 101

B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by scheduled in NECA 1, where its Table 1 lists maximum spacings that are less than those stated in NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.

B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
3. To Existing Concrete: Expansion anchor fasteners.

4. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
5. To Light Steel: Sheet metal screws.
6. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 CONCRETE BASES

A. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete."

C. Anchor equipment to concrete base as follows:

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Nonmetallic conduits and fittings.
3. Metal wireways and auxiliary gutters.
4. Boxes, enclosures, and cabinets.
5. Handholes and boxes for exterior underground cabling.

1.3 DEFINITIONS

A. GRC: Galvanized rigid steel conduit.

B. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

A. Product Data: For conduits, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AFC Cable Systems; a part of Atkore International.

b. Allied Tube & Conduit; a part of Atkore International.
c. Wheatland Tube Company.

2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. GRC: Comply with ANSI C80.1 and UL 6.
4. IMC: Comply with ANSI C80.6 and UL 1242.
5. FMC: Comply with UL 1; zinc-coated steel.

B. Metal Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AFC Cable Systems; a part of Atkore International.
b. Allied Tube & Conduit; a part of Atkore International.
c. O-Z/Gedney; a brand of Emerson Industrial Automation.

2. Comply with NEMA FB 1 and UL 514B.
3. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
4. Fittings, General: Listed and labeled for type of conduit, location, and use.

C. Joint Compound for IMC, or GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

A. Nonmetallic Conduit:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Allied Tube & Conduit; a part of Atkore International.
b. CANTEX INC.
c. Prime Conduit, Inc.

2. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

B. Nonmetallic Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AFC Cable Systems; a part of Atkore International.

b. CANTEX INC.
c. Thomas & Betts Corporation; A Member of the ABB Group.

2. Fittings, General: Listed and labeled for type of conduit, location, and use.
3. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

a. Fittings for LFNC: Comply with UL 514B.

4. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. B-line, an Eaton business.
2. Hoffman; a brand of Pentair Equipment Protection.
3. Square D.

B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.

1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Hinged type unless otherwise indicated.

E. Finish: Manufacturer's standard enamel finish.

2.4 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Crouse-Hinds, an Eaton business.
2. EGS/Appleton Electric.
3. O-Z/Gedney; a brand of Emerson Industrial Automation.

B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

E. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.

F. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

G. Device Box Dimensions: 4 inches by 2-1/8 inches by 2-1/8 inches deep (100 mm by 60 mm by 60 mm deep).

H. Gangable boxes are allowed.

I. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

J. Cabinets:

1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.

2.5 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. General Requirements for Handholes and Boxes:

1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Armorcast Products Company.
b. Oldcastle Precast, Inc.
c. Quazite: Hubbell Power Systems, Inc.

2. Standard: Comply with SCTE 77.

3. Configuration: Designed for flush burial with integral closed bottom unless otherwise indicated.
4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
6. Cover Legend: Molded lettering, "ELECTRIC.".

2.6 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
1. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
2. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012 and traceable to NIST standards.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC.
2. Underground Conduit: RNC, Type EPC-40-PVC.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: GRC.
2. Exposed, Not Subject to Severe Physical Damage: GRC.
3. Exposed and Subject to Severe Physical Damage: GRC.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
5. Damp or Wet Locations: GRC.
6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.

C. Minimum Raceway Size: 1/2-inch (16-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.

2. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

3.2 INSTALLATION

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

C. Do not fasten conduits onto the bottom side of a metal deck roof.

D. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water piping.

E. Complete raceway installation before starting conductor installation.

F. Arrange stub-ups so curved portions of bends are not visible above finished slab.

G. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.

H. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.

I. Install conduits parallel or perpendicular to building lines.

J. Support conduit within 12 inches (300 mm) of enclosures to which attached.

K. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

L. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

M. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

N. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

O. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

P. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

Q. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

R. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service raceway enters a building or structure.
3. Conduit extending from interior to exterior of building.
4. Where otherwise required by NFPA 70.

S. Comply with manufacturer's written instructions for solvent welding RNC and fittings.

T. Locate boxes so that cover or plate will not span different building finishes.

U. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe less than 6 inches (150 mm) in nominal diameter.
2. Install backfill as specified in Section 312000 "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.

a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete for a minimum of 12 inches (300 mm) on each side of the coupling.
b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

5. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.

D. Install handholes with bottom below frost line, 42” below grade.

E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install 0sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.7 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to paint finishes with matching touchup paint recommended by manufacturer.

END OF SECTION 260533

SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Sleeve-seal systems.
   2. Grout.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      a. Crouse-Hinds by Eaton.
      b. GPT Industries.
      c. Metraflex Company (The).
   2. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
   3. Pressure Plates: Plastic.
   4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.2 GROUT

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

END OF SECTION 260544

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Color and legend requirements for raceways, conductors, and warning labels and signs.
2. Labels.
3. Tapes and stencils.
4. Signs.
5. Paint for identification.
6. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.

B. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

C. Delegated-Design Submittal: For arc-flash hazard study.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with ASME A13.1 and IEEE C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Comply with NFPA 70E and Section 260573.19 "Arc-Flash Hazard Analysis" requirements for arc-flash warning labels.

F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

2.2 COLOR AND LEGEND REQUIREMENTS

A. Raceways and Cables Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage and system or service type.

B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.

1. Color shall be factory applied.
2. Colors for 208/120-V Circuits:

    a. Phase A: Black.
    b. Phase B: Red.
    c. Phase C: Blue.

3. Colors for 480/277-V Circuits:

    a. Phase A: Brown.
    b. Phase B: Orange.
    c. Phase C: Yellow.

4. Color for Neutral: White or gray.
5. Color for Equipment Grounds: Green.

C. Warning Label Colors:

1. Identify system voltage with black letters on an orange background.

D. Warning labels and signs shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning (240V nominal systems): "WARNING - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."
3. Workspace Clearance Warning (480V nominal systems): "WARNING - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 42 INCHES (1067 MM)."

4. On-site Generator Warning Signs located at each service equipment main circuit breakers: “WARNING – ON-SITE DIESEL GENERATOR LOCATED OUTDOORS.”

E. Equipment Identification Labels:

1. Black letters on a white field.

2.3 LABELS

A. Self-Adhesive Wraparound Labels: Preprinted, 3-mil- (0.08-mm-) thick, vinyl flexible label with acrylic pressure-sensitive adhesive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. Pipemarker by Brimar Industries.
c. Seton Identification Products.

2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
3. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.

B. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil- (0.08-mm-) thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. Marking Services, Inc.
c. Seton Identification Products.

2. Minimum Nominal Size:

a. 1-1/2 by 6 inches (37 by 150 mm) for raceway and conductors.
b. 3-1/2 by 5 inches (76 by 127 mm) for equipment.
c. As required by authorities having jurisdiction.

2.4 TAPES AND STENCILS

A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Carlton Industries, LP.
b. Ideal Industries, Inc.
c. Marking Services, Inc.

B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide; compounded for outdoor use.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. emedco.
c. Marking Services, Inc.

C. Tape and Stencil: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers placed diagonally over orange background and are 12 inches (300 mm) wide. Stop stripes at legends.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. LEM Products Inc.
b. Marking Services, Inc.
c. Seton Identification Products.

D. Underground-Line Warning Tape:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Ideal Industries, Inc.
b. LEM Products Inc.
c. Marking Services, Inc.

2. Tape:

a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical utility lines.
b. Printing on tape shall be permanent and shall not be damaged by burial operations.
c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.

3. Color and Printing:

a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".

4. Tag: Underground warning tape for generator feeders.:

a. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright colored, compounded for direct-burial service.
b. Width: 3 inches (75 mm).
c. Overall Thickness: 5 mils (0.125 mm).
d. Foil Core Thickness: 0.35 mil (0.00889 mm).
e. Weight: 28 lb/1000 sq. ft. (13.7 kg/100 sq. m).
f. Tensile according to ASTM D882: 70 lbf (311.3 N) and 4600 psi (31.7 MPa).

2.5 SIGNS

A. Metal-Backed Butyrate Signs:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Champion America.
b. emedco.
c. Marking Services, Inc.

2. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396-inch (1-mm) galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.
3. 1/4-inch (6.4-mm) grommets in corners for mounting.
4. Nominal Size: 10 by 14 inches (250 by 360 mm).

B. Laminated Acrylic or Melamine Plastic Signs:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. emedco.
c. Marking Services, Inc.

2. Engraved legend.
3. Thickness:

a. For signs up to 20 sq. in. (129 sq. cm), minimum 1/16 inch (1.6 mm) thick.
b. For signs larger than 20 sq. in. (129 sq. cm), 1/8 inch (3.2 mm) thick.
c. Engraved legend with black letters on white face.
d. Self-adhesive.
e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

B. Verify identity of each item before installing identification products.

C. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

D. Apply identification devices to surfaces that require finish after completing finish work.

E. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

F. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.

1. Secure tight to surface of conductor, cable, or raceway.

G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

H. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer.

I. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.

J. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.

K. Self-Adhesive Labels:

1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.

L. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.

M. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.

1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.

N. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.

O. Underground Line Warning Tape:

1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches (400 mm) overall.
2. Install underground-line warning tape for direct-buried cables and cables in raceways.

P. Metal-Backed Butyrate Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high sign; where two lines of text are required, use labels 2 inches (50 mm) high.

Q. Laminated Acrylic or Melamine Plastic Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high sign; where two lines of text are required, use labels 2 inches (50 mm) high.

3.3 IDENTIFICATION SCHEDULE

A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.

B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

C. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:

1. "OPTIONAL STANDBY POWER."

D. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels to identify the phase.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

E. Power-Circuit Conductor Identification, More Than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use nonmetallic preprinted tags colored and marked to indicate phase, and a separate tag with the circuit designation.

F. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with the conductor or cable designation, origin, and destination.

G. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive labels with the conductor designation.

H. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.

I. Workspace Indication: Apply tape and stencil to finished surfaces. Show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

J. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.

K. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Metal-backed, butyrate warning signs.

1. Apply to exterior of door, cover, or other access.
2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:

a. Power-transfer switches.

L. Arc Flash Warning Labeling: Self-adhesive labels.

M. Operating Instruction Signs: Self-adhesive labels.

N. Emergency Operating Instruction Signs: Self-adhesive labels with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for.

O. Equipment Identification Labels:

1. Indoor Equipment: Metal-backed butyrate signs.
2. Outdoor Equipment: Laminated acrylic or melamine sign.
3. Equipment to Be Labeled:

a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a self-adhesive, engraved, laminated acrylic or melamine label.
b. Enclosures and electrical cabinets.
c. Switchboards.
d. Transformers: Label that includes tag designation indicated on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
e. Enclosed switches.
f. Power-transfer equipment.
g. Power-generating units.

END OF SECTION 260553

SECTION 260573.13 - SHORT-CIRCUIT STUDIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

1.3 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or removed and reinstalled. Existing to remain items shall remain functional throughout the construction period.

B. Field Adjusting Agency: An independent electrical testing agency with full-time employees and the capability to adjust devices and conduct testing indicated and that is a member company of NETA.

C. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

D. Power System Analysis Software Developer: An entity that commercially develops, maintains, and distributes computer software used for power system studies.

E. Power Systems Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.

F. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion of the circuit from the system.

G. SCCR: Short-circuit current rating.

H. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

I. Single-Line Diagram: See "One-Line Diagram."

1.4 ACTION SUBMITTALS

A. Product Data:

1. For computer software program to be used for studies.
2. Submit the following after the approval of system protective devices submittals. Submittals may be in digital form.

    a. Short-circuit study input data, including completed computer program input data sheets.
    b. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a qualified professional engineer.

        1) Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.
        2) Revised one-line diagram, reflecting field investigation results and results of short-circuit study.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. For Power Systems Analysis Software Developer.
2. For Power System Analysis Specialist.
3. For Field Adjusting Agency.

B. Product Certificates: For short-circuit study software, certifying compliance with IEEE 399.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. For overcurrent protective devices to include in emergency, operation, and maintenance manuals.
2. The following are from the Short-Circuit Study Report:

    a. Final one-line diagram.
    b. Final Short-Circuit Study Report.
    c. Short-circuit study data files.
    d. Power system data.

1.7 QUALITY ASSURANCE

A. Study shall be performed using commercially developed and distributed software designed specifically for power system analysis.

B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

C. Manual calculations are unacceptable.

1. Power System Analysis Software Qualifications: Computer program shall be designed to perform short-circuit studies or have a function, component, or add-on module designed to perform short-circuit studies.
2. Computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

D. Power Systems Analysis Specialist Qualifications: Professional engineer licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

E. Short-Circuit Study Certification: Short-Circuit Study Report shall be signed and sealed by Power Systems Analysis Specialist.

F. Field Adjusting Agency Qualifications:

1. Employer of a NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification responsible for all field adjusting of the Work.
2. A member company of NETA.
3. Acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 POWER SYSTEM ANALYSIS SOFTWARE DEVELOPERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. SKM Systems Analysis, Inc.

B. Comply with IEEE 399 and IEEE 551.

1. Analytical features of power systems analysis software program shall have capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output.

2.2 SHORT-CIRCUIT STUDY REPORT CONTENTS

A. Executive summary of study findings.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.

C. One-line diagram of modeled power system, showing the following:

1. Protective device designations and ampere ratings.
2. Conductor types, sizes, and lengths.
3. Transformer kilovolt ampere (kVA) and voltage ratings.
4. Motor and generator designations and kVA ratings.
5. Switchgear, switchboard, motor-control center, and panelboard designations and ratings.
6. Derating factors and environmental conditions.
7. Any revisions to electrical equipment required by the study.

D. Comments and recommendations for system improvements or revisions in a written document, separate from one-line diagram.

E. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to available short-circuit currents. Verify that equipment withstand ratings exceed available short-circuit current at equipment installation locations.
2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.
3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in standards to 1/2-cycle symmetrical fault current.
5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

F. Short-Circuit Study Input Data:

1. One-line diagram of system being studied.
2. Power sources available.
3. Manufacturer, model, and interrupting rating of protective devices.
4. Conductors.
5. Transformer data.

G. Short-Circuit Study Output Reports:

1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.

b. Calculated fault-current magnitude and angle.
c. Fault-point X/R ratio.
d. Equivalent impedance.

2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.
b. Calculated symmetrical fault-current magnitude and angle.
c. Fault-point X/R ratio.
d. Calculated asymmetrical fault currents:

1) Based on fault-point X/R ratio.
2) Based on calculated symmetrical value multiplied by 1.6.
3) Based on calculated symmetrical value multiplied by 2.7.

3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.
b. Calculated symmetrical fault-current magnitude and angle.
c. Fault-point X/R ratio.
d. No AC Decrement (NACD) ratio.
e. Equivalent impedance.
f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

PART 3 - EXECUTION

3.1 POWER SYSTEM DATA

A. Obtain all data necessary for conduct of the study.

1. Verify completeness of data supplied on one-line diagram. Call any discrepancies to Architect's attention.
2. For equipment included as Work of this Project, use characteristics submitted under provisions of action submittals and information submittals for this Project.
3. For equipment that is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. Qualifications of technicians and engineers shall be as defined by NFPA 70E.

B. Gather and tabulate the required input data to support the short-circuit study. Comply with requirements in Section 017839 "Project Record Documents" for recording circuit protective device characteristics. Record data on a Record Document copy of one-line diagram. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds

NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, the following:

1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Obtain electrical power utility impedance at the service.
3. Power sources and ties.
4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
5. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
6. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.
7. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
8. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
9. Motor horsepower and NEMA MG 1 code letter designation.
10. Conductor sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).
11. Derating factors.

3.2 SHORT-CIRCUIT STUDY

A. Perform study following the general study procedures contained in IEEE 399.

B. Calculate short-circuit currents according to IEEE 551.

C. Base study on device characteristics supplied by device manufacturer.

D. Extent of electrical power system to be studied is indicated on Drawings.

E. Begin short-circuit current analysis at the service, extending down to system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.

F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

G. Include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and apply to low- and medium-voltage, three-phase ac systems. Also account for the fault-current dc decrement to address asymmetrical requirements of interrupting equipment.

H. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and a single line-to-ground fault at each equipment indicated on one-line diagram.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

I. Include in the report identification of any protective device applied outside its capacity.

END OF SECTION 260573.13

SECTION 260573.16 - COORDINATION STUDIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.

1.3 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled. Existing to remain items shall remain functional throughout the construction period.

B. Field Adjusting Agency: An independent electrical testing agency with full-time employees and the capability to adjust devices and conduct testing indicated and that is a member company of NETA.

C. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

D. Power System Analysis Software Developer: An entity that commercially develops, maintains, and distributes computer software used for power system studies.

E. Power System Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.

F. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion of the circuit from the system.

G. SCCR: Short-circuit current rating.

H. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

I. Single-Line Diagram: See "One-Line Diagram."

1.4 ACTION SUBMITTALS

A. Product Data:

1. For computer software program to be used for studies.
2. Submit the following after the approval of system protective devices submittals. Submittals may be in digital form.

    a. Coordination-study input data, including completed computer program input data sheets.
    b. Study and equipment evaluation reports.

3. Overcurrent protective device coordination study report; signed, dated, and sealed by a qualified professional engineer.

    a. Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. For Power System Analysis Software Developer.
2. For Power Systems Analysis Specialist.
3. For Field Adjusting Agency.

B. Product Certificates: For overcurrent protective device coordination study software, certifying compliance with IEEE 399.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For overcurrent protective devices to include in emergency, operation, and maintenance manuals.

1. The following are from the Coordination Study Report:

    a. Final one-line diagram.
    b. Final protective device coordination study.
    c. Coordination study data files.
    d. List of all protective device settings.
    e. Time-current coordination curves.
    f. Power system data.

1.7 QUALITY ASSURANCE

A. Studies shall be performed using commercially developed and distributed software designed specifically for power system analysis.

B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

C. Manual calculations are unacceptable.

D. Power System Analysis Software Qualifications:

1. Computer program shall be designed to perform coordination studies or have a function, component, or add-on module designed to perform coordination studies.
2. Computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

E. Power Systems Analysis Specialist Qualifications: Professional engineer licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

F. Field Adjusting Agency Qualifications:

1. Employer of a NETA ETT-Certified Technician Level III responsible for all field adjusting of the Work.
2. A member company of NETA.
3. Acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 POWER SYSTEM ANALYSIS SOFTWARE DEVELOPERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. SKM Systems Analysis, Inc.

B. Comply with IEEE 242 and IEEE 399.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

1. Optional Features:

    a. Arcing faults.
    b. Simultaneous faults.
    c. Explicit negative sequence.
    d. Mutual coupling in zero sequence.

2.2 COORDINATION STUDY REPORT CONTENTS

A. Executive summary of study findings.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.

C. One-line diagram of modeled power system, showing the following:

1. Protective device designations and ampere ratings.
2. Conductor types, sizes, and lengths.
3. Transformer kilovolt ampere (kVA) and voltage ratings.
4. Motor and generator designations and kVA ratings.
5. Switchgear, switchboard, motor-control center, and panelboard designations.
6. Any revisions to electrical equipment required by the study.
7. Study Input Data: As described in "Power System Data" Article.

    a. Short-Circuit Study Output: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260573.13 "Short-Circuit Studies."

D. Protective Device Coordination Study:

1. Report recommended settings of protective devices, ready to be applied in the field. Use manufacturer's data sheets for recording the recommended setting of overcurrent protective devices when available.

    a. Phase and Ground Relays:

        1) Device tag.
        2) Relay current transformer ratio and tap, time dial, and instantaneous pickup value.
        3) Recommendations on improved relaying systems, if applicable.

    b. Circuit Breakers:

        1) Adjustable pickups and time delays (long time, short time, and ground).
        2) Adjustable time-current characteristic.
        3) Adjustable instantaneous pickup.
        4) Recommendations on improved trip systems, if applicable.

c. Fuses: Show current rating, voltage, and class.

E. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

1. Device tag and title, one-line diagram with legend identifying the portion of the system covered.
2. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
3. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
4. Plot the following listed characteristic curves, as applicable:

   a. Power utility's overcurrent protective device.
   b. Medium-voltage equipment overcurrent relays.
   c. Medium- and low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
   d. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.
   e. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.
   f. Cables and conductors damage curves.
   g. Ground-fault protective devices.
   h. Motor-starting characteristics and motor damage points.
   i. Generator short-circuit decrement curve and generator damage point.
   j. The largest feeder circuit breaker in each motor-control center and panelboard.

5. Maintain selectivity for tripping currents caused by overloads.
6. Maintain maximum achievable selectivity for tripping currents caused by overloads on series-rated devices.
7. Provide adequate time margins between device characteristics such that selective operation is achieved.
8. Comments and recommendations for system improvements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance of the Work. Devices to be coordinated are indicated on Drawings.

1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.2 POWER SYSTEM DATA

A. Obtain all data necessary for conduct of the overcurrent protective device study.

1. Verify completeness of data supplied in one-line diagram on Drawings. Call any discrepancies to Architect's attention.
2. For equipment included as Work of this Project, use characteristics submitted under provisions of action submittals and information submittals for this Project.
3. For equipment that is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. Qualifications of technicians and engineers shall be as defined by NFPA 70E.

B. Gather and tabulate all required input data to support the coordination study. List below is a guide. Comply with recommendations in IEEE 551 for the amount of detail required to be acquired in the field. Field data gathering shall be under direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, the following:

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Electrical power utility impedance at the service.
3. Power sources and ties.
4. Short-circuit current at each system bus (three phase and line to ground).
5. Full-load current of all loads.
6. Voltage level at each bus.
7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
8. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
12. Maximum demands from service meters.
13. Busway manufacturer and model designation, current rating, impedance, lengths, size, and conductor material.
14. Motor horsepower and NEMA MG 1 code letter designation.

15. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).
16. Medium-voltage cable sizes, lengths, conductor material, cable construction, metallic shield performance parameters, and conduit material (magnetic or nonmagnetic).
17. Data sheets to supplement electrical distribution system one-line diagram, cross-referenced with tag numbers on diagram, showing the following:

    a. Special load considerations, including starting inrush currents and frequent starting and stopping.
    b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
    c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
    d. Generator thermal-damage curve.
    e. Ratings, types, and settings of utility company's overcurrent protective devices.
    f. Special overcurrent protective device settings or types stipulated by utility company.
    g. Time-current-characteristic curves of devices indicated to be coordinated.
    h. Manufacturer, frame size, interrupting rating in amperes root mean square (rms) symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
    i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
    j. Switchgear, switchboards, motor-control centers, and panelboards ampacity, and SCCR in amperes rms symmetrical.
    k. Identify series-rated interrupting devices for a condition where the available fault current is greater than the interrupting rating of downstream equipment. Obtain device data details to allow verification that series application of these devices complies with NFPA 70 and UL 489 requirements.

3.3 COORDINATION STUDY

A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.

B. Comply with IEEE 399 for general study procedures.

C. Base study on device characteristics supplied by device manufacturer.

D. Extent of electrical power system to be studied is indicated on Drawings.

E. Begin analysis at the service, extending down to system overcurrent protective devices as follows:

    1. To normal system low-voltage load buses where fault current is 10 kA or less.

F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

G. Transformer Primary Overcurrent Protective Devices:

1. Device shall not operate in response to the following:

a. Inrush current when first energized.
b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.

2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.

H. Motor Protection:

1. Select protection for low-voltage motors according to IEEE 242 and NFPA 70.
2. Select protection for motors served at voltages more than 600 V according to IEEE 620.

I. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.

J. Generator Protection: Select protection according to manufacturer's written instructions and to IEEE 242.

K. Include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and apply to low- and medium-voltage, three-phase ac systems. Also account for fault-current dc decrement, to address asymmetrical requirements of interrupting equipment.

L. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and a single line-to-ground fault at each equipment indicated on one-line diagram.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

M. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.
2. Adequacy of switchgear, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.

3. Any application of series-rated devices shall be recertified, complying with requirements in NFPA 70.
4. Include in the report identification of any protective device applied outside its capacity.

3.4 LOAD-FLOW AND VOLTAGE-DROP STUDY

A. Perform a load-flow and voltage-drop study to determine the steady-state loading profile of the system. Analyze power system performance two times as follows:

1. Determine load flow and voltage drop based on full-load currents obtained in "Power System Data" Article.
2. Determine load flow and voltage drop based on 80 percent of the design capacity of load buses.
3. Prepare load-flow and voltage-drop analysis and report to show power system components that are overloaded, or might become overloaded; show bus voltages that are less than as prescribed by NFPA 70.

3.5 MOTOR-STARTING STUDY

A. Perform a motor-starting study to analyze the transient effect of system's voltage profile during motor starting. Calculate significant motor-starting voltage profiles and analyze the effects of motor starting on the power system stability.

3.6 FIELD ADJUSTING

A. Adjust relay and protective device settings according to recommended settings provided by the coordination study. Field adjustments shall be completed by the engineering service division of equipment manufacturer under the "Startup and Acceptance Testing" contract portion.

B. Make minor modifications to equipment as required to accomplish compliance with short-circuit and protective device coordination studies.

C. Testing and adjusting shall be by a full-time employee of the Field Adjusting Agency, who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification.

1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS. Certify compliance with test parameters. Perform NETA tests and inspections for all adjustable overcurrent protective devices.

3.7 DEMONSTRATION

A. Engage Power Systems Analysis Specialist to train Owner's maintenance personnel in the following:

1. Acquaint personnel in fundamentals of operating the power system in normal and emergency modes.
2. Hand-out and explain the coordination study objectives, study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpreting time-current coordination curves.
3. For Owner's maintenance staff certified as NETA ETT-Certified Technicians Level III or NICET Electrical Power Testing Level III Technicians, teach how to adjust, operate, and maintain overcurrent protective device settings.

END OF SECTION 260573.16

SECTION 260573.19 - ARC-FLASH HAZARD ANALYSIS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes a computer-based, arc-flash study to determine the arc-flash hazard distance and the incident energy to which personnel could be exposed during work on or near electrical equipment.

1.3 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

B. Field Adjusting Agency: An independent electrical testing agency with full-time employees and the capability to adjust devices and conduct testing indicated and that is a member company of NETA.

C. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

D. Power System Analysis Software Developer: An entity that commercially develops, maintains, and distributes computer software used for power system studies.

E. Power Systems Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.

F. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

G. SCCR: Short-circuit current rating.

H. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

I. Single-Line Diagram: See "One-Line Diagram."

1.4 ACTION SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Study Submittals: Submit the following submittals after the approval of system protective devices submittals. Submittals may be in digital form:

1. Arc-flash study input data, including completed computer program input data sheets.
2. Arc-flash study report; signed, dated, and sealed by Power Systems Analysis Specialist.
3. Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. For Power Systems Analysis Software Developer.
2. For Power System Analysis Specialist.
3. For Field Adjusting Agency.

B. Product Certificates: For arc-flash hazard analysis software, certifying compliance with IEEE 1584 and NFPA 70E.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. Provide maintenance procedures in equipment manuals according to requirements in NFPA 70E.
2. Operation and Maintenance Procedures: In addition to items specified in Section 017823 "Operation and Maintenance Data," provide maintenance procedures for use by Owner's personnel that comply with requirements in NFPA 70E.

1.7 QUALITY ASSURANCE

A. Study shall be performed using commercially developed and distributed software designed specifically for power system analysis.

B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

C. Manual calculations are unacceptable.

D. Power System Analysis Software Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. Computer program shall be designed to perform arc-flash analysis or have a function, component, or add-on module designed to perform arc-flash analysis.
2. Computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

E. Power Systems Analysis Specialist Qualifications: Professional engineer in charge of performing the arc-flash study, analyzing the arc flash, and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

F. Arc-Flash Study Certification: Arc-Flash Study Report shall be signed and sealed by Power Systems Analysis Specialist.

G. Field Adjusting Agency Qualifications:

1. Employer of a NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification responsible for all field adjusting of the Work.
2. A member company of NETA.
3. Acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. SKM Systems Analysis, Inc.

B. Comply with IEEE 1584 and NFPA 70E.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

2.2 ARC-FLASH STUDY REPORT CONTENT

A. Executive summary of study findings.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.
2. Conductor types, sizes, and lengths.
3. Transformer kilovolt ampere (kVA) and voltage ratings, including derating factors and environmental conditions.
4. Motor and generator designations and kVA ratings.
5. Switchgear, switchboard, motor-control center, panelboard designations, and ratings.

D. Study Input Data: As described in "Power System Data" Article.

E. Short-Circuit Study Output Data: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260573.13 "Short-Circuit Studies."

F. Protective Device Coordination Study Report Contents: As specified in "Coordination Study Report Contents" Article in Section 260573.16 "Coordination Studies."

G. Arc-Flash Study Output Reports:

1. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each equipment location included in the report:

a. Voltage.
b. Calculated symmetrical fault-current magnitude and angle.
c. Fault-point X/R ratio.
d. No AC Decrement (NACD) ratio.
e. Equivalent impedance.
f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

H. Incident Energy and Flash Protection Boundary Calculations:

1. Arcing fault magnitude.
2. Protective device clearing time.
3. Duration of arc.
4. Arc-flash boundary.
5. Restricted approach boundary.
6. Limited approach boundary.
7. Working distance.
8. Incident energy.
9. Hazard risk category.
10. Recommendations for arc-flash energy reduction.

I. Fault study input data, case descriptions, and fault-current calculations including a definition of terms and guide for interpretation of computer printout.

2.3 ARC-FLASH WARNING LABELS

A. Comply with requirements in Section 260553 "Identification for Electrical Systems" for self-adhesive equipment labels. Produce a 3.5-by-5-inch (76-by-127-mm) self-adhesive equipment label for each work location included in the analysis.

B. Label shall have an orange header with the wording, "WARNING, ARC-FLASH HAZARD," and shall include the following information taken directly from the arc-flash hazard analysis:

1. Location designation.
2. Nominal voltage.
3. Protection boundaries.
    a. Arc-flash boundary.
    b. Restricted approach boundary.
    c. Limited approach boundary.
4. Arc flash PPE category.
5. Required minimum arc rating of PPE in Cal/cm squared.
6. Available incident energy.
7. Working distance.
8. Engineering report number, revision number, and issue date.

C. Labels shall be machine printed, with no field-applied markings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Project overcurrent protective device submittals. Proceed with arc-flash study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to arc-flash study may not be used in study.

3.2 ARC-FLASH HAZARD ANALYSIS

A. Comply with NFPA 70E and its Annex D for hazard analysis study.

B. Preparatory Studies: Perform the Short-Circuit and Protective Device Coordination studies prior to starting the Arc-Flash Hazard Analysis.

1. Short-Circuit Study Output: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260573.13 "Short-Circuit Studies."
2. Coordination Study Report Contents: As specified in "Coordination Study Report Contents" Article in Section 260573.16 "Coordination Studies."

C. Calculate maximum and minimum contributions of fault-current size.

1. Maximum calculation shall assume a maximum contribution from the utility and shall assume motors to be operating under full-load conditions.
2. Calculate arc-flash energy at 85 percent of maximum short-circuit current according to IEEE 1584 recommendations.
3. Calculate arc-flash energy at 38 percent of maximum short-circuit current according to NFPA 70E recommendations.

D. Calculate the arc-flash protection boundary and incident energy at locations in electrical distribution system where personnel could perform work on energized parts.

E. Include medium- and low-voltage equipment locations, except equipment rated 240 V ac or less fed from transformers less than 125 kVA.

F. Calculate the limited, restricted, and prohibited approach boundaries for each location.

G. Incident energy calculations shall consider the accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations shall take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators shall be decremented as follows:

1. Fault contribution from induction motors shall not be considered beyond three to five cycles.
2. Fault contribution from synchronous motors and generators shall be decayed to match the actual decrement of each as closely as possible (for example, contributions from permanent magnet generators will typically decay from 10 per unit to three per unit after 10 cycles).

H. Arc-flash energy shall generally be reported for the maximum of line or load side of a circuit breaker. However, arc-flash computation shall be performed and reported for both line and load side of a circuit breaker as follows:

1. When the circuit breaker is in a separate enclosure.
2. When the line terminals of the circuit breaker are separate from the work location.

I. Base arc-flash calculations on actual overcurrent protective device clearing time. Cap maximum clearing time at two seconds based on IEEE 1584, Section B.1.2.

3.3 POWER SYSTEM DATA

A. Obtain all data necessary for conduct of the arc-flash hazard analysis.

1. Verify completeness of data supplied on one-line diagram on Drawings and under "Preparatory Studies" Paragraph in "Arc-Flash Hazard Analysis" Article. Call discrepancies to Architect's attention.

2. For new equipment, use characteristics from approved submittals under provisions of action submittals and information submittals for this Project.
3. For existing equipment, whether or not relocated, obtain required electrical distribution system data by field investigation and surveys conducted by qualified technicians and engineers.

B. Electrical Survey Data: Gather and tabulate the following input data to support study. Comply with recommendations in IEEE 1584 and NFPA 70E as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, the following:

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Obtain electrical power utility impedance or available short circuit current at the service.
3. Power sources and ties.
4. Short-circuit current at each system bus (three phase and line to ground).
5. Full-load current of all loads.
6. Voltage level at each bus.
7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
8. For reactors, provide manufacturer and model designation, voltage rating and impedance.
9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
12. Busway manufacturer and model designation, current rating, impedance, lengths, size, and conductor material.
13. Motor horsepower and NEMA MG 1 code letter designation.
14. Low-voltage conductor sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).
15. Medium-voltage conductor sizes, lengths, conductor material, conductor construction and metallic shield performance parameters, and conduit material (magnetic or nonmagnetic).

3.4 LABELING

A. Apply one arc-flash label on the front cover of each section of the equipment for each equipment included in the study. Base arc-flash label data on highest values calculated at each location.

B. Each piece of equipment listed below shall have an arc-flash label applied to it:
1. Low-voltage switchboard.

2. Low voltage transformers. Exclude transformers with high voltage side 240 V or less and less than 125 kVA.
3. Panelboard and safety switch over 250 V.
4. Applicable panelboard and safety switch under 250 V.
5. Control panel.
6. Generator.

C. Note on record Drawings the location of equipment where the personnel could be exposed to arc-flash hazard during their work.

1. Indicate arc-flash energy.
2. Indicate protection level required.

3.5 APPLICATION OF WARNING LABELS

A. Install arc-flash warning labels under the direct supervision and control of Power System Analysis Specialist.

3.6 DEMONSTRATION

A. Engage Power Systems Analysis Specialist to train Owner's maintenance personnel in potential arc-flash hazards associated with working on energized equipment and the significance of arc-flash warning labels.

END OF SECTION 260573.19

SECTION 261219 - PAD-MOUNTED, LIQUID-FILLED, MEDIUM-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes pad-mounted, liquid-filled, medium-voltage distribution transformers, with primary and secondary bushings within or without air-terminal enclosures.

1.3 DEFINITIONS

A. BIL: Basic Impulse Insulation Level.

B. Bushing: An insulating structure including a central conductor, or providing a central passage for a conductor, with provision for mounting on a barrier, conducting or otherwise, for the purpose of insulating the conductor from the barrier and conducting current from one side of the barrier to the other.

C. Bushing Elbow: An insulated device used to connect insulated conductors to separable insulated connectors on dead-front, pad-mounted transformers and to provide a fully insulated connection. This is also called an "elbow connector."

D. Bushing Insert: That component of a separable insulated connector that is inserted into a bushing well to complete a dead-front, load break or nonload break, separable insulated connector (bushing).

E. Bushing Well: A component of a separable insulated connector, either permanently welded or clamped to an enclosure wall or barrier, having a cavity that receives a replaceable component (bushing insert) to complete the separable insulated connector (bushing).

F. Elbow Connector: See "bushing elbow" above.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, and furnished specialties and accessories.

B. Shop Drawings: For pad-mounted, liquid-filled, medium-voltage transformers.

1. Include plans and elevations showing major components and features.

    a. Include a plan view and cross section of equipment base, showing clearances, required workspace, and locations of penetrations for grounding and conduits.

2. Include details of equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include single-line diagram.
4. Include list of materials.
5. Include nameplate data.
6. Manufacturer's published time-current curves of the transformer high-voltage fuses, with transformer damage curve, inrush curve, and thru fault current indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings:

1. Utilities site plan, drawn to scale, showing heavy equipment or truck access paths for maintenance and replacement.

B. Qualification Data: For testing agency.

C. Product Certificates: For transformers, signed by product manufacturer.

D. Source quality-control reports.

E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For transformer and accessories to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with IEEE C2.

C. Comply with IEEE C57.12.00.

2.2 THREE-PHASE TRANSFORMERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Howard Industries, Inc. – Howard Industries Quote # VG1381-001/ 186060.

B. Description:

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with IEEE C57.12.26.

C. Compartment Construction:
1. Double-Compartment Construction: Individual compartments for high- and low-voltage sections, formed by steel isolating barriers that extend full height and depth of compartments, with hinged, lift-off doors and three-point latching, with a stop in the open position and provision for padlocking.

2.3 WARNING LABELS AND SIGNS

A. Comply with requirements for labels and signs specified in Section 260553 "Identification for Electrical Systems."

1. High-Voltage Warning Label: Provide self-adhesive warning signs on outside of high-voltage compartment door(s). Sign legend shall be "DANGER HIGH VOLTAGE" printed in two lines of nominal 2-inch- (50-mm)-) high letters. The word "DANGER" shall be in white letters on a red background and the words "HIGH VOLTAGE" shall be in black letters on a white background.
2. Arc Flash Warning Label: Provide self-adhesive warning signs on outside of high-voltage compartment door(s), warning of potential electrical arc flash hazards and appropriate personal protective equipment required.

2.4 SOURCE QUALITY CONTROL

A. Provide manufacturer's certificate that the transformer design tests comply with IEEE C57.12.90.

1. Perform the following factory-certified routine tests on each transformer for this Project:

a. Resistance.
b. Turns ratio, polarity, and phase relation.
c. Transformer no-load losses and excitation current at 100 percent of ratings.

d. Transformer impedance voltage and load loss.
e. Operation of all devices.
f. Lightning impulse.
g. Low frequency.
h. Leak.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine pad-mounted, liquid-filled, medium-voltage transformers upon delivery.

1. Upon delivery of transformers and prior to unloading, inspect equipment for any damage that may have occurred during shipment or storage.
2. Verify that tie rods and chains are undamaged and tight, and that all blocking and bracing is tight. Verify that there is no evidence of load shifting in transit, and that readings from transportation shock recorders, if equipped, are within manufacturer's recommendations.
3. Verify that there is no indication of external damage and no dents or scratches in doors and sill, tank walls, radiators and fins, or termination provisions.
4. Verify that there is no evidence of insulating-liquid leakage on transformer surfaces, at weld seams, on high- or low-voltage bushing parts, and at transformer base.
5. Verify that there is positive pressure or vacuum on tank. Check pressure gauge; it is required to read other than zero.
6. Compare transformers and accessories received with bill of materials to verify that shipment is complete. Verify that transformers and accessories conform with manufacturer's quotation and shop drawings. If shipment is incomplete or does not comply with Project requirements, notify manufacturer in writing immediately.
7. Verify presence of polychlorinated biphenyl content labeling.
8. Unload transformers carefully, observing all packing label warnings and handling instructions.
9. Open termination compartment doors and inspect components for damage or displaced parts, loose or broken connections, cracked or chipped insulators, bent mounting flanges, dirt or foreign material, and water or moisture.

B. Handling:

1. Handle transformers carefully, in accordance with manufacturer recommendations, to avoid damage to enclosure, termination compartments, base, frame, tank, and internal components. Do not subject transformers to impact, jolting, jarring, or rough handling.
2. Protect transformer termination compartments against entrance of dust, rain, and snow.
3. Transport transformers upright, to avoid internal stresses on core and coil mounting assembly and to prevent trapping air in windings. Do not tilt or tip transformers.
4. Verify that transformer weights are within rated capacity of handling equipment.
5. Use only manufacturer-recommended points for lifting, jacking, and pulling. Use all lifting lugs when lifting transformers.
6. Use jacks only at corners of tank base plate.
7. Use nylon straps of same length to balance and distribute weight when handling transformers with a crane.

8. Use spreaders or a lifting beam to obtain a vertical lift and to protect transformer from straps bearing against enclosure. Lifting cable pull angles may not be greater than 15 degrees from vertical.
9. Exercise care not to damage tank base structure when handling transformer using skids or rollers. Use skids to distribute stresses over tank base when using rollers under large transformers.

C. Storage:

1. Store transformers in accordance with manufacturer's recommendations.
2. Transformers may be stored outdoors. If possible, store transformers at final installation locations on concrete pads. If dry concrete surfaces are unavailable, use pallets of adequate strength to protect transformers from direct contact with ground. Ensure transformer is level.
3. Ensure that transformer storage location is clean and protected from severe conditions. Protect transformers from dirt, water, contamination, and physical damage. Do not store transformers in presence of corrosive or explosive gases. Protect transformers from weather when stored for more than three months.
4. Store transformers with compartment doors closed.
5. Regularly inspect transformers while in storage and maintain documentation of storage conditions, noting any discrepancies or adverse conditions. Verify that an effective pressure seal is maintained using pressure gauges. Visually check for insulating-liquid leaks and rust spots.

D. Examine areas and space conditions for compliance with requirements for pad-mounted, liquid-filled, medium-voltage transformers and other conditions affecting performance of the Work.

E. Examine roughing-in of conduits and grounding systems to verify the following:

1. Wiring entries comply with layout requirements.
2. Entries are within conduit-entry tolerances specified by manufacturer, and no feeders will cross section barriers to reach load or line lugs.

F. Examine concrete bases for suitable conditions for transformer installation.

G. Pre-Installation Checks:

1. Verify removal of any shipping bracing after placement.
2. Remove a sample of insulating liquid according to ASTM D923. Insulating-liquid values shall comply with NETA ATS, Table 100.4. Sample shall be tested for the following:

    a. Dielectric Breakdown Voltage: ASTM D877 or ASTM D1816.
    b. Acid Neutralization Number: ASTM D974.
    c. Interfacial Tension: ASTM D971.
    d. Color: ASTM D1500.
    e. Visual Condition: ASTM D1524.

H. Verify that ground connections are in place and that requirements in Section 260526 "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at transformer location.

I. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install transformers on precast concrete equipment base and vault.

B. Transformer shall be installed level and plumb and shall tilt less than 1.5 degrees while energized.

C. Maintain minimum clearances and workspace at equipment according to manufacturer's written instructions and IEEE C2.

3.3 CONNECTIONS

A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

1. For counterpoise, use tinned bare copper cable not smaller than No. 4/0 AWG, buried not less than 30 inches (765 mm) below grade interconnecting the grounding electrodes. Bond surge arrester and neutrals directly to transformer enclosure and then to grounding electrode system with bare copper conductors, sized as shown. Keep lead lengths as short as practicable, with no kinks or sharp bends.
2. Fence and equipment connections shall not be smaller than No. 4 AWG. Ground fence at each gate post and corner post and at intervals not exceeding 10 ft. (3050 mm). Bond each gate section to fence post using 1/8 by 1 inch (3 by 25 mm) tinned flexible braided copper strap and clamps.
3. Make joints in grounding conductors and loops by exothermic weld or compression connector.
4. Terminate all grounding and bonding conductors on a common equipment grounding terminal on transformer enclosure.
5. Complete transformer tank grounding and lightning arrester connections prior to making any other electrical connections.

B. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

1. Maintain air clearances between energized live parts and between live parts and ground for exposed connections in accordance with manufacturer recommendations.
2. Bundle associated phase, neutral, and equipment grounding conductors together within transformer enclosure. Arrange conductors such that there is not excessive strain that could cause loose connections. Allow adequate slack for expansion and contraction of conductors.

3.4 SIGNS AND LABELS

A. Comply with installation requirements for labels and signs specified in Section 260553 "Identification for Electrical Systems."

B. Install warning signs as required to comply with 29 CFR 1910.269.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform the following tests and inspections:

1. General Field-Testing Requirements:

   a. Comply with provisions of NFPA 70B Ch. "Testing and Test Methods."
   b. Perform each visual and mechanical inspection and electrical test. Certify compliance with test parameters.
   c. After installing transformer but before primary is energized, verify that grounding system at the transformer is tested at specified value or less.
   d. After installing transformer and after electrical circuitry has been energized, test for compliance with requirements.
   e. Visual and Mechanical Inspection:

      1) Verify equipment nameplate data complies with Contract Documents.
      2) Inspect bolted electrical connections for high resistance using one of the following two methods:

         a) Use a low-resistance ohmmeter to compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
         b) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data or NETA ATS, Table 100.12. Bolt-torque levels shall be according to manufacturer's published data. In absence of manufacturer's published data, use NETA ATS, Table 100.12.

   f. Remove and replace malfunctioning units and retest.
   g. Prepare test and inspection reports. Record as-left set points of all adjustable devices.

2. Medium-Voltage Surge Arrester Field Tests:

   a. Visual and Mechanical Inspection:

      1) Inspect physical and mechanical condition.
      2) Verify arresters are clean.
      3) Verify that ground lead on each device is individually attached to a ground bus or ground electrode.

   b. Electrical Test:

1) Perform an insulation-resistance test on each arrester, phase terminal-to-ground. Apply voltage according to manufacturer's published data. In the absence of manufacturer's published data, comply with NETA ATS, Table 100.1. Replace units that fail to comply with recommended minimum insulation resistance listed in that table.
2) Perform a watts-loss test. Evaluate watts-loss values by comparison with similar units and test equipment manufacturer's published data.

3. Liquid-Filled Transformer Field Tests:

a. Visual and Mechanical Inspection:

1) Test dew point of tank gases if applicable.
2) Inspect anchorage, alignment, and grounding.
3) Verify bushings are clean.
4) Verify that alarm, control, and trip settings on temperature and level indicators are set and operate within manufacturer's recommended settings.
5) Verify that liquid level in tanks is within manufacturer's published tolerances.
6) Perform specific inspections and mechanical tests recommended by manufacturer.
7) Verify presence of transformer surge arresters and that their ratings are as specified.
8) Verify that as-left tap connections are as specified.

b. Electrical Tests:

1) Perform insulation-resistance tests winding-to-winding and each winding-to-ground. Apply voltage according to manufacturer's published data. In the absence of manufacturer's published data, comply with NETA ATS, Table 100.5. Calculate polarization index; the value of the index shall not be less than 1.0.
2) Perform power-factor or dissipation-factor tests on all windings according to test equipment manufacturer's published data. Maximum winding insulation power-factor/dissipation-factor values shall be according to manufacturer's published data. In the absence of manufacturer's published data, comply with NETA ATS, Table 100.3.
3) Measure core insulation resistance at 500-V dc if the core is insulated and the core ground strap is removable. Core insulation-resistance values shall not be less than 1 megohm at 500-V dc.
4) Perform turns-ratio tests at tap positions. Turns-ratio test results shall not deviate by more than one-half percent from either adjacent coils or calculated ratio. If test fails, replace transformer.
5) Perform an excitation-current test on each phase. The typical excitation-current test data pattern for a three-legged core transformer is two similar current readings and one lower current reading. Investigate and correct if test shows a different pattern.
6) Measure resistance of each winding at each tap connection, and record temperature-corrected winding-resistance values in the Operations and Maintenance Manual.

7) Perform an applied-voltage test on high- and low-voltage windings-to-ground. Comply with IEEE C57.12.91, Sections 10.2 and 10.9. This test is not required for single-phase transformers and for three-phase Y-Y-connected transformers.
8) Verify correct secondary voltage, phase-to-phase and phase-to-neutral, after energization and prior to loading.
9) Remove a sample of insulating liquid according to ASTM D923, and perform dissolved-gas analysis according to IEEE C57.104 or ASTM D3612.

3.6 FOLLOW-UP SERVICE

A. Voltage Monitoring and Adjusting: After Substantial Completion, if requested by Owner, but not more than six months after Final Acceptance, perform the following voltage monitoring:

1. During a period of normal load cycles as evaluated by Owner, perform seven days of three-phase voltage recording at the outgoing section of each transformer. Use voltmeters with calibration traceable to the National Institute of Science and Technology standards and with a chart speed of not less than 1 inch (25 mm) per hour. Voltage unbalance greater than 1 percent between phases, or deviation of any phase voltage from the nominal value by more than plus or minus 5 percent during test period, is unacceptable.
2. Corrective Action: If test results are unacceptable, perform the following corrective action, as appropriate:

   a. Adjust transformer taps.
   b. Prepare written request for voltage adjustment by electric utility.

3. Retests: Repeat monitoring, after corrective action is performed, until satisfactory results are obtained.
4. Report:

   a. Prepare a written report covering monitoring performed and corrective action taken.

B. Infrared Inspection: Perform survey during periods of maximum possible loading. Remove all necessary covers prior to inspection.

1. After Substantial Completion, but not more than 60 days after Final Acceptance, perform infrared inspection of transformer's electrical power connections.
2. Instrument: Inspect distribution systems with imaging equipment capable of detecting a minimum temperature difference of 1 degree C at 30 degree C.
3. Record of Infrared Inspection: Prepare a certified report that identifies testing technician and equipment used, and lists results as follows:

   a. Description of equipment to be tested.
   b. Discrepancies.
   c. Temperature difference between area of concern and reference area.
   d. Probable cause of temperature difference.
   e. Areas inspected. Identify inaccessible and unobservable areas and equipment.

f. Identify load conditions at time of inspection.
g. Provide photographs and thermograms of deficient area.

4. Act on inspection results according to recommendations of NETA ATS, Table 100.18. Correct possible and probable deficiencies as soon as Owner's operations permit. Retest until deficiencies are corrected.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain systems.

END OF SECTION 261219

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Distribution panelboards.
2. Lighting and appliance branch-circuit panelboards.

1.3 DEFINITIONS

A. ATS: Acceptance testing specification.

B. MCCB: Molded-case circuit breaker.

C. SPD: Surge protective device.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of panelboard.

1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
4. Detail bus configuration, current, and voltage ratings.
5. Short-circuit current rating of panelboards and overcurrent protective devices.
6. Include evidence of NRTL listing for series rating of installed devices.
7. Include evidence of NRTL listing for SPD as installed in panelboard.

8. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
9. Include wiring diagrams for power, signal, and control wiring.
10. Key interlock scheme drawing and sequence of operations.
11. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device. Include an Internet link for electronic access to downloadable PDF of the coordination curves.

1.5 INFORMATIONAL SUBMITTALS

A. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: ISO 9001 or 9002 certified.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation according to NECA 407.

1.9 FIELD CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

    a. Ambient Temperature: Not exceeding 23 deg F (minus 5 deg C) to plus 104 deg F (plus 40 deg C).
    b. Altitude: Not exceeding 6600 feet (2000 m).

B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of electric service.
2. Do not proceed with interruption of electric service without Owner's written permission.
3. Comply with NFPA 70E.

1.10 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

1. Panelboard Warranty Period: 18 months from date of Substantial Completion.

B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace SPD that fails in materials or workmanship within specified warranty period.

1. SPD Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

A. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

E. Enclosures: Surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.

    a. Indoor Dry and Clean Locations: NEMA 250, Type 1.

b. Outdoor Locations: NEMA 250, Type 3R.

2. Height: 84 inches (2.13 m) maximum.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.
4. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
5. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
6. Finishes:

   a. Panels and Trim: galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
   b. Back Boxes: Galvanized steel.

F. Incoming Mains:

1. Location: Top.
2. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.

G. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.

   a. Plating shall run entire length of bus.
   b. Bus shall be fully rated the entire length.

2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.
3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
4. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.

H. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Terminations shall allow use of 75 deg C rated conductors without derating.
3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
4. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
5. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.

I. NRTL Label: Panelboards or load centers shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting

and overcurrent protective devices. Panelboards or load centers shall have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.

J. Future Devices: Panelboards or load centers shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

1. Percentage of Future Space Capacity: Ten percent.

K. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

1. Panelboards and overcurrent protective devices rated 240 V or less shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.
2. Panelboards and overcurrent protective devices rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

2.2 PERFORMANCE REQUIREMENTS

A. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 2.

2.3 POWER PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
2. General Electric Company; GE Energy Management - Electrical Distribution.
3. Square D; by Schneider Electric.

B. Panelboards: NEMA PB 1, distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches (914 mm) high, provide two latches, keyed alike.

D. Mains: Circuit breaker.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers or plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers or plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
2. General Electric Company; GE Energy Management - Electrical Distribution.
3. Square D; by Schneider Electric.

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Circuit breaker or lugs only.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

E. Doors: Door-in-door construction with concealed hinges; secured with multipoint latch with tumbler lock; keyed alike. Outer door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed.

2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
2. General Electric Company; GE Energy Management - Electrical Distribution.
3. Square D; by Schneider Electric.

B. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers (100A Frame and Less):
    a. Inverse time-current element for low-level overloads.
    b. Instantaneous magnetic trip element for short circuits.
    c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Electronic Trip Circuit Breakers (Over 100A Frame):
    a. RMS sensing.
    b. Field-replaceable rating plug or electronic trip.
    c. Digital display of settings, trip targets, and indicated metering displays.
    d. Multi-button keypad to access programmable functions and monitored data.
    e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.
    f. Integral test jack for connection to portable test set or laptop computer.
    g. Field-Adjustable Settings:
        1) Instantaneous trip.

2) Long- and short-time pickup levels.
3) Long and short time adjustments.

3. MCCB Features and Accessories:

a. Standard frame sizes, trip ratings, and number of poles.
b. Breaker handle indicates tripped status.
c. UL listed for reverse connection without restrictive line or load ratings.
d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
f. Rating Plugs: Three-pole breakers with ampere ratings greater than 150 amperes shall have interchangeable rating plugs or electronic adjustable trip units.
g. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

2.6 IDENTIFICATION

A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.

B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.

C. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.

1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.

B. Receive, inspect, handle, and store panelboards according to NECA 407.

C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.

D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Comply with NECA 1.

C. Install panelboards and accessories according to NECA 407.

D. Equipment Mounting:
   1. Attach panelboard to the vertical finished or structural surface behind the panelboard.

E. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

F. Mount top of trim 90 inches (2286 mm) above finished floor unless otherwise indicated.

G. Mount panelboard cabinet plumb and rigid without distortion of box.

H. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

I. Mount surface-mounted panelboards to steel slotted supports 1 1/4 inch (32 mm) in depth. Orient steel slotted supports vertically.

J. Install overcurrent protective devices and controllers not already factory installed.

   1. Set field-adjustable, circuit-breaker trip ranges.
   2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.

K. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.

L. Install filler plates in unused spaces.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

E. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers and low-voltage surge arrestors stated in NETA ATS, Paragraph 7.6 Circuit Breakers and Paragraph 7.19.1 Surge Arrestors, Low-Voltage. Perform optional tests. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

    a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
    b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
    c. Instruments and Equipment:

        1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as specified in Section 260573.16 "Coordination Studies."

END OF SECTION 262416

SECTION 262800 – LOW VOLTAGE ACTIVE HARMONIC FILTER SYSTEM NEMA 1 ENCLOSED

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Active harmonic filter systems to meet IEEE-519-1992 electrical system requirements for harmonic current limits. The active harmonic filter shall maintain power factor between 0.95 and 0.999 lagging when operated within limits.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For Active Filter to include in emergency, operation, and maintenance manuals.

1.5 ENVIRONMENTAL CONDITIONS

A. The active harmonic filter shall be able to withstand the following environmental conditions without damage or degradation of operating characteristics or life.
1. Operating Ambient Temperature: 0^0C to 40^0C.
2. Operating Ambient Temperature for selected open chassis units: -20^0C to 50^0C.
3. Storage Temperature: -40^0C to 65^0C.
4. Relative Humidity: 0 to 95%, non-condensing.
5. Altitude: Operating to 1000 meters (3300 ft).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. TCI (Basis of Design).
2. EATON.
3. ABB.

2.2 GENERAL DESCRIPTION

A. System Description:
1. Voltage: 480/600 Volts, 60 Hz, 3-phase, 3-wire plus ground.
2. Current Rating:
   a. 150 Amp – Model#: ALC150A01H0100/HGAF01E1- Stand
3. Current Transformers:
   a. Two current transformers are required and mounted on phases A & C.
   b. Current transformers are an integral part of the active harmonic filter. When current transformers are installed external to the active harmonic filter equipment, the contractor shall be responsible for the installation of manufacturer provided current transformers.
   c. Current ratings of the current transformers shall be according to full load current of the circuit on which installed. Primary rating or 500A, 1000A, 3000A, or 5000A with a secondary rating of 5A are acceptable.
   d. Current transformers rated for 400 hertz shall be used.
   e. The current transformers shall be placed as close as possible to the non-linear load to be conditioned, within manufacturer guidelines.

B. Standards:
1. The active harmonic filter system shall be designed in accordance with the applicable sections of the following documents:
   a. ANSI/IEEE std. 519-1992.
   b. UL 508.
   c. ARRA – American Recovery Investment Act.
   d. Manufactured in the USA.
   e. The products shall include third party approvals by cULus.

C. Philosophy of Operation:
1. The active harmonic filter shall electronically supply the non-fundamental current demanded by the non-linear load that results in a near sinusoidal current being drawn from the supply.

D. Performance Requirements:
1. Response Time:
   a. In a steady state condition, the active harmonic filter shall have a response time of less than one (1) line cycle.

b. In the event of a load change or transient condition, the response time shall be within three (3) line cycles.

2. Input Power:
   a. Voltage: 480 Volt, 3-phase, 3-wire plus ground
   b. Voltage Tolerance: +/- 10% of nominal
   c. Frequency: automatically adapted to 60Hz, +/- 3%
   d. Input Circuit Breaker: 100k AIC Rated

E. Output Performance:
1. Performance of the active harmonic filter shall be independent of the impedance of the power source. All performance levels shall be attained whether on the AC lines, backup generator, or output of UPS.
2. Harmonic Correction:
   a. Limit the 2nd through 50th order harmonic current to <5% TDD at each installed location indicated herein. Levels for individual harmonic orders shall comply with respective levels established in ANSI/IEEE std 519-1992, Table 10-3.
   b. Limit the THD (V) added to the electrical system immediately upstream of the active line conditioner location(s) to less than or equal to 5%. The active harmonic filter shall not correct for utility supplied voltage distortion levels.
   c. Reactive Current Compensation shall improve power factor to be to between 0.95 and 0.999 lagging.

2.3 OPERATOR CONTROLS and INTERFACE

A. The active harmonic filter shall require minimal field programming.

B. The active harmonic filter shall contain a color touch screen display with the following features:
1. A minimum display size of 5.6 inches, 65k colors, and LED backlight.
2. Easily navigable screens, including Home, Status, Fault and Setup screens.
3. Display voltage and current waveform data along with RMS metering data.
4. A gauge based indicator of active filter current usage, from 0 to 100% of capacity. Dual state indications of nominal operation and “at capacity” operation.
5. An alarm history buffer saved in non-volatile. Buffer information shall persist between power outages, with a minimum of 128 event entries.
6. Ability to set the end user Line/Load CT ratio of the active harmonic filter system.
7. The Operator Interface shall show THD, Power Factor, RMS Current, RMS Voltage, and Fault History.

C. The active harmonic filter shall have the ability to operate in three (3) modes: i) harmonic correction only mode, ii) power factor correction only mode, or iii) combination harmonic and power factor mode. All three control modes shall be configurable from the local operator color touch screen display.

D. The active harmonic filter shall have a configurable relay based run/stop command input in addition to the manual and auto run/stop commands. The active filter shall have a configurable relay based fault output. Each contact shall be rated for 2.0 Amperes at 250 volts.

E. The filter shall have a configurable network based run/stop command input in addition to the manual and auto run/stop commands.

F. The filter shall have the ability to load and save operational parameters in non-volatile persistent memory and the ability to revert to factory default parameter settings.

G. The filter shall possess an integrated industry standard serial TIA/EIA-485 / RS-485 fieldbus slave network connection such as Modbus RTU for remote monitoring and operation of the active filter.

H. The filter shall have the ability to communicate over a standard industrial Ethernet communications network such as Ethernet/IP Modbus TCP/IP.

I. The filter shall have the ability to communicate over a standard industrial Fieldbus communications network such as DeviceNet.

J. The unit shall automatically begin to correct harmonic currents after power up without the need for operator intervention.

K. The unit shall have the ability to display trend history data for line voltage, line current, filter current, current THD, filter bus voltage, and filter heatsink temperature.

2.4 DESIGN

A. All active harmonic filters shall be defined as power electronic devices which consist of power semiconductors and a DC bus that acts to inject current into the AC line that will cancel undesirable harmonic currents drawn by the load. A DC bus shall store power for power semiconductor switching. A digital microcontroller shall control the operation of the power converter.

B. The active harmonic filter shall feature fully digital synchronous frame controls for selected harmonics to enhance drive load compatibility.

C. The active harmonic filter shall feature a fully digital, broadband current regulator with progressive gains to eliminate system resonance tuning issues and simplify startup and commissioning.

D. The active harmonic filter shall feature single processor control of all power electronic devices per a single active filter to reduce fault response latency and harmonic correction loop times

E. Each unit shall be designed with over-current and current limiting self-protection. Operation shall continue indefinitely at manufacturer defined safe operating levels without trip off or destruction of the active harmonic filter.

F. Large units (capacity>150A) shall have built in redundancy so at least one half of the corrective current capacity is available after a normal single point fault

G. All inductive elements in the power circuit of active harmonic filter shall be coreless, in order to maintain constant inductance and avoid saturation at high current levels

H. Units shall detect heatsink temperature and can fold back the current limit based on the temperature measurement.

I. Two distinct levels of faults shall be employed: Critical and Non-critical levels Non-critical level faults will provide automatic restart and a return to normal operation upon automatic fault clearance. Critical level faults stop the function of the unit and await operator action to restart.
   1. Faults such as AC line power loss shall be automatically restarted upon power restoration. Upon removal of these fault conditions, the active line conditioner shall restart without user action.
   2. All other faults shall be considered critical faults and stop the active harmonic filter. The run relay shall be disabled and the fault relay enabled. User shall be required to initiate a power reset (cycle power off and on) to restart the active harmonic filter.

J. The logic of the active harmonic filter shall monitor the load current by utilizing two (2) current transformers (CTs) mounted on phases A and C to direct the function of the power electronic converter.

K. Multiple active harmonic filters may be installed in parallel to inject current. The units will function independently. If one unit is stopped or faulted, the remaining units will continue to operate normally.

L. Individual unit characteristics, including sample drawings, weight, and watts loss, can be found in the Installation, Operation, and Maintenance Manual.

2.5 ENCLOSURE

A. Each filter shall be provided in a UL Type 1 rated enclosure, with floor stand.

B. All UL Type 1 enclosed units shall have means to prevent the door from being opened when the unit is energized. This can be achieved by either:

C. A door-interlocked circuit breaker that provides power interruption when the door is opened. The circuit breaker shall be lockable in the power-off position. Units shall be disconnected from the power source by a disconnect device or circuit breaker contained in the power distribution center as defined by local and national codes for branch circuit protection. OR

D. A mechanism that locks the door when the unit is energized. The unit may be fed using an external disconnect or breaker.

E. Freestanding units shall include lifting provisions by forklift truck and lifting lugs. Wall mount units weighing more than 80 pounds shall be equipped with a means of lifting, such as lifting lugs.

F. Door Mounted Digital HMI Operator Interface.

G. All units shall be provided with a grounding lug. Grounding by the contractor is to be performed according to local and national standards.

H. The paint shall be the manufacturer’s standard type and color.

I. All enclosed units shall have a door-interlocked disconnect for power interruption when the door is opened.

PART 3 - EXECUTION

3.1 EXAMINATION

A. The supplier shall verify that jobsite is ready to receive the active harmonic filter.

B. The supplier shall verify that the jobsite environment can be maintained during and after installation within the service conditions required by the manufacturer.

3.2 INSTALLATION

A. Installation shall follow all manufacturer requirements, instructions, and contract drawings, including:
   1. Space surrounding the active harmonic filter to maintain adequate cooling.
   2. Conditioning of space surrounding the active harmonic filter enclosure to maintain the manufacturer's ambient temperature and humidity ranges.
   3. Accessibility of the active harmonic filter diagnostic lights and communication ports – these components shall be free from obstructions always.

B. Interface:
   1. The supplier shall provide all required cables and connectors to interface with other equipment.
   2. The supplier shall ensure that communication connections and wiring are properly protected in accordance with manufacturer recommendations.

3.3 START-UP SERVICE

A. Factory authorized technician shall inspect the installation and perform start-up for each filter:
   1. Pre-power check:
      a. Verify proper active filter installation and clearances
      b. Inspection of the filter for damage and debris
      c. Verify critical electrical and mechanical connections are tight
      d. Tug test internal connections and verify wiring
      e. Update hardware if appropriate
      f. Verification of proper power connection at filter input terminals
      g. Verification of proper CT installations and electrical connections
   2. Active harmonic filter power-up and commissioning:
      a. Power the active harmonic filter and perform operational checks
      b. Update software if appropriate
      c. If applicable run the filter with VFD load and tune filter to system attributes

B. Performance measurements shall be recorded.

C. Active harmonic filter parameter listing shall be provided.

D. Training for the active filter operation shall be provided by the manufacturer. Provide owner (8) eight hours of on-site training for maintenance personnel. Provide handouts and (2) two copies on DVD of the video training session.

3.4 IDENTIFICATION

A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

END OF SECTION 262800

SECTION 262813 - FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cartridge fuses rated 600 V ac and less for use in the following:
   a. Enclosed switches.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:

1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
2. Current-limitation curves for fuses with current-limiting characteristics.
3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse. Submit in electronic format suitable for use in coordination software.
4. Coordination charts and tables and related data.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

1. Ambient temperature adjustment information.
2. Current-limitation curves for fuses with current-limiting characteristics.
3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse used on the Project. Submit in electronic format suitable for use in coordination software.
4. Coordination charts and tables and related data.

1.5 FIELD CONDITIONS

A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F (5 deg C) or more than 100 deg F (38 deg C), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bussmann, an Eaton business.
2. Littelfuse, Inc.
3. Mersen USA.

B. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.2 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

1. Type RK-1: 600-V, zero- to 600-A rating, 200 kAIC, time delay.
2. Type L: 600-V, 601- to 6000-A rating, 200 kAIC, time delay.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NEMA FU 1 for cartridge fuses.

D. Comply with NFPA 70.

E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.

B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.

C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.

D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

A. Cartridge Fuses:
   1. Feeders: Class RK1, time delay, Type L: 600-V, 601- to 6000-A rating, 200 kAIC, time delay.
   2. Other Branch Circuits: Class RK1, time delay.
   3. Provide open-fuse indicator fuses or fuse covers with open fuse indication.

3.3 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.4 IDENTIFICATION

A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 262816 - ENCLOSED SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Enclosures.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Include evidence of a nationally recognized testing laboratory (NRTL) listing for series rating of installed devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.

B. Shop Drawings: For enclosed switches and circuit breakers.

1. Include plans, elevations, sections, details, and attachments to other work.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Accredited by NETA.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
2. Altitude: Not exceeding 6600 feet (2010 m).

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

C. Comply with NFPA 70.

2.2 FUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
2. General Electric Company.
3. Square D; by Schneider Electric.

B. Type HD, Heavy Duty:

1. Single throw.
2. Three pole.
3. 600-V ac.
4. 1200 A and smaller.
5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses.
6. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

2.3 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

B. Enclosure Finish: The enclosure shall be gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 PREPARATION

A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Owner's written permission.
4. Comply with NFPA 70E.

3.3 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.

3.4 INSTALLATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

C. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

D. Install fuses in fusible devices.

E. Comply with NFPA 70 and NECA 1.

3.5 IDENTIFICATION

A. Comply with requirements in Section 260553 "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections for Switches:

1. Visual and Mechanical Inspection:

a. Inspect physical and mechanical condition.
b. Inspect anchorage, alignment, grounding, and clearances.
c. Verify that the unit is clean.
d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
e. Verify that fuse sizes and types match the Specifications and Drawings.
f. Verify that each fuse has adequate mechanical support and contact integrity.

g. Inspect bolted electrical connections for high resistance using one of the two following methods:

1) Use a low-resistance ohmmeter.

a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.

2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.

a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.

h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
i. Verify correct phase barrier installation.
j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.

2. Electrical Tests:

a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
b. Measure contact resistance across each switchblade fuseholder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.

D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

1. Test procedures used.
2. Include identification of each enclosed switch and circuit breaker tested and describe test results.

3. List deficiencies detected, remedial action taken, and observations after remedial action.

3.7 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 262816

SECTION 263213.14 - DIESEL ENGINE GENERATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes packaged engine generators used to supply non-emergency power, with the following features:

1. Engine.
2. Engine Governing.
3. Generator.
4. Controls – Generator Set Mounted.
5. Cooling System.
6. Fuel System.
7. Starting System.
8. Enclosure.
9. Load Bank.

B. Related Requirements:
1. Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine generators.

1.3 REFERENCES AND STANDARDS

A. Applicable standards for generator systems:
1. CSA C22.2 No14
2. CSA 282
3. CSA 100
4. EN61000-6
5. EN55011
6. FCC Part 15 Subpart B
7. ISO8528
8. IEC61000
9. UL508
10. UL142
11. UL2200
12. Designed to allow for installed compliance to NFPA 70 and NFPA 110

1.4 REQUIREMENTS, CODES AND REGULATIONS

A. The equipment supplied and installed shall meet the requirements of the NEC and all applicable local codes and regulations. All equipment shall be of new and current production by a MANUFACTURER who has 25 years of experience building this type of equipment. Manufacturer shall be ISO9001 certified.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Factory published specification sheet.
   2. Manufacturer's catalog cut sheets of all auxiliary components such as battery charger, control panel, enclosure, etc.
   3. Dimensional elevation and layout drawings of the generator set, enclosure and transfer switchgear and related accessories.
   4. Weights of all equipment.
   5. Concrete pad recommendation, layout and stub-up locations of electrical and fuel systems.
   6. Interconnect wiring diagram of complete emergency system, including generator, switchgear, day tank, remote pumps, battery charger, control panel, and remote alarm indications.
   7. Engine mechanical data, including heat rejection, exhaust gas flows, combustion air and ventilation air flows, fuel consumption, etc.
   8. Generator electrical data including temperature and insulation data, cooling requirements, excitation ratings, voltage regulation, voltage regulator, efficiencies, waveform distortion and telephone influence factor.
   9. Generator resistances, reactances and time constants.
   10. Generator locked rotor motor starting curves.
   11. Manufacturer's documentation showing maximum expected transient voltage and frequency dips, and recovery time during operation of the generator set at the specified site conditions with the specified loads.
   12. Manufacturer's and dealer's written warranty.

B. Shop Drawings:

   1. Include plans and elevations for engine generator and other components specified. Indicate access requirements affected by height of subbase fuel tank.
   2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Identify fluid drain ports and clearance requirements for proper fluid drain.
   4. Design calculations for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
   5. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include base weights.
   6. Include diagrams for power, signal, and control wiring. Complete schematic, wiring, and interconnection diagrams showing terminal markings for engine generators and functional relationship between all electrical components.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, manufacturer, and testing agency.

B. Seismic Qualification Data: Certificates, for engine generator, accessories, and components, from manufacturer.

1. Certification: Include IBC seismic certification.
2. Dimensioned Outline Drawings of Equipment Unit: With engine and generator mounted on rails, identify center of gravity and total weight, including full fuel tank, supplied enclosure, external silencer, subbase-mounted fuel tank, skid-mounted load bank, and each piece of equipment not integral to the engine generator, and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Source Quality-Control Reports: Including, but not limited to, the following:

1. Certified summary of prototype-unit test report.
2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
3. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
4. Report of sound generation.
5. Report of exhaust emissions showing compliance with applicable regulations.

D. Field quality-control reports.

E. Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.
b. Operating instructions laminated and mounted adjacent to generator location.
c. Training plan.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Testing Agency Qualifications: Accredited by NETA.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

C. The completed engine generator set shall be supplied by the *Manufacturer's* authorized distributor only.

1.9 WARRANTY

A. Manufacturer's Warranty: Extended Service Coverage shall be provided for a period of 5 years, and shall include no deductible. Extended Service Coverage provides for 100 percent of usual and customary parts and labor costs for failures due to defects in materials and workmanship to the "as shipped consist" from the factory, excluding filters, fluids, vee belts, hoses, power take-offs, paint, batteries and clutches. All repairs will be performed by factory trained dealer service personnel, and allows for repairer travel and mileage for all repairs up to 8 hours and 320 miles per incident.

1. Warranty Period: Five years from date of Substantial Completion.

B. Service Facility:
1. The engine-generator supplier shall maintain 24-hour parts and service capability within 50 miles of the project site. The distributor shall stock parts as needed to support the generator set package for this specific project. The supplier must carry sufficient inventory to cover no less than 80% parts service within 24hrs and 95% within 48 hours.

C. Service Personnel:
1. The dealer shall maintain qualified factory trained service personnel.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Caterpillar, Inc.; Electric Power Division.
2. Cummins Power Generation.
3. MTU Onsite Energy Corporation.

B. Source Limitations: Obtain packaged engine generators and auxiliary components from single source from single manufacturer.

2.2 GEN-SET REQUIREMENTS

A. The generator set shall be Standby Duty rated at 750.0 ekW, 1800 RPM, 0.8 power factor, 480/277V, 3-Phase, 60 hertz, including radiator fan and all parasitic loads. Generator set shall

be sized to operate at the specified load at a maximum ambient of 105F and altitude of 1000.0 feet (304.8 m).

2.3 MATERIAL AND PARTS

A. All materials and parts comprising the unit shall be new and unused.

2.4 ENGINE

A. The engines shall be Caterpillar model C27 diesel fueled, four (4) cycle, water-cooled, while operating with nominal speed not exceeding 1800 RPM. The engine will utilize in-cylinder combustion technology, as required, to meet applicable EPA non-road mobile regulations and/or the EPA NSPS rule for stationary reciprocating compression ignition engines. Additionally, the engine shall comply with the State Emission regulations at the time of installation/commissioning. Actual engine emissions values must be in compliance with applicable EPA emissions standards per ISO 8178 – D2 Emissions Cycle at specified ekW / bHP rating. Utilization of the "Transition Program for Equipment Manufacturers" (also known as "Flex Credits") to achieve EPA certification is not acceptable. The in-cylinder engine technology must not permit unfiltered exhaust gas to be introduced into the combustion cylinder. Emissions requirements / certifications of this package: EPA T2

2.5 ENGINE GOVERNING

A. The engine governor shall be an electronic Engine Control Module (ECM) with 24-volt DC Electric Actuator. The ECM shall be enclosed in an environmentally sealed, die-cast aluminum housing which isolates and protects electronic components from moisture and dirt contamination. Speed droop shall be adjustable from 0 (isochronous) to 10%, from no load to full rated load. Steady state frequency regulation shall be +/- 6 RPM. Speed shall be sensed by a magnetic pickup off the engine flywheel ring gear. A provision for remote speed adjustment shall be included. The ECM shall adjust fuel delivery according to exhaust smoke, altitude and cold mode limits. In the event of a DC power loss, the forward acting actuator will move to the minimum fuel position.

2.6 GENERATOR

A. Generator Specifications
   1. The synchronous generator shall be a single bearing, self-ventilated, drip-proof design in accordance with NEMA MG 1 and directly connected to the engine flywheel housing with a flex coupling. Include generator heater to keep windings above the dew point at all times. The excitation system shall be of brushless construction. Maximum temperature rise shall not exceed 105 deg. C over 40 deg. C ambient. The per unit sub transient reactance shall not exceed .1025.

B. Digital Voltage Regulator
   1. The digital voltage regulator shall be microprocessor based with fully programmable operating and protection characteristics. The regulator shall maintain generator output

voltage within +/- 0.25% for any constant load between no load and full load. The regulator shall be capable of sensing true RMS in three phases of alternator output voltage, or operating in single phase sensing mode. The voltage regulator shall include a VAR/Pf control feature as standard. The regulator shall provide an adjustable dual slope regulation characteristic in order to optimize voltage and frequency response for site conditions. The voltage regulator shall include standard the capability to provide generator paralleling with reactive droop compensation and reactive differential compensation.

2. The voltage regulator shall communicate with the Generator Control Panel via a J1939 communication network with generator voltage adjustments made via the controller keypad. Additionally, the controller shall allow system parameter setup and monitoring, and provide fault alarm and shutdown information through the controller. A PC-based user interface shall be available to allow viewing and modifying operating parameters in a windows compatible environment.

C. Motor Starting
1. Provide locked rotor motor starting capability of 2641skVA at 30% instantaneous voltage dip as defined per NEMA MG 1. Sustained voltage dip data is not acceptable.

2.7 CONTROLS – GENERATOR SET MOUNTED

A. Provide a fully solid-state, microprocessor based, generator set control. The control panel shall be designed and built by the engine manufacturer. The control shall provide all operating, monitoring, and control functions for the generator set. The control panel shall provide real time digital communications to all engine and regulator controls via SAE J1939.
1. Environmental
a. The generator set control shall be tested and certified to the following environmental conditions.
1) –40°C to +70°C Operating Range
2) 95% humidity non-condensing, 30°C to 60°C
3) IP22 protection for rear of controller; IP55 when installed in control panel
4) 5% salt spray, 48 hours, +38°C, 36.8V system voltage
5) Sinusoidal vibration 4.3G's RMS, 24-1000Hz
6) Electromagnetic Capability (89/336/EEC, 91/368/EEC, 93/44/EEC, 93/68/EEC, BS EN 50081-2, 50082-2)
7) Shock: withstand 15G

B. Functional Requirements
1. The following functionality shall be integral to the control panel.
a. The control shall include a 33 x 132 pixel, 24mm x 95mm, positive image, transflective LCD display with text based alarm/event descriptions.
b. Audible horn for alarm and shutdown with horn silence switch
c. Standard ISO labeling
d. Multiple language capability
e. Remote start/stop control
f. Local run/off/auto control integral to system microprocessor
g. Cooldown timer
h. Speed adjust
i. Lamp test

j. Push button emergency stop button
k. Voltage adjust
l. Voltage regulator V/Hz slope - adjustable
m. Password protected system programming

C. Digital Monitoring Capability
1. The controls shall provide the following digital readouts for the engine and generator. All readings shall be indicated in either metric or English units
a. Engine
1) Engine oil pressure
2) Engine oil temperature
3) Engine coolant temperature
4) Engine RPM
5) Battery volts
b. Generator
1) Generator AC volts (Line to Line, Line to Neutral and Average)
2) Generator AC current (Avg and Per Phase)
3) Generator AC Frequency
4) Generator kW (Total and Per Phase)
5) Generator kVA (Total and Per Phase)
6) Generator kVAR (Total and Per Phase)
7) Power Factor (Avg and Per Phase)
8) Total kW-hr
9) Total kVAR-hr
10) % kW
11) % kVA
12) % kVAR

D. Alarms and Shutdowns
1. The control shall monitor and provide alarm indication and subsequent shutdown for the following conditions. All alarms and shutdowns are accompanied by a time, date, and engine hour stamp that are stored by the control panel for first and last occurrence:
a. Engine Alarm/Shutdown
1) Low oil pressure alarm/shutdown
2) High coolant temperature alarm/shutdown
3) Loss of coolant shutdown
4) Overspeed shutdown
5) Overcrank shutdown
6) Low coolant level alarm
7) Low fuel level alarm
8) Emergency stop depressed shutdown
9) Low coolant temperature alarm
10) Low battery voltage alarm
11) High battery voltage alarm
12) Control switch not in auto position alarm
13) Battery charger failure alarm
b. Generator Alarm/Shutdown
1) Generator Over Voltage
2) Generator Under Voltage
3) Generator Over Frequency

4) Generator Under Frequency
5) Generator Overcurrent

c. Voltage Regulation (available only with adjustable voltage regulator)
1) Loss of excitation alarm/shutdown
2) Instantaneous over excitation alarm/shutdown
3) Time over excitation alarm/shutdown
4) Rotating diode failure
5) Loss of sensing
6) Loss of PMG

E. Inputs and Outputs
1. Programmable Digital Inputs
a. The Controller shall include the ability to accept eight (8) total with six (6) programmable digital input signals. The signals may be programmed for either high or low activation using programmable Normally Open or Normally Closed contacts.
2. Programmable Relay Outputs
a. The control shall include the ability to operate eight (8) total with six (6) programmable relay output signals, integral to the controller. The output relays shall be rated for 2A @ 30VDC and consist of six (6) Form A (Normally Open) contacts and two (2) Form C (Normally Open & Normally Closed) contacts.
3. Programmable Discrete Outputs
a. The control shall include the ability to operate one (1) discrete output, integral to the controller, which is capable of sinking up to 300mA.

F. Maintenance
1. All engine, voltage regulator, control panel and accessory units shall be accessible through a single electronic service tool. The following maintenance functionality shall be integral to the generator set control:
a. Engine running hours display
b. Service maintenance interval (running hours or calendar days)
c. Engine crank attempt counter
d. Engine successful starts counter
e. 20 events are stored in control panel memory
f. Programmable cycle timer that starts and runs the generator for a predetermined time. The timer shall use 14 user-programmable sequences that are repeated in a 7-day cycle. Each sequence shall have the following programmable set points:
1) Day of week
2) Time of day to start
3) Duration of cycle

G. Remote Communications
1. The control shall include Modbus RTU communications as standard via RS-485 half duplex with configurable baud rates from 2.4k to 57.6k. Also, provide Ethernet connection.

H. Remote Monitoring Software
1. The control shall provide Monitoring Software with the following functionality
a. Provide access to all date and events on generator set communications network
b. Provide remote control capability for the generator set

c. Ability to communicate via Modbus RTU or remote modem

I. Local and Remote Annunciation
1. Remote Annunciator (NFPA 110)
a. Provide a remote annunciator to meet the requirements of NFPA 110, Level 2.
1) The annunciator shall provide remote annunciation of all points stated above and shall incorporate ring-back capability so that after silencing the initial alarm, any subsequent alarms will sound the horn.
2) Ability to be located up to 800 ft from the generator set

2.8 COOLING SYSTEM

A. The generator set shall be equipped with a rail-mounted, engine-driven radiator with blower fan and all accessories. The cooling system shall be sized to operate at full load conditions and 114 F* ambient air entering the enclosure. The radiator shall be rated 122 F .The generator set supplier is responsible for providing a properly sized cooling system based on the enclosure static pressure restriction.

2.9 FUEL SYSTEM

A. The fuel system shall be integral with the engine. In addition to the standard fuel filters provided by the engine manufacturer, there shall also be installed a primary fuel filter/water separator in the fuel inlet line to the engine. All fuel piping shall be black iron or flexible fuel hose rated for this service. No galvanized piping will be permitted. Flexible fuel lines shall be minimally rated for 300 degrees F and 100 psi.

B. Fuel Base Tank
1. Provide a double wall day tank constructed to meet all local codes and requirements. A fuel tank minimum 24 hour at full load, shall be provided as an integral part of the enclosure package. Provide tank with a rupture basin with minimum 110% capacity. The tank shall meet UL142 and NFPA 37 standards. A mechanical reading fuel level gauge, low/high fuel level alarm contacts, and fuel tank rupture alarm contact shall be provided.
2. Provide a minimum 7-gallon fuel spill containment box.

2.10 STARTING SYSTEM

A. Starting Motor
1. Dual heavy duty electric starting motors shall be supplied. Single motor starting systems are not acceptable. The motor voltage shall be a minimum of 24V.

B. Jacket Water Heater
1. Jacket water heater shall be provided and shall be sized to ensure that gen-set will start within the specified time period at 0 deg. F ambient conditions. Minimum size shall be 9kw.

C. Batteries

1. Batteries - A lead-acid storage battery set of the heavy-duty diesel starting type shall be provided. Minimum cold cranking amps of 2600 shall be provided. Battery voltage shall be compatible with the starting system. Include battery blanket heaters for cold start protection.

D. Battery Charger
1. Battery Charger - A current limiting battery charger shall be furnished to automatically recharge batteries. The charger shall be dual charge rate with automatic switching to the boost rate when required. The battery charger shall be mounted on the gen-set package or inside the gen-set enclosure/room. Minimum rating shall be 10A. Alarms for AC input failure and high/low DC voltage output.

2.11 ENCLOSURE

A. The complete engine generator set, including generator control panel and engine starting batteries, shall be enclosed in a factory assembled, sound attenuated enclosure mounted on the fuel tank base.
1. A weather resistant, sound attenuated enclosure of steel with electrostatically applied powder coated baked polyester paint. The enclosure shall have a resulting sound level of 75 dba @ 23 ft. with the gen-set running under full load. It shall consist of a roof, side walls, and end walls. Fasteners shall be either zinc plated or stainless steel. The ambient capability of the enclosed unit shall be 115 deg. F. Ambient temperature capability of the enclosed package to be properly documented in the equipment submittals.
2. Enclosure Sound Attenuation: Acoustical foam shall be provided between all supports and inside doors and sound baffles on air intake and air discharge.
3. Enclosure shall be constructed so that all fluids shall be contained in the event of hose or other equipment failure. **This is to be documented in the equipment submittals**.
4. Provide an aluminum platform with stairs on both sides of the enclosure for entire length of enclosure to cover all door openings.
5. Include factory installed 240/120V, single phase, three wire load center. Provide factory wired, winding heaters, battery charger, blanket heaters, light and GFCI receptacle, etc.

2.12 LOAD BANK

A. The load bank shall be a completely self-contained unit for permanent mounting to the engine radiator within radiator airstream. The load bank shall include all resistive load elements, load control devices, protective devices, and a remote wall mounted control panel. The load bank shall be UL listed.
1. Rating: The load bank shall be 3 phase, 3 wire, 60Hz, 1.0 PF continuous and sized to handle 50-60% of the rated generator capacity.
2. Ambient:
   a. Temperature; -20°F to 120°F
   b. Altitude; 4000ft
   c. Relative humidity; 0-100%
3. Tolerance: 5% nominal
4. Enclosure:
   a. The enclosure shall be NEMA 3R rated and galvanized steel construction with channels provided for permanent mounting to engine radiator.

b. The load bank shall sized to fit the radiator core.
c. The enclosure shall be constructed to isolate the heated air flow through the load resistors from the control section containing the power control and distribution components .
d. The main load bus, load step relays, fuses and control terminals shall be located within the load bank enclosure.
e. Main load bus shall be copper sized at 1000A per square inch.
f. Load step control shall be one electrically actuated, electrically held magnetic contactor for each fused resistor branch circuit. Load bank power wiring shall be 150C insulated.

5. Cooling Failure:
   a. A failure circuit shall be provided to monitor the load bank exhaust and to disconnect the load steps to prevent damage.
   b. A temperature switch in the load chamber exhaust shall be provided to monitor for excessive exhaust temperature and signal upon sensing an air temperature greater than 275°F.
6. Fuses:
   a. Each 50 KW resistor branch circuit is to be protected by 200,000AIC fuses.
   b. Fuses shall be provided for protection of the control power transformer and wiring.
7. Resistors:
   a. The load elements shall be helically wound coils made of corrosion resistant chromium alloy that are continuously supported. If the resistor alloy should fail, the resistor material shall be held captive to prevent contact with surrounding resistors or ground.
   b. The resistors continuous support shall consist of segmented ceramic tubes assembled on stainless steel rods with fastening provided to compensate for thermal expansion of the ceramic tubes
   c. The resistors shall not require a cool down period. Normal shutdown or failure of the cooling fan during operation shall not cause any damage or shorten the life expectancy of the resistors.
8. Control Panel:
   a. The control panel enclosure shall be NEMA 3R rated.
   b. The control and protective circuits shall operate at 120 volts and be serviced internally from the main load bus utilizing an integral control power transformer.
   c. Control panel to include the following:
      1) Master load switch
      2) Load step switch
      3) Remote Load dump circuit to allow use of remote dry contacts (close to run) to trip load bank off line in the event of remote contact opening.
      4) Load step active indicator
      5) Control power indicator
      6) Normal operation indicator
      7) Cooling Failure indicator

2.13 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine generator using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with IEEE 115.

B. Project-Specific Equipment Tests: Before shipment, factory test engine generator and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Test generator, exciter, and voltage regulator as a unit.
3. Full load run.
4. Maximum power.
5. Voltage regulation.
6. Transient and steady-state governing.
7. Single-step load pickup.
8. Safety shutdown.
9. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.
10. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine generator performance.

B. Examine roughing-in for piping systems and electrical connections. Verify actual locations of connections before packaged engine generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Owner no fewer than two working days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Owner's written permission.

3.3 INSTALLATION

A. Comply with NECA 1 and NECA 404.

B. Comply with packaged engine generator manufacturers' written installation and alignment instructions.

C. Equipment Mounting:

1. Install packaged engine generators on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Coordinate size and location of concrete bases for packaged engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

D. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

E. Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.4 CONNECTIONS

A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Provide a minimum of one 90-degree bend in flexible conduit routed to the engine generator from a stationary element.

3.5 IDENTIFICATION

A. Identify system components according to Section 260553 "Identification for Electrical Systems."

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections with the assistance of a factory-authorized service representative.

D. Tests and Inspections in accordance with NFPA 110 Chapter 7.13 and in accordance with the following:

1. Perform tests recommended by manufacturer and each visual and mechanical inspection and electrical and mechanical test listed in first two subparagraphs below, as specified in NETA ATS. Certify compliance with test parameters.

a. Visual and Mechanical Inspection:

1) Compare equipment nameplate data with Drawings and the Specifications.
2) Inspect physical and mechanical condition.
3) Inspect anchorage, alignment, and grounding.
4) Verify that the unit is clean.

b. Electrical and Mechanical Tests:

1) Perform insulation-resistance tests according to IEEE 43.
   a) Machines Larger Than 200 hp (150 kW): Test duration shall be 10 minutes. Calculate polarization index.
   b) Machines 200 hp (150 kW) or Less: Test duration shall be one minute. Calculate the dielectric-absorption ratio.
2) Test protective relay devices.
3) Verify phase rotation, phasing, and synchronized operation as required by the application.
4) Functionally test engine shutdown for low oil pressure, overtemperature, overspeed, and other protection features as applicable.
5) Verify correct functioning of the governor and regulator.

2. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
   a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
   b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
   c. Verify acceptance of charge for each element of the battery after discharge.
   d. Verify that measurements are within manufacturer's specifications.
3. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
4. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine generator system before and during system operation. Check for air, exhaust, and fluid leaks.
5. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
6. Harmonic-Content Tests: Measure harmonic content of output voltage at 25 and 100 percent of rated linear load. Verify that harmonic content is within specified limits.

E. Load Bank Test:
1. The unit shall be operated at 75% of full load rating for one hour followed by two hours operation at 100% full load. After the first half-hour stabilization period at full load, the following shall be recorded at fifteen-minute intervals:
   a. Voltage, amperage and frequency
   b. Fuel pressure, oil pressure and water temperature
   c. Exhaust gas temperature at engine exhaust outlet
   d. Ambient temperature

F. Coordinate tests with tests for transfer switches and run them concurrently.

G. Test instruments shall have been calibrated within the past 12 months, traceable to NIST Calibration Services, and adequate for making positive observation of test results. Make calibration records available for examination on request.

H. Leak Test: After installation, charge exhaust, coolant, and fuel systems and test for leaks. Repair leaks and retest until no leaks exist.

I. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation for generator and associated equipment.

J. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

K. Remove and replace malfunctioning units and retest as specified above.

L. Retest: Correct deficiencies identified by tests and observations, and retest until specified requirements are met.

M. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

N. Infrared Scanning: After Substantial Completion, but not more than 60 days after final acceptance, perform an infrared scan of each power wiring termination and each bus connection while running with maximum load. Remove all access panels so terminations and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 month after date of Substantial Completion.
2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
3. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.7 MAINTENANCE SERVICE (**Separate Breakout Pricing on Bid Form**)

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's authorized service representative. Include bi-annual preventive maintenance and exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Parts shall be manufacturer's authorized replacement parts and supplies.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

3.9 FACTORY WITNESS TESTING (**Separate Breakout Pricing on Bid Form**)

A. Provide accommodations for two (2) owner representatives for a witness factory testing. This price should be all inclusive of travel, hotel accommodations and meals, etc.

3.10 SCHEDULED OIL SAMPLING

A. In order to forecast and minimize engine failure, the supplier of the equipment must provide an oil sampling analysis kit which operating personnel shall utilize for scheduled oil sampling.

B. The laboratory to which oil samples will be sent shall be located at and be a part of the local generator set supplier's facility, and shall be open to inspection during normal working hours. Independent laboratories not a part of the engine supplier's facility are disallowed as to conformance with this specification.

C. Scheduled oil sampling shall be of the atomic absorption spectrophotometer method as opposed to the spectrographic analysis method and shall be accurate to within a fraction of one part per million for the following elements:
1. Iron
2. Chromium
3. Copper
4. Aluminum
5. Silicon
6. Lead

D. In addition, the sample shall be tested for the presence of water, fuel dilution, and anti-freeze

E. All equipment needed to take oil samples shall be provided a kit at the time of acceptance and shall include the following:
1. Sample extraction gun (1)
2. Bottle (10)
3. Postage paid mailers (10)
4. Written instructions (1)

F. IMMEDIATE notification shall be provided to the owner when analysis shows any critical reading. If readings are normal a report showing that the equipment is operating within established parameters shall be provided.

G. This scheduled oil sampling kit shall be made available, at additional cost, to the owner beyond the mandatory starter kit specified previously and shall be optional for the owner to continue purchasing after the starter kit has been depleted.

END OF SECTION 263213.14

SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes automatic transfer switches rated 600 V and less, including the following:
   1. Remote annunciator and control system.

1.3 SCOPE

A. Furnish and install two automatic transfer switches with delayed transition transfer mode. The transfer switches are to be 800 amps, 3-poles with no neutral, 480 volts, 60 Hertz, 3ph – 3w, and withstand current ratings as shown on the plans. Each delayed transition transfer switch (DTTS) shall consist of a power transfer switch unit and a control panel interconnected to provide complete automatic operation plus all features and accessories specified herein. All transfer switches shall be the product of the same manufacturer. No exceptions!

B. The switch shall transfer the load in delayed transition (break-before-make) mode. Transfer is accomplished with a user-defined interruption period in both directions adjustable from 1 second to 5 minutes in at least 15 increments.

1.4 CODES AND STANDARDS

A. The automatic transfer switches and controls shall conform to the requirements of:
   1. UL 1008 - Standard for Transfer Switch Equipment
   2. IEC 60947-6-1 Low-voltage Switchgear and Controlgear; Multifunction equipment; Automatic Transfer Switching Equipment
   3. NFPA 70 - National Electrical Code
   4. NFPA 110 - Emergency and Standby Power Systems
   5. IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
   6. NEMA Standard ICS10-1993 (formerly ICS2-447) - AC Automatic Transfer Switches
   7. UL 508 Industrial Control Equipment

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for transfer switches.
2. Include rated capacities, operating characteristics, electrical characteristics, and accessories.

B. Shop Drawings:

1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
2. Include material lists for each switch specified.
3. Single-Line Diagram: Show connections between transfer switch, power sources, and load; and show interlocking provisions for each combined transfer switch and bypass/isolation switch.
4. Riser Diagram: Show interconnection wiring between transfer switches, annunciators, and control panels.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. Features and operating sequences, both automatic and manual.
b. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. Member company of NETA.

a. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.9 FIELD CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:

1. Notify Owner no fewer than two days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Owner's written permission.

1.10 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion. Years 6 through 10 - Seller warrants all associated Power Transfer Switch Main Contacts against material defects for a period of ten (10) years from the date of shipment from its factory.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA ICS 1.

C. Comply with NFPA 110.

D. Comply with UL 1008 unless requirements of these Specifications are stricter.

2.2 MECHANICALLY HELD TRANSFER SWITCHES

A. The transfer switch shall be electrically operated and mechanically held. The electrical operator shall be a momentarily energized, single-solenoid mechanism. Main operators which include overcurrent disconnect devices, linear motors or gears shall not be acceptable. The switch shall be mechanically interlocked to ensure only two possible positions, normal or emergency.

B. All transfer switch sizes shall use only one type of main operator for ease of maintenance and commality of parts.

C. The switch shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.

D. All main contacts shall be silver composition. Switches rated 800 amperes and above shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts.

E. Designs, where the wiring harness, controller, and contactor that are not all fabricated and assembled by one manufacturer are not acceptable.

F. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 600 amps and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.

G. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.

H. Transfer switch does not require a neutral. The system will be 3-phase, 3-wire.

2.3 MICROPROCESSOR CONTROLLER

A. The controller's sensing and logic shall be provided by a single built-in microprocessor for maximum reliability, minimum maintenance, and the ability to communicate serially through an optional serial communication module.

B. A single controller shall provide twelve selectable nominal voltages for maximum application flexibility and minimal spare part requirements. Voltage sensing shall be true RMS type and shall be accurate to ± 1% of nominal voltage. Frequency sensing shall be accurate to ± 0.2%. The panel shall be capable of operating over a temperature range of -20 to +60 degrees C and storage from -55 to +85 degrees C.

C. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Sensing and control logic shall be provided on multi-layer printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers. The panel shall be enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. The protective cover shall include a built-in pocket for storage of the operator's manuals.

D. All customer connections shall be wired to a common terminal block to simplify field-wiring connections.

E. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:
   1. EN 55011:1991 - Emission standard - Group 1, Class A

2. EN 50082-2:1995 - Generic immunity standard, from which:
3. EN 61000-4-2:1995 - Electrostatic discharge (ESD) immunity
4. ENV 50140:1993 - Radiated Electro-Magnetic field immunity
5. EN 61000-4-4:1995 - Electrical fast transient (EFT) immunity
6. EN 61000-4-5:1995 - Surge transient immunity
7. EN 61000-4-6:1996 - Conducted Radio-Frequency field immunity

2.4 ENCLOSURE

A. The transfer switch shall be furnished in a NEMA Type 1 enclosure unless otherwise shown on the plans. Transfer switch shall be front service access only, no rear or side access, and with dimensions not exceeding 72”H x 34”W x 20”D

B. All standard and optional door-mounted switches and pilot lights shall be 16-mm industrial grade type or equivalent for easy viewing & replacement. Door controls shall be provided on a separate removable plate, which can be supplied loose for open type units.

2.5 CONTROLLER DISPLAY AND KEYPAD

A. A four-line, 20 character LCD display and keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters. Operational parameters shall also be available for viewing and limited control through the serial communications input port. The following parameters shall only be adjustable via DIP switches on the controller:
   1. Nominal line voltage and frequency
   2. Single or three phase sensing
   3. Operating parameter protection
   4. Transfer operating mode configuration - (Open transition, Closed transition or Delayed transition)
   5. All instructions and controller settings shall be easily accessible, readable and accomplished without the use of codes, calculations, or instruction manuals.

2.6 VOLTAGE, FREQUENCY AND PHASE ROTATION SENSING

A. Voltage and frequency on both the normal and emergency sources (as noted below) shall be continuously monitored, with the following pickup, dropout and trip setting capabilities (values shown as % of nominal unless otherwise specified):

Parameter	Sources	Dropout / Trip	Pickup / Reset
Undervoltage	N&E,3ϕ	70 to 98%	85 to 100%
Overvoltage	N&E,3ϕ	102 to 115%	2% below trip
Underfrequency	N&E	85 to 98%	90 to 100%
Overfrequency	N&E	102 to 110%	2% below trip
Voltage unbalance	N&E	5 to 20%	1% below dropout

B. Repetitive accuracy of all settings shall be within ± 0.5% over an operating temperature range of -20°C to 60°C.

C. Voltage and frequency settings shall be field adjustable in 1% increments either locally with the display and keypad or remotely via serial communications port access.

D. The controller shall be capable (when activated by the keypad or through the serial port) of sensing the phase rotation of both the normal and emergency sources. The source shall be considered unacceptable if the phase rotation is not the preferred rotation selected (ABC or CBA).

E. Source status screens shall be provided for both normal & emergency to pro-vide digital readout of voltage on all 3 phases, frequency, and phase rotation.

F. The controller shall include a user selectable algorithm to prevent repeated transfer cycling to a source on an installation which experiences primary side, single phase failures on a Grounded Wye – Grounded Wye transformer which regenerates voltage when unloaded. The algorithm shall also inhibit retransfer to the normal (utility) source upon detection of a single phasing condition until a dedicated timer expires, the alternate source fails, or the normal source fails completely and is restored during this time delay period. The time delays associated with this feature shall be adjustable by the user through the controller keypad and LCD.

2.7 TIME DELAYS

A. An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 24 VDC power supply.

B. A time delay shall be provided on transfer to emergency, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.

C. Two time delay modes (which are independently adjustable) shall be provided on re-transfer to normal. One time delay shall be for actual normal power failures and the other for the test mode function. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.

D. A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.

E. A time delay activated output signal shall also be provided to drive an external relay(s) for selective load disconnect control. The controller shall have the ability to activate an adjustable 0 to 5 minute time delay in any of the following modes:
1. Prior to transfer only.
2. Prior to and after transfer.
3. Normal to emergency only.
4. Emergency to normal only.
5. Normal to emergency and emergency to normal.
6. All transfer conditions or only when both sources are available.

F. The controller shall also include the following built-in time delays for optional Closed Transition and Delayed Transition operation:
1. 1 to 5 minute time delay on failure to synchronize normal and emergency sources prior to closed transition transfer.
2. 0.1 to 9.99 second time delay on an extended parallel condition of both power sources during closed transition operation.
3. 0 to 5 minute time delay for the load disconnect position for delayed transition operation.

G. All time delays shall be adjustable in 1 second increments, except the extended parallel time, which shall be adjustable in .01 second increments.

H. All time delays shall be adjustable by using the LCD display and keypad or with a remote device connected to the serial communications port.

I. The controller shall also include the following built-in time delays for optional Delayed Transition operation: a. 0 to 5 minute time delay for the load disconnect position for delayed transition operation.

2.8 ADDITIONAL FEATURES

A. A three-position momentary-type test switch shall be provided for the *test / automatic / reset* modes. The test position will simulate a normal source failure. The reset position shall bypass the time delays on either transfer to emergency or retransfer to normal.

B. Switches which require utilizing the keypad and display function or have no manual time delay bypass means are not acceptable.

C. A SPDT contact, rated 5 amps at 30 VDC, shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.

D. Auxiliary contacts, rated 10 amps, 250 VAC shall be provided consisting of one contact, closed when the ATS is connected to the normal source and one contact closed, when the ATS is connected to the emergency source.

E. LED indicating lights (16 mm industrial grade, type 12) shall be provided; one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red).

F. LED indicating lights (16 mm industrial grade, type 12) shall be provided and energized by controller outputs. The lights shall provide true source availability of the normal and emergency sources, as determined by the voltage sensing trip and reset settings for each source.

G. Provide the ability to select "commit/no commit to transfer" to determine whether the load should be transferred to the emergency generator if the normal source restores before the generator is ready to accept the load.

H. The controller shall be capable of accepting a normally open contact that will allow the transfer switch to function in a non-automatic mode using an external control device.

I. Engine Exerciser - The controller shall provide an internal engine exerciser. The engine exerciser shall allow the user to program up to seven different exercise routines. For each routine,
   1. the user shall be able to:
      a. Enable or disable the routine.
      b. Enable or disable transfer of the load during routine.
      c. Set the start time:
         1) time of day
         2) day of week
         3) week of month (1st, 2nd, 3rd, 4th, alternate or every)
      d. Set the duration of the run.
   2. At the end of the specified duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. A 10-year life battery that supplies power to the real time clock in the event of a power loss will maintain all time and date information.

J. Terminals shall be provided for a remote contact which opens to signal the ATS to transfer to emergency and for remote contacts which open to inhibit transfer to emergency and/or retransfer to normal. Both of these inhibit signals can be activated through the keypad or serial port. The transfer switch will operate in a non-automatic mode with this feature activated.

K. System Status - The controller LCD display shall include a "System Status" screen which shall be readily accessible from any point in the menu by depressing the "ESC" key a maximum of two times. This screen shall display a clear description of the active operating sequence and switch position. For example,

1. Normal Failed
2. Load on Normal
3. TD Normal to Emergency
4. 2min15s
5. Controllers that require multiple screens to determine system status or display "coded" system status messages, which must be explained by references in the operator's manual, are not permissible.

L. Self-Diagnostics - The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed.

M. Communications Interface – The controller shall be capable of interfacing, through an optional serial communication module, with a network of transfer switches, locally (up to 4000 ft.) or remotely through modem serial communications. Standard software specific for transfer switch applications shall be available by the transfer switch manufacturer. This software shall allow for the monitoring, control and setup of parameters.

N. Data Logging – The controller shall have the ability to log data and to maintain the last 99 events, even in the event of total power loss. The following events shall be time and date stamped and maintained in a non-volatile memory:
1. Event Logging
   a. Data and time and reason for transfer normal to emergency.
   b. Data and time and reason for transfer emergency to normal.
   c. Data and time and reason for engine start.
   d. Data and time engine stopped.
   e. Data and time emergency source available.
   f. Data and time emergency source not available.
2. Statistical Data
   a. Total number of transfers.
   b. Total number of transfers due to source failure.
   c. Total number of days controller is energized.
   d. Total number of hours both normal and emergency sources are available.

2.9 TRANSFER SWITCH ACCESSORIES:

A. 2pole D/T contacts that operate when emergency and normal source voltage is present at transfer switch terminals. The contacts shall be equal to ASCO Accessory 18B and 18G.

B. Load shedding sequence initiated by the removal of the 24Vdc control voltage to the load shedding relay to match generator capacity to the load. This accessory shall be equal to the ASCO Accessory 30BA

C. Selective Load disconnect circuit to provide a pre-transfer and/or post transfer signal when transferring from emergency to normal and/or normal to emergency. The signal can be programmed to occur during all transfers or only when the transfer is occurring between two live sources. The length of the pre- and post-transfer delays can be set to 0-5 minutes 59 seconds. The contacts shall be equal to ASCO Accessory 31Z.

D. Power Meter and Monitoring Package “Acc.150A” for BMS monitoring using ASCO protocol. For ATS substitutions, the transfer switch must match the capabilities of these accessories to communicate over ASCOBusII protocol to the University’s BMS by providing a stand-alone and wall mounted ASCO Power Manager Box and to be wired to the transfer switch for monitoring and control as specified herein. No exceptions allowed!
   1. Two uninterruptable power supplies (UPS’) in parallel, 24VDC. For powering the transfer switches controller panel, Power Manager Meter, and communication devices when both normal and emergency sources are not present for up to 1 minute, depending on the load requirements. A customer connection is provided for a customer supplied external 24VDC source which is used as a secondary power source for the UPS.
   2. ASCO 5170 QUAD-Ethernet module provides communication from the transfer switch controller and power meter to external devices via Ethernet or Serial communications using ASCOBusII, ModBus and SNMP.
   3. ASCO 5210 Power Meter with display monitoring the load side electrical parameters include voltage, current, power, energy, kW demand, Max/Min history and harmonics. See Section 5.0 for power meter specification details.

2.10 WITHSTANDING AND CLOSING RATINGS

A. The ATS shall be rated to close on and withstand the available RMS symmetrical short circuit current at the ATS terminals with the type of overcurrent protection shown on the plans.

B. The ATS shall be UL listed in accordance with UL 1008 and be labeled in accordance with that standard's 1½ and 3 cycle ratings. ATS which are not tested and labeled with 1½ and 3 cycle (any breaker) ratings and have series, or specific breaker ratings only, are not acceptable.

2.11 TESTS AND CERTIFICATION

A. The complete ATS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements.

B. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification including compliance with the above codes and standards, and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.

C. The ATS manufacturer shall be certified to ISO 9001 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, and installation and servicing in accordance with ISO 9001.

2.12 SERVICE REPRESENTATION

A. The ATS manufacturer shall maintain a national service organization of company-employed personnel located throughout the contiguous United States. The service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.

B. The manufacturer shall maintain records of each switch, by serial number, for a minimum of 20 years.

2.13 FEATURE DESCRIPTION (ASCO 5210 POWER METER)

A. Scope
1. Provide a power metering device for collecting real-time power system information.

B. Codes and Standards
1. The Power Meter shall conform to the requirements of:
   a. UL 3111-1 – Electrical Measuring and Testing Equipment
   b. CAN/CSA-C22.2 No. 23-M89 – CSA Safety Requirements for Electrical and Electronic Measuring and Test Equipment.

C. Hardware Specifications
1. The power meter shall be capable of operating without modification at a nominal frequency of 45 to 66 Hz.
2. The Power Meter shall be rated for an operating temperature of -4° F to 158° F and a storage temperature of -22° F to 176° F. And shall be rated for an 85% non-condensing, relative humidity.
3. The Power Meter shall accept inputs from industry standard instrument transformers (120 VAC secondary PT’s and 5A secondary CT’s). Direct phase voltage connections, 0 to 600VAC nominal, shall be possible without the use of PT’s.
4. The Power Meter shall accept single, 3 phase, or three & four wire circuits. A fourth CT input shall be available to measure neutral or ground current.
5. The Power Meter shall contain a built-in discrete contact to wire an ATS 14A auxiliary contact to indicate switch position.
6. The Power meter shall accept AC voltage from the sensing lines for operation. Additional provisions shall be provided for external DC voltage input range 9-36VDC with a nominal of 24VDC.
7. The power meter shall be equipped with a continuous duty, long-life, 4 line x 20 character green backlit LCD.
8. All setup parameters required by the Power Meter shall be stored in non-volatile memory and retained in the event of a control power interruption.
9. The Power Meter shall be flush mountable on a surface.
10. The power meter enclosure shall be sealed to IP-51 (NEMA 1) and the faceplate shall be sealed to IP-65 (NEMA 4). All push buttons shall be sealed tact switches.

D. Communication Specification
1. The Power Meter shall send, when prompted, information to a central location equiped with a manufacturer supplied critical power management system or 3rd party monitor

through manufacturer supplied communication modules. All 3rd party monitors must utilize industry standard open protocols ASCOBusII, Modbus/RTU or Modbus/TCP.

2. An embedded RS-485 port will be provided which will enable communication at 9600, 19.2K, 38.4K or 57.6K baud. DIP switches will be provided on the RS-485 port allowing a user to select 2-wire or 4-wire communication as well as the option to activate a terminating resistor on the port.
3. Ethernet module shall be provided for TCP/IP Ethernet communications.

E. Monitored and Calculated Data
1. The following data will be available on the display and Modbus registers of the Power Meter:
   a. Line-to-neutral voltages (V_{AN}, V_{BN} and V_{CN})
   b. Line-to-neutral voltage average (V_{AVE})
   c. Line-to-line voltages (V_{AB}, V_{BC} and V_{CA})
   d. Line-to-line voltage average (VL_{AVE})
   e. Current on each phase (I_A, I_B and I_C)
   f. Current on the neutral conductor(I_N)
   g. Average current(I_{AVE})
   h. Active power, KW per phase and total (W_A, W_B, W_C and W_T)
   i. Reactive power, KVAR per phase and total (VAR_A, VAR_B, VAR_C and VAR_T)
   j. Apparent power, KVA per phase and total (VA_A, VA_B, VA_C and VA_T)
   k. KWHours importing, exporting and net (KWH_{IMP}, KWH_{EXP}, and KWH_{NET})
   l. KVARHours leading, lagging and net ($KVARH_{LEAD}$, $KVARH_{LAG}$, and $KVARH_{NET}$)
   m. Power factor (PF)
   n. Signal frequency (Hz)
   o. Transfer switch position with Acc. 135L

F. Languages:
1. The Power Meter shall offer an LCD which can display no less than nine different languages.

G. Interface:
1. Displaying each of the metered values shall be done through the use of menu scroll buttons. There will be an escape button which will be used to take the user back to the previous page or to cancel a setting change. Pressing escape, no more than three times will return the user to the home screen.
2. For ease of operator viewing, the display can be configured to remain on continuously, with no detrimental effect on the life of the Power Meter
3. The display's contrast shall be configurable in intervals of 10%(ranging 0%-100%).
4. Setup of system requirements shall be allowed from the front of the Power Meter.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Floor-Mounting Switch: Anchor to floor by bolting.

1. Install transfer switches on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
3. Provide workspace and clearances required by NFPA 70.

B. Identify components according to Section 260553 "Identification for Electrical Systems."

C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

D. Comply with NECA 1.

3.2 CONNECTIONS

A. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.

1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

C. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

E. Route and brace conductors according to manufacturer's written instructions[.] and Section 260529 "Hangers and Supports for Electrical Systems." Do not obscure manufacturer's markings and labels.

F. Final connections to equipment shall be made with liquidtight, flexible metallic conduit no more than 18 inches (457 mm) in length.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. After installing equipment, test for compliance with requirements according to NETA ATS.
2. Visual and Mechanical Inspection:

    a. Compare equipment nameplate data with Drawings and Specifications.
    b. Inspect physical and mechanical condition.
    c. Inspect anchorage, alignment, grounding, and required clearances.
    d. Verify that the unit is clean.
    e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
    f. Verify that manual transfer warnings are attached and visible.
    g. Verify tightness of all control connections.
    h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:

        1) Use of low-resistance ohmmeter.
        2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.

    i. Perform manual transfer operation.
    j. Verify positive mechanical interlocking between normal and alternate sources.
    k. Perform visual and mechanical inspection of surge arresters.
    l. Inspect control power transformers.

        1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
        2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
        3) Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.

3. Electrical Tests:

    a. Perform insulation-resistance tests on all control wiring with respect to ground.
    b. Verify settings and operation of control devices.
    c. Calibrate and set all relays and timers.
    d. Verify phase rotation, phasing, and synchronized operation.
    e. Perform automatic transfer tests.
    f. Verify correct operation and timing of the following functions:

        1) Normal source voltage-sensing and frequency-sensing relays.
        2) Engine start sequence.
        3) Time delay on transfer.
        4) Alternative source voltage-sensing and frequency-sensing relays.
        5) Automatic transfer operation.
        6) Interlocks and limit switch function.
        7) Time delay and retransfer on normal power restoration.
        8) Engine cool-down and shutdown feature.

4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

    a. Check for electrical continuity of circuits and for short circuits.
    b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
    c. Verify that manual transfer warnings are properly placed.
    d. Perform manual transfer operation.

5. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.

    a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
    b. Simulate loss of phase-to-ground voltage for each phase of normal source.
    c. Verify time-delay settings.
    d. Verify pickup and dropout voltages by data readout or inspection of control settings.
    e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
    f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

D. Coordinate tests with tests of generator and run them concurrently.

E. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

F. Transfer switches will be considered defective if they do not pass tests and inspections.

G. Remove and replace malfunctioning units and retest as specified above.

H. Prepare test and inspection reports.

I. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.

1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.

B. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.

C. Coordinate this training with that for generator equipment.

END OF SECTION 263600

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. References to the Standard Specifications for this section shall mean the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 817 supplemented and amended through the date of this project bid.

C. 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, DEP Bulletin 34 or as amended through the date of this project bid.

D. 2016 Connecticut State Building Code which includes 2012 International Building Code.

E. 2010 ADA Standards for Accessible Design by the Department of Justice dated September 15, 2010 or as amended through the date of this project bid.

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Stripping and stockpiling rock.
6. Removing above- and below-grade site improvements.
7. Disconnecting, capping or sealing, and removing site utilities.
8. Temporary erosion and sedimentation control.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary erosion- and sedimentation-control measures.

1.3 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than 2 inches in diameter; and free of weeds, roots, toxic materials, or other nonsoil materials.

D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.

F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.

B. Topsoil stripping and stockpiling program.

C. Rock stockpiling program.

D. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

E. Burning: Burning is NOT permitted.

1.7 QUALITY ASSURANCE

A. Topsoil Stripping and Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

B. Rock Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

1.8 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Engineer.

C. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

D. Utility Locator Service: Notify Call Before You Dig for area where Project is located before site clearing.

E. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

F. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site.

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations.

3.4 EXISTING UTILITIES

A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.
2. Owner will arrange to shut off indicated utilities when requested by Contractor.

C. Locate, identify, and disconnect utilities indicated to be abandoned in place.

D. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Do not proceed with utility interruptions without Engineer's written permission.

E. Excavate for and remove underground utilities indicated to be removed.

F. Removal of underground utilities is included in earthwork sections; in applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security, and utilities sections.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots larger than 2 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
3. Use only hand methods or air spade for grubbing within protection zones.
4. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within protection zones.
3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.7 STOCKPILING ROCK

A. Remove from construction area naturally formed rocks that measure more than 1 foot across in least dimension. Do not include excavated or crushed rock.

1. Separate or wash off non-rock materials from rocks, including soil, clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

B. Stockpile rock without intermixing with other materials. Cover to prevent windblown debris from accumulating among rocks.

1. Limit height of rock stockpiles to 36 inches.
2. Do not stockpile rock within protection zones.
3. Dispose of surplus rock. Surplus rock is that which exceeds quantity indicated to be stockpiled or reused.

3.8 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Burning tree, shrub, and other vegetation waste is NOT permitted. Burning of other waste and debris is also prohibited.

C. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. References to the Standard Specifications for this section shall mean the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 817 supplemented and amended through the date of this project bid.

C. 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, DEP Bulletin 34 or as amended through the date of this project bid.

D. 2016 Connecticut State Building Code which includes 2012 International Building Code.

E. 2010 ADA Standards for Accessible Design by the Department of Justice dated September 15, 2010 or as amended through the date of this project bid.

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
3. Excavating and backfilling for buildings and structures.
4. Subbase course for concrete walks and pavements.
5. Subbase course and base course for asphalt paving.
6. Subsurface drainage backfill for walls and trenches.
7. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:

1. Section 315000 "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Equipment for Footing, Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom.
2. Equipment for Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp flywheel power and developing a minimum of 47,992-lbf breakout force with a general-purpose bare bucket.

I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

J. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

K. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

L. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Controlled low-strength material, including design mixture.
3. Warning tapes.

B. Samples for Verification: For the following products, in sizes indicated below:

1. Geotextile: 12 by 12 inches.
2. Warning Tape: 12 inches long; of each color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. CONNDOT Certification, classification according to ASTM D 2487, and laboratory compaction curve according to ASTM D 1557: For each soil material proposed for fill and backfill as follows:

1. Borrow
2. Processed Aggregate / Processed Coarse Aggregate
3. Subbase
4. Bedding Material / Bedding Course / Select Backfill
5. Controlled / Engineered / Granular fill
6. No. 8 Stone
7. No. 6 Stone Bedding Material
8. No. 4 Stone
9. No. 3 Stone
10. ASTM C-33 Sand

C. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

D. Test Reports: Submit approriate reports in accordance with the following criteria directly from the testing services to the Engineer, with copy to the Contractor:

1. Laboratory collection and analysis of each soil material/source proposed from all on-site and borrow sources.
2. Verification of suitability of subgrade material, in accordance with specified requirements.
3. Report of actual unconfined compressive strength and/or results of bearing tests of each stratum tested.

4. **Soil Sampling: Prior to placement of any soil material on site, representative samples shall be collected and analyzed to verify the fill material meets the Connecticut Department of Environmental Protection (CTDEP) and Remediation Standard Regulations (RSRs) requirements. Samples shall be collected from the source area of the proposed material prior to excavation and delivery to or movement on the site. Sample analysis frequency will be equal to or greater than 1 sample per 1,000 cubic yards of soil.**
5. **If more than one source of fill will be used, at least one (1) fill sample shall be collected and laboratory analyzed from each source (even if less than 1,000 cubic yards of material is obtained from the source).**
6. Samples being collected for analysis of Volatile Organic Compounds (VOCs) will not be composited or mixed.

    a. Fill samples will be analyzed by a Connecticut Department of Public Health certified laboratory for the following constituents:
        1) VOCs per EPA Method 8260B;
        2) Extractable Total Petroleum Hydrocarbons (ETPH) per CTDEP approved method;
        3) Polynuclear aromatic hydrocarbon (PAHs) compounds per EPA Method 8270C;
        4) Mass and Synthetic Precipitation Leaching Procedure (SPLP) 8 RCRA metals per EPA Methods 6010 and 7471; and
        5) Polychlorinated biphenyls (PCBs) per EPA Method 8082.
    b. The analyses of the fill samples will be evaluated by the Engineer and the fill will not be transported to the site or used on site unless the results demonstrate compliance with the applicable RSR criteria for the site, which are the Residentail Direct Exposure Criteria (DEC) and the GA Pollutant Mobility Criteria (PMC). The material must be approved by the Engineer prior to delivery to the site.

7. Testing reports must be submitted within seven calendar days of collection.

E. Construction Staging Plan for Site Grading Activities

F. Construction schedule for earth moving activities

1.6 QUALITY ASSURANCE

A. Blasting: Blasting is NOT permitted.

B. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

C. Employ and pay for a State Licensed environmental analytical laboratory to collect samples and perform all testing of the borrow material.

1. Borrow material shall be tested at the rate of once per 500 cubic yards and representatives samples shall be collected at the source prior to initiation of work. Samples shall be collected, stored, and transported in accordance with laboratory recommendations.

1.7 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

C. Utility Locator Service: Notify "Call Before You Dig for area where Project is located before beginning earth-moving operations.

D. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures are in place.

E. Do not commence earth-moving operations until plant-protection measures are in place.

F. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

G. Do not direct vehicle or equipment exhaust towards protection zones.

H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Imported material shall comply with Article M.02.02 of the Standard Specifications. Reclaimed aggregate shall satisfy resistance to abrasion and soundness requirements set forth in Article M.02.06 of the Standard Specification.

E. Base Course: Material shall comply with Article M.05.01 Processed Aggregate Base of the Standard Specifications except as modified below:

US STANDARD SIEVE SIZE	PERCENT FINER BY WEIGHT
1.25”	100
1”	90-100
3/4 ”	75-100
1/4 ”	25-60
NO. 40	10-35
NO. 100	3-12
NO. 200	0-5

F. Controlled / Engineered / Structural / Granular Fill: Material shall comply with Article M.02.01 Granular Fill of the Standard Specifications except as modified below:

US STANDARD SIEVE SIZE	PERCENT FINER BY WEIGHT
4”	100
3/4”	50-100
NO. 4	20-100
NO.40	5-50
NO. 200	0-8

Material shall consist of sandy gravel, gravelly sand, free of organic matter, snow, ice or other unsuitable materials. Reclaimed aggregate shall satisfy resistance to abrasion and soundness requirements set forth in Article M.02.06 of the Standard Specification. Reclaimed aggregate shall not be used under building footprints.

G. Bedding Course and Select Backfill: Materials shall comply with Section M.08.01-21 of the Standard Specifications for bedding material.

H. No. 3, No. 4, No. 6 and No. 8 Stone: Materials shall comply with Section M.01.01 of the Standard Specifications respectively.

I. Sand: ASTM C 33/C 33M; fine aggregate.

J. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

A. All products must be listed on CONNDOT Qualified product list with can be obtained at http://www.ct.gov/dot/LIB/dot/documents/dresearch/conndot_qpl.pdf.

B. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Survivability: As follows:

    a. Grab Tensile Strength: 157 lbf; ASTM D 4632.
    b. Sewn Seam Strength: 142 lbf; ASTM D 4632.
    c. Tear Strength: 56 lbf; ASTM D 4533.
    d. Puncture Strength: 56 lbf; ASTM D 4833.

3. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
4. Permittivity: 0.2 per second, minimum; ASTM D 4491.
5. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

C. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Survivability: As follows:

    a. Grab Tensile Strength: 247 lbf; ASTM D 4632.
    b. Sewn Seam Strength: 222 lbf; ASTM D 4632.
    c. Tear Strength: 90 lbf; ASTM D 4533.
    d. Puncture Strength: 90 lbf; ASTM D 4833.

3. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
4. Permittivity: 0.02 per second, minimum; ASTM D 4491.
5. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may

include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

B. Rock Excavation:
   1. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

      a. 24 inches outside of concrete forms other than at footings.
      b. 12 inches outside of concrete forms at footings.
      c. 6 inches outside of minimum required dimensions of concrete cast against grade.
      d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
      e. 6 inches beneath bottom of concrete slabs-on-grade.
      f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide with vertical walls.
   2. Wherever rock to be excavated is encountered, the Contractor shall strip or expose the rock to such an extent that in the Owner's opinion the necessary measurements can be taken. The Contractor shall provide the Owner with a survey by a licensed land surveyor indicating top of rock elevations at points of intersection on a rectilinear grid with lines spaced sufficiently close to show accurately the rock surface contours. At the Owner's option, an additional survey may be furnished by the Owner from a licensed surveyor. The volume of material conforming to the above limits derived from this survey data will be the basis of payment of this item. Quantity shall be calculated by the contractor and provided to the engineer for review and verification
   3. Rock excavation is to be paid per cubic yard measured in-place to the pay limits described above. Prices include backfill with on-site excavated material if it is suitable. Prices also include all excavation and disposal of all surplus or unsuitable material. Prices include costs of shoring, de-watering, and sloping for sides of excavation as necessary. Payment and credit amounts shall be determined based on the limits identified above. The total quantity of earth or rock excavation encountered in each depth payment category shall be paid for at its respective unit price as shown on the Bid Sheet.
   4. If the conditions of the excavation work indicated are clearly of a special nature as identified by the Contractor and confirmed by the Engineer, the Contractor may ask the Owner for reconsideration of the established unit prices and if granted, the unit prices will not apply, and prices will be negotiated in accordance with Article 13 "Compensations for Changes in the Work" of the General Conditions.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

   1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.

4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3.8 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 GENERAL BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with controlled fill; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 033000 "Cast-in-Place Concrete."

D. Trenches under Roadways: Provide 4-inch thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course. Concrete is specified in Section 033000 "Cast-in-Place Concrete."

E. Backfill voids with satisfactory soil while removing shoring and bracing.

F. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

    a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

G. Final Backfill:

1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
2. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

H. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.

4. For utility trenches, compact each layer of initial and final backfill soil material at 92 percent.

3.16 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place base course material over subbase course under hot-mix asphalt pavement.
3. Shape subbase course and base course to required crown elevations and cross-slope grades.
4. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.
5. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
6. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

C. Pavement Shoulders: Place shoulders along edges of subbase course and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.18 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
2. Determine that fill material classification and maximum lift thickness comply with requirements.
3. Determine, during placement and compaction that in-place density of compacted fill complies with requirements.

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.

E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
2. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.19 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.20 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 312100 – DISPOSAL OF CONTROLLED MATERIALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The work included under this item consists of the Contractor's requirements for the loading, transportation and final off-site disposal of all Controlled Materials within the contract limits as specified in Section 017620-Excavation and Handling of Controlled Materials.

B. This item shall apply to Controlled Materials generated by the Contractor and all subcontractors.

C. The Contractor must use an approved, permitted treatment/disposal facility for State-regulated solid waste disposal. Identification of the proposed disposal facility must be included with the Contactor’s bid as required in the bid documents.

1.2 RELATED SECTIONS

A. Section 011110 – Environmental Health and Safety

B. Section 017620 - Excavation and Handling of Controlled Materials

C. Section 026500 – Underground Storage Tank Cleaning and Removal

1.3 SUBMITTALS

A. **Bidders shall submit with their bid documents** the name, address, telephone number and fax number of the proposed treatment/disposal facility, which shall include the name and phone number of an authorized representative of the facility. This letter shall also include a copy of the facility acceptance criteria and a copy of the facility’s operational permit.

Failure to comply with the above requirements may result in rejection of the bid.

B. No facility may be substituted for the one designated in the Contractor's submittals unless approved by the Owner in writing.

C. The contractor shall submit copies of transportation and disposal documentation, including bills of lading and weight tickets/receipts for disposal of Controlled Materials. The Contractor shall prepare and submit copies of all manifests for disposal of Controlled Materials.

1.4 REGULATORY REQUIRMENTS

A. Conform to all applicable Federal, State and local regulations, including local permits, if applicable.

B. Conform to 29 CFR Section 1926, “Safety and Health Regulations for Construction”, as required.

PART 2 - PRODUCTS

2.1 TRANSPORTATION

A. Vehicles used to transport Controlled Materials must be free from leaks, equipped with load tarpaulins, and any discharge openings must be securely closed during transportation.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

A. All Controlled Materials handled and transported for disposal will require Special Handling according to the requirements of these specifications and any applicable federal, state or local regulations

B. Contractors that work with, or have the potential to be exposed to, Controlled Materials in the course of UST closure activities shall meet OSHA requirements for health and safety provisions which may include the use of chemical protective clothing, personal protective equipment, implementation of engineering controls, air and personnel monitoring, and decontamination procedures.

C. The Contractor shall minimize the spread of Controlled Materials during handling and transportation for disposal. Transport vehicles used to move Controlled Materials at the project site shall be free from leaks. Discharge openings must be securely closed during transportation.

D. The Contractor shall keep paved areas including, but not limited to, areas adjacent to excavations, roadways leading to and from the project site, parking areas, and public roadways free from dirt, dust, Controlled Materials, or other materials. If such materials are deposited, spilled, or spread, such material shall be removed promptly, and properly disposed of to the satisfaction of the Engineer no later than the end of each working day or as directed by the Engineer.

3.2 DISPOSAL

A. The Contractor shall be responsible for coordinating treatment/disposal facility approval, loading, transportation, and ultimate disposal of the material at the facility. **No claim for delay will be considered based upon the facility failing to meet the Contractor's production schedule or based upon the Contractor's failure to accommodate the disposal/treatment facility requirements as identified above.**

B. It shall be the Contractor's responsibility to comply with applicable over-the-road Federal, State, or local weight limits and all rules and regulations applicable to the transportation of Controlled Materials.

C. Manifests or bills of lading, whichever is required, shall be prepared by the Contractor and signed by an authorized representative of the Owner as "Generator" for each load of Controlled Materials (truck) that leaves the site. The Contractor shall forward the appropriate original copies of manifests or bills of lading to the Engineer and/or Owner's representative the same day the materials leave the project site.

D. Discharge openings on trucks used for the transportation of soils must be securely closed during transportation, and load tarpaulins must be deployed. Trucks deemed unacceptable for use by the Engineer shall not be used for the transportation of Controlled Materials.

E. Following load-out each day, residual Controlled Materials resulting from spillage shall be removed from the loading area and returned to appropriate stockpiles.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Disposal of Controlled Materials Soil will be measured as the actual net weight in tons of "Controlled Material" delivered to the treatment/disposal facility. Such determinations shall be made by measuring each hauling vehicle on the permanent scales at the treatment/recycling facility. Total weight shall be the summation of weigh bills issued by the facility. Contractors Unit Price shall include the cost for removal of the material from the temporary stockpile, material handling, transportation and disposal at a treatment/recycling center. This item shall also include preparation of manifests or bills of lading, all fees paid, and all equipment, materials, tools, and labor incidental to loading, transporting, treating/recycling and disposal of Controlled Materials. This item pays for the Contractors incremental costs associated with the disposal of Controlled Materials above and beyond costs for handling and disposal of non-Controlled Materials already included in the contract. No additonal measurement or payment shall be made for establishment of the Temporary Waste Stockpile Area, Dust Control, Soil Characterization, or Equipment decontamination.

4.2 PAYMENT

A. Payment under this item shall be at the Contract Unit Price per ton of material for "Disposal of Controlled Material Soils".

Item No.	PAY ITEMS	PAY UNITS
312100-A	Disposal of Controlled Material Soil	Ton

END OF SECTION 312100

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. References to the Standard Specifications for this section shall mean the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 817 supplemented and amended through the date of this project bid.

C. 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, DEP Bulletin 34 or as amended through the date of this project bid.

D. 2016 Connecticut State Building Code which includes 2012 International Building Code.

E. 2010 ADA Standards for Accessible Design by the Department of Justice dated September 15, 2010 or as amended through the date of this project bid.

1.2 SUMMARY

A. Section includes temporary excavation support and protection systems.

B. Related Requirements:

1. Section 312000 "Earth Moving" for excavating and backfilling and for controlling surface-water runoff and ponding.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review existing utilities and subsurface conditions.
2. Review coordination for interruption, shutoff, capping, and continuation of utility services.
3. Review proposed excavations.
4. Review proposed equipment.
5. Review monitoring of excavation support and protection system.
6. Review abandonment or removal of excavation support and protection system.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, performance properties, and dimensions of individual components and profiles, and calculations for excavation support and protection system.

B. Shop Drawings: For excavation support and protection system, prepared by or under the supervision of a qualified professional engineer licensed in the State of Connecticut.

1. Include plans, elevations, sections, and details.
2. Show arrangement, locations, and details of soldier piles, piling, lagging, tiebacks, bracing, and other components of excavation support and protection system according to engineering design.
3. Indicate type and location of waterproofing.
4. Include a written plan for excavation support and protection, including sequence of construction of support and protection coordinated with progress of excavation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor and professional engineer.

B. Contractor Calculations: For excavation support and protection system. Include analysis data signed and sealed by the qualified professional engineer licensed in the State of Connecticut responsible for their preparation.

C. Existing Conditions: Using photographs or video recordings, show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by inadequate performance of excavation support and protection systems. Submit before Work begins.

D. Record Drawings: Identify locations and depths of capped utilities, abandoned-in-place support and protection systems, and other subsurface structural, electrical, or mechanical conditions.

1.6 FIELD CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Do not proceed with interruption of utility without Owner's written permission.

B. Survey Work: Engage a qualified land surveyor licensed in the State of Connecticut to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide, design, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting earth and hydrostatic pressures and superimposed and construction loads.

1. Contractor Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Connecticut.
2. Prevent surface water from entering excavations by grading, dikes, or other means.
3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
4. Continuously monitor vibrations, settlements, and movements to ensure stability of excavations and constructed slopes and to ensure that damage to permanent structures is prevented.

2.2 MATERIALS

A. General: Provide materials that are either new or in serviceable condition.

B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.

C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.

1. Corners: Site-fabricated mechanical interlock.

D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application.

E. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.

F. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

G. Tiebacks: Steel bars, ASTM A 722/A 722M.

H. Tiebacks: Steel strand, ASTM A 416/A 416M.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Locate excavation support and protection systems clear of permanent construction so that construction and finishing of other work is not impeded.

3.2 SOLDIER PILES AND LAGGING

A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.3 SHEET PILING

A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock vertical edges to form a continuous barrier.

B. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

C. Cut tops of sheet piling to uniform elevation at top of excavation.

3.4 TIEBACKS

A. Drill, install, grout, and tension tiebacks.

B. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.

1. Have test loading observed by a qualified professional engineer responsible for design of excavation support and protection system.

C. Maintain tiebacks in place until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.5 BRACING

A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.

1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Engineer.
2. Install internal bracing if required to prevent spreading or distortion of braced frames.
3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 FIELD QUALITY CONTROL

A. Survey-Work Benchmarks: Resurvey benchmarks weekly during installation of excavation support and protection systems, excavation progress, and for as long as excavation remains open. Maintain an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

B. Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.

C. Promptly repair damages to adjacent facilities caused by installation or faulty performance of excavation support and protection systems.

3.7 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities.

1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction and abandon remainder.
2. Fill voids immediately with approved backfill compacted to density specified in Section 312000 "Earth Moving."
3. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.

B. Leave excavation support and protection systems permanently in place.

END OF SECTION 315000

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. References to the Standard Specifications for this section shall mean the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 817 supplemented and amended through the date of this project bid.

C. 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, DEP Bulletin 34 or as amended through the date of this project bid.

D. 2016 Connecticut State Building Code which includes 2012 International Building Code.

E. 2010 ADA Standards for Accessible Design by the Department of Justice dated September 15, 2010 or as amended through the date of this project bid.

1.2 SUMMARY

A. Section Includes:

1. Hot-mix asphalt patching.
2. Hot-mix asphalt paving.

B. Related Requirements:

1. Section 312000 "Earth Moving" for subgrade preparation, fill material, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:

a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Job-Mix Designs: Certification, by the Connecticut Department of Transportation, of approval of each job mix proposed for the Work. Certification shall include name of project covered under these specifications.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and testing agency.

B. Material Certificates: For each paving material. Include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.

C. Material Test Reports: For each paving material, by a qualified testing agency.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by the Connecticut Department of Transportation.

B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the Connecticut Department of Transportation for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Tack Coat: Minimum air and surface temperature of 40 deg F.
2. Asphalt Base Course: Minimum air and surface temperature of 40 deg F and rising at time of placement.
3. Asphalt Surface Course: Minimum air and surface temperature of 40 deg F and rising at time of placement.

PART 2 - PRODUCTS

2.1 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by the Connecticut Department of Transportation and complying with the following requirements:

1. Comply with Form 817 Section M.04– Bituminous Concrete Materials.
2. Base Course: Form 817 Section M.04 "HMA S0.5 – Design Level 2".
3. Surface Course: Form 817 Section M.04 "HMA S0.375 – Design Level 2"

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph.
2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PATCHING

A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.

1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseat pieces firmly.
2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.

C. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.05 to 0.07 gal./sq. yd..

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

E. Placing Patch Material: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.3 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.

1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.

1. Clean cracks and joints in existing hot-mix asphalt pavement.
2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.4 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.03 to 0.05 gal./sq. yd. for a non-milled surface and 0.05 to 0.07 gal./sq. yd. for a milled surface.

1. The material for tack coat shall not be heated in excess of 160 deg F and shall not be further diluted.
2. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
3. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.5 PLACING HOT-MIX ASPHALT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
2. Place hot-mix asphalt surface course in single lift.
3. Spread mix at a minimum temperature of 265 deg F (min. 300 deg F. after October 15).
4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
2. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.6 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.

3.7 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Density: All material placed in a lift shall be compacted to the degree specified in Tables 4.06-9 and 4.06-10 of the Standard Specifications. The density of each core will be determined using the production lot's average maximum theoretical specific gravity (Gmm) established during the testing of the parent material at the plant.
2. Density testing shall comply with 4.06.03 paragraphs 10 through 13.
3. No adjustment to the contract sum will be made for positive density values in Tables 4.06-9 and 4.06-10 of the Standard Specifications. Negative density values on Tables 4.06-9 and 4.06-10 of the Standard Specifications will result in pavement removal and replacement.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.8 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. HMA S1: Plus or minus 3/8 inch.
2. HMA S0.25, S0.375, S0.5: Plus or minus 1/4 inch.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 3/8 inch.
2. Surface Course (each lift): 1/4 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Core samples as required in Section 4.06.03 of the Standard Specifications.

1. All material placed in a lift shall be compacted to the degree specified in Tables 4.06-9 and 4.06-10 of the Standard Specifications. The density of each core will be determined using the production lot's average maximum theoretical specific gravity (Gmm) established during the testing of the parent material at the plant.
2. Density testing shall comply with 4.06.03 paragraphs 10 through 13.
3. No adjustment to the contract sum will be made for positive density values in Tables 4.06-9 and 4.06-10 of the Standard Specifications. Negative density values on Tables 4.06-9 and 4.06-10 of the Standard Specifications will result in pavement removal and replacement.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

END OF SECTION 321216

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. References to the Standard Specifications for this section shall mean the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 817 supplemented and amended through the date of this project bid.

C. 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, DEP Bulletin 34 or as amended through the date of this project bid.

D. 2016 Connecticut State Building Code which includes 2012 International Building Code.

E. 2010 ADA Standards for Accessible Design by the Department of Justice dated September 15, 2010 or as amended through the date of this project bid.

1.2 SUMMARY

A. Section Includes Concrete Paving Including the Following:

1. Driveways.
2. Curbs.
3. Walks.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for general building applications of concrete.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to concrete paving, including but not limited to, the following:

    a. Concrete mixture design.
    b. Quality control of concrete materials and concrete paving construction practices.

2. Require representatives of each entity directly concerned with concrete paving to attend, including the following:

    a. Contractor's superintendent.
    b. Independent testing agency responsible for concrete design mixtures.
    c. Ready-mix concrete manufacturer.
    d. Concrete paving Subcontractor.
    e. Manufacturer's representative of stamped concrete paving system used for stamped detectable warnings.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of product, ingredient, or admixture requiring color selection.

C. Samples for Verification: For each type of product or exposed finish, prepared as Samples of size indicated below:

1. Exposed Aggregate: 10-lb Sample of each mix.

D. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer of stamped detectable warnings, ready-mix concrete manufacturer and testing agency.

B. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures.
4. Curing compounds.
5. Applied finish materials.
6. Bonding agent or epoxy adhesive.
7. Joint fillers.

C. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

1.8 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, fabricated from steel wire into flat sheets.

B. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.

C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

D. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60 deformed bars; assembled with clips.

E. Plain-Steel Wire: ASTM A 1064/A 1064M.

F. Deformed-Steel Wire: ASTM A 1064/A 1064M.

G. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.

H. Tie Bars: ASTM A 615/A 615M, Grade 60; deformed.

I. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

J. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.4 CONCRETE MATERIALS

A. Comply with Section M.03 of the Standard Specifications. Mix composition shall comply with Class "F".

B. Water: Potable and complying with ASTM C 94/C 94M.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.6 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

B. Epoxy-Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:

1. Types I and II, nonload bearing, Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

C. Chemical Surface Retarder: Water-soluble, liquid, set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): Class "F" per the Standard Specifications.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.53
3. Slump Limit: 4 inches, plus or minus 1 inch.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: 5-7 percent.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

F. Concrete Mixtures: Normal-weight concrete.

1. Compressive Strength (28 Days): Class "F" per the Standard Specifications
2. Maximum W/C Ratio at Point of Placement: 0.53.
3. Slump Limit: 4 inches, plus or minus 1 inch.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete batches of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete batches larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.

3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 312000 "Earth Moving."

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
2. Provide tie bars at sides of paving strips where indicated.
3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 15 feet unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows, to match jointing of existing adjacent concrete paving:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes

    a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

    a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.

3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement dowels and joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
2. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 3/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-feet- long; unleveled straightedge not to exceed 1/2 inch.
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch.
6. Vertical Alignment of Dowels: 1/4 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.11 REPAIR AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

STATE OF CONNECTICUT
UNIVERSITY OF CONNECTICUT

SUSAN HERBST
PRESIDENT

STORRS CAMPUS
HIGH HEAD GENERATOR SYSTEM
UNIVERSITY OF CONNECTICUT
STORRS, CT 06269

PROJECT NO.: LL170420
AREA OF RENOVATION : TOWERS LOOP AND HIGH HEAD BUILDING

PREPARED FOR:

FACILITIES OPERATIONS AND BUILDING SERVICES
25 LEDOYT RD. UNIT 3252
STORRS, CT 06269

AUGUST 29, 2018

PROJECT CONSULTANT

Electrical Engineer:

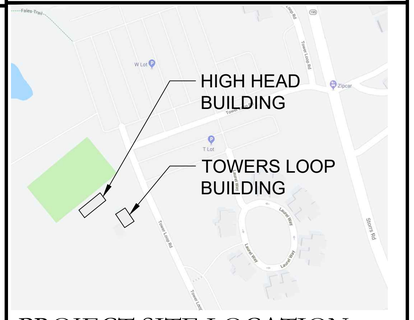
2321 Whitney Avenue - Hamden Center II - Hamden CT 06518
Ph: 203 239 4200 Fax: 203 234 7376
www.teamdtc.com

DRAWING INDEX

8/29/2018 FINAL CONSTRUCTION DOCUMENTS

ELECTRICAL

E-001	ELECTRICAL NOTES, LEGENDS, & ABBREVIATIONS
ES-100	ELECTRICAL SITE PLAN
EV-100	ENVIRONMENTAL SITE PLAN
ED-100	ELECTRICAL DEMO HIGH HEAD PLANS
ED-101	ELECTRICAL DEMO TOWERS LOOP PLANS
E-100	ELECTRICAL FLOOR PLANS
E-200	ELECTRICAL RISER DIAGRAMS
E-300	ELECTRICAL DETAILS
E-301	ELECTRICAL DETAILS



PROJECT SITE LOCATION
NO SCALE

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	MOTOR
	VARIABLE FREQUENCY DRIVE
	MOTOR STARTER / VFD
FACP	EXISTING FIRE ALARM CONTROL PANEL
MM	ADDRESSABLE MONITORING MODULE
	GROUND
	DEMOLITION OF EXISTING EQUIPMENT
	CIRCUIT BREAKER
—— U/G ——	UNDERGROUND CONDUIT
	HOMERUN
M	METERING
J	JUNCTION BOX
	DUPLEX RECEPTACLE OUTLET WITH GROUND-FAULT CIRCUIT-INTERRUPTER

ELECTRICAL ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
A	AMPERES
AF	AMP-FRAME
AHF	ACTIVE HARMONIC FILTER
AT	AMP-TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CU	COPPER
DISC	DISCONNECT
DWG	DRAWING
EMT	ELECTRICAL METALLIC TUBING
EQUIP	EQUIPMENT
EX	EXISTING TO REMAIN
GFI	GROUND-FAULT CIRCUIT-INTERRUPTER
HP	HORSEPOWER
Kcmils	THOUSAND CIRCUIT MILLS
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUGS ONLY
N/A	NOT APPLICABLE
NEC	NATIONAL ELECTRIC CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOC.
N.T.S.	NOT TO SCALE
O.C.	ON-CENTER
P	POLE
PH	PHASE
RECPT	RECEPTACLE
RM	ROOM
SPD	SURGE PROTECTION DEVICE
TX	TRANSFORMER
TYP	TYPICAL
UL	UNDERWRITER'S LABORATORY
U.O.N.	UNLESS OTHERWISE NOTED
V	VOLTS
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS
WP	WEATHERPROOF
%	PERCENT
#	NUMBER
'	FEET
"	INCHES

ELECTRICAL NOTES

GENERAL

SEQUENCE BELOW IS A GENERAL SCOPE OF WORK OUTLINE. CONTRACTOR IS REQUIRED TO DETERMINE THE ACTUAL SEQUENCE OF WORK AS HE SEES FIT TO COMPLETE THE WORK IN ITS ENTIRETY WITH MINIMUM DOWN TIME FOR THE FACILITIES.

1. PROVIDE AND INSTALL TEMPORARY PORTABLE 400KW GENERATOR WIRE WITH PORTABLE TEMP. CABLE(S) TO LUGS OF EXISTING SWITCHBOARD / PANELBOARD FOR EACH BUILDING. GENERATOR TO PROVIDE SIMULTANEOUS BACKUP OF BOTH BUILDINGS AS REQUIRED INCLUDING ALL FUEL FOR RUNTIME AS REQUIRED TO COMPLETE ENTIRE CHANGEOVER. REFER TO DRAWINGS FOR CONNECTION POINT IN EACH BUILDING. CONTRACTOR CAN SELECT ANOTHER POINT OF CONNECTION IF REQUIRED TO COMPLETE WORK. PROVIDE PROTECTION FOR CABLES IN DRIVEWAY.

TOWERS LOOP BUILDING

2. LIFT, STORE, AND PROTECT THE TOWERS LOOP TRANSFORMER OFF OF THE PAD AND REMOVE CONCRETE BASE TO GAIN ACCESS TO EXISTING CONDUITS AND WIRE.
3. REMOVE SERVICE ENTRANCE CONDUCTORS AND INSTALL NEW CONDUCTORS. REINSTALL EXISTING TRANSFORMER AND RECONNECT TO EXISTING CONDUCTORS AND GROUND. LIFT NEUTRAL STRAPS FROM TRANSFORMER.
4. SQUARE D TO SUPPLY AND INSTALL THE NECESSARY MATERIAL TO CONVERT THE EXISTING QED SWITCHBOARD F0#17054082-001 SECTIONS 1 & 2 FROM 3W TO 4W BY FIELD INSTALLING A NEUTRAL BUS RUN IN BOTH SECTIONS. SQUARE D TO SUPPLY AND INSTALL ALL NECESSARY COMPONENTS TO CONNECT THE HORIZONTAL AND RUNBACK NEUTRAL BUS TO THE EXISTING SYSTEM. THIS INCLUDES: NEW COPPER BUS, BUS SUPPORTS, CIRCUIT BREAKER(S), AND HARDWARE. A SITE VISIT WILL BE REQUIRED BY A SQUARE D SERVICES TECH, ASSISTED REMOTELY BY AN ENGINEER, TO OBTAIN THE NECESSARY MEASUREMENTS REQUIRED FOR THE DESIGN. A BUS OUTAGE OF UP TO 8 TO 10 HOURS WILL BE REQUIRED FOR THIS VISIT. SQUARE D SERVICES WILL REQUIRE A 2-3 WEEK NOTICE TO SCHEDULE THIS VISIT.
5. CONTRACTOR TO REPROGRAM EXISTING METERING FOR NEW 4 WIRE CONFIGURATION AS REQUIRED.
6. REMOVE AND REPLACE EXISTING RUSS ELECTRIC ATS WITH AN ASCO 7000 ATS IN SAME LOCATION. REWORK FEEDERS TO CONNECT TO ATS AS NEEDED.
7. REMOVE UNUSED NEUTRAL WIRE FROM SWITCHBOARD TO PANELBOARD 'HV' PASSING THROUGH EXISTING ATS.
8. INSTALL HARMONICS FILTER SYSTEM.

HIGH HEAD BUILDING

9. REMOVE EXISTING 375KW DIESEL GENERATOR INSIDE HIGH HEAD PUMP STATION, FEEDER CONDUIT AND CONDUCTORS, BATTERY CHARGER, UNDERGROUND STORAGE TANK (UST), AND ALL ASSOCIATED EQUIPMENT AND ACCESSORIES.
10. REMOVE 18" THICK CONCRETE SLAB AND POUR CONCRETE TO RELEVEL FLOOR TO MATCH EXISTING FLOOR HEIGHT.
11. REMOVE EXISTING 300KVA TRANSFORMER, TRANSFORMER PAD, TRANSFORMER VAULT, SECONDARY CONDUITS AND CONDUCTORS, OUTDOOR SERVICE DISCONNECT, SERVICE ENTRANCE CONDUCTORS, ATS, PANEL 'EDP', AND ALL EQUIPMENT SHOWN ON DEMO PLAN.
12. INSTALL 500KVA PAD MOUNTED TRANSFORMER AND TRANSFORMER VAULT AND PAD. CONNECT TO EXISTING PRIMARY LOOP AND NEW GROUND LOOP AS DETAILED. PROVIDE SECONDARIES AND TERMINATE TO PANELBOARD INSIDE BUILDING.
13. BUILD AND INSTALL UTILITY FRAME PER DETAILS IN LOCATION OF OLD GENERATOR. INSTALL ATS, PANELBOARD 'HHDP', MINI-UNIT SUBSTATION WITH TRANSFORMER, AND HARMONICS FILTER ON/ INFRONT OF UTILITY FRAME. MAINTAIN ALL ELECTRICAL WORKING CLEARANCES PER NEC ARTICLE 110 FROM EXISTING EQUIPMENT TO BE REMOVED AND NEW EQUIPMENT TO BE INSTALLED ON WALL.
14. TRANSFER EXISTING PUMPS, UNIT HEATER, AND MISC. FEEDERS TO NEW 'HHDP' PANELBOARD. UTILIZE JUNCTION BOXES ABOVE EXISTING WIREWAY.
15. INSTALL 750 KW DIESEL GENERATOR WITH SUBBASE TANK, ENCLOSURE, AND WALKWAY WITH STAIRS AT LOCATION SHOWN ON SITE PLAN. WIRE TO ASSOCIATED DISCONNECT SWITCHES ALONG WITH 480V AND 120/240V LOADS TO MINI-UNIT SUBSTATION INSIDE BUILDING.
16. INSTALL (2) 800A GENERATOR DISCONNECT PANELS AND (1) SERVICE DISCONNECT PANEL FOR NORMAL HIGH HEAD SERVICE. GROUND AND LABEL AS DESCRIBED.

ELECTRICAL GENERAL NOTES

1. UNLESS OTHERWISE INDICATED, FURNISH AND INSTALL A COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM INCLUDING ALL NECESSARY MATERIAL, LABOR, AND EQUIPMENT.
2. ELECTRICAL PLANS AND DETAILS, AND ONE LINE DIAGRAMS SHOW THE GENERAL LOCATION AND ARRANGEMENT OF THE ELECTRICAL SYSTEM. THEY ARE DIAGRAMMATIC AND DO NOT SHOW ALL CONDUIT BODIES, CONNECTORS, BENDS, FITTINGS, HANGERS, AND ADDITIONAL PULL AND JUNCTION BOXES WHICH THE CONTRACTOR MUST PROVIDE TO COMPLETE THE ELECTRICAL SYSTEM.
3. ALL EQUIPMENT AND MATERIAL SHALL BE LABELED AND LISTED, AND INSTALLED IN ACCORDANCE WITH THEIR LISTING AND PER MANUFACTURERS INSTRUCTION.
4. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS AND ARRANGE FOR ALL REQUIRED INSPECTIONS IN ACCORDANCE WITH STATE GOVERNING AUTHORITIES.
5. ALL WORK SHALL BE DONE WITH LICENSED WORKMEN IN ACCORDANCE WITH STATE GOVERNING AUTHORITY.
6. THE TERM "INDICATED" SHALL MEAN "AS SHOWN ON CONTRACT DOCUMENTS (SPECIFICATIONS, DRAWINGS, AND RELATED ATTACHMENTS)".
7. THE TERM "SIZE" SHALL MEAN ONE OR MORE OF THE FOLLOWING: "LENGTH, CURRENT AND VOLTAGE RATING, NUMBER OF POLES, NEMA SIZE, AND OTHER SIMILAR ELECTRICAL CHARACTERISTICS".
8. THE TERM "SPACE" ON PANELBOARD AND SWITCHBOARD SCHEDULES SHALL MEAN "PROVIDE SPACE TO INSTALL THE NUMBER OF POLES AND SIZE OF THE PROTECTIVE DEVICE INDICATED WITH ALL THE NECESSARY BUS AND FITTINGS TO INSTALL THE DEVICE AT SOME FUTURE DATE".
9. COORDINATE ELECTRICAL WORK WITH OWNER.
10. COORDINATE ELECTRICAL WORK WITH OTHER DIVISIONS OF THIS PROJECT.
11. BEFORE SELECTING MATERIAL AND EQUIPMENT, AND PROCEEDING WITH WORK, INSPECT AREAS WHERE MATERIAL AND EQUIPMENT ARE TO BE INSTALLED TO INSURE SUITABILITY, AND CHECK NEEDED SPACE FOR REPLACEMENT, CLEARANCES AND INTERCONNECTIONS.
12. BEFORE CUTTING OR DRILLING INTO BUILDING ELEMENTS INSPECT AND LAYOUT WORK TO AVOID DAMAGING STRUCTURAL ELEMENTS AND BUILDING UTILITIES.
13. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE ANSI/NFPA 70 2014 EDITION.
14. THE DEFINITION OF ELECTRICAL TERMS USED SHALL BE AS DEFINED IN THE NATIONAL ELECTRICAL CODE.
15. TYPICAL MOUNTING HEIGHTS OF DEVICES SHALL COMPLY NECA 1-2015.
16. ALL WIRING AND CABLING BEING RUN IN PLENUM SHALL BE PLENUM RATED.
17. ELECTRICAL CONTRACTOR SHALL SEAL ALL ELECTRICAL PENETRATIONS THROUGH FIRE AND SMOKE RATED PARTITIONS WITH FIRE RATED MATERIAL EQUAL TO 3M FIRE BARRIER SEALANT CP 25WB+ AS A MINIMUM. MATERIAL SELECTION SHALL BE BASED ON RATING OF PARTITION PENETRATED. CONTRACTOR TO SUBMIT DETAILS TO ENGINEER FOR APPROVAL SHOWING EACH THROUGH-PENETRATION FIRESTOP SYSTEM REQUIRED.
18. FURNISH AND INSTALL MEANS OF DISCONNECTION FOR ALL MOTORIZED EQUIPMENT IN ACCORDANCE WITH NEC SECTION 430-IX.
19. ALL GROUNDING AND BONDING IN ACCORDANCE WITH 2014 NEC ARTICLE 250.

ELECTRICAL DEMOLITION NOTES

1. DEMOLITION PLANS ARE DIAGRAMMATIC AND DO NOT DEPICT ENTIRE SCOPE OF WORK. ADDITIONAL WORK RELATED TO DEMOLITION MODIFICATIONS SHOULD BE EXPECTED. THE CONTRACTOR SHALL PROVIDE LABOR AND EQUIPMENT TO COMPLETELY REMOVE ALL EQUIPMENT REQUIRED AND IN SEQUENCE WITH PROJECT PHASING PLANS.
2. EXISTING ELECTRICAL INFORMATION WAS OBTAINED FROM THE ELECTRICAL PLANS FROM LENARD ENGINEERING, INC. DATED SEPTEMBER 20, 2002 AND LIMITED FIELD WORK.
3. PRIOR TO BID, CONTRACTOR TO INSPECT SITE AND IDENTIFY ANY EXISTING CONDITIONS THAT WILL AFFECT THE WORK TO BE PERFORMED. IF ANY LATENT HAZARDOUS MATERIALS ARE NOTICES OR SUSPECTED, CONTRACTOR SHALL NOTIFY OWNER IMMEDIATELY AND WAIT FOR FURTHER INSTRUCTIONS BEFORE STARTING/ RESTARTING ANY WORK IN PROJECT AREA. THE OWNER IS RESPONSIBLE FOR THE REMOVAL OR ABATEMENT OF ANY/ALL ASBESTOS-LADEN MATERIALS PRIOR TO THE CONTRACTOR COMMENCING WITH HIS WORK.
4. WHERE THE REMOVAL OF ANY DEVICE, FIXTURE, AND/OR EQUIPMENT INTERRUPTS THE CONTINUITY OF AN EXISTING (TO REMAIN) CIRCUIT, PROVIDE ALL CONNECTIONS AND CIRCUITRY NECESSARY TO MAINTAIN EXISTING CIRCUIT CONTINUITY.
5. WHERE BOXES REMAIN AFTER REMOVAL OF FIXTURES AND ELECTRICAL DEVICES FROM EXISTING (TO REMAIN) CONSTRUCTION, PROVIDE BLANK COVER FOR EACH BOX.
6. REMOVAL OF ANY ELECTRICAL MATERIAL SHALL INCLUDE THE REMOVAL OF ALL CONTROL, CONDUCTORS, AND CONDUIT (WHERE PRACTICAL) ASSOCIATED WITH MATERIAL, UNLESS OTHERWISE NOTED.

ELECTRICAL DESIGN NOTES

1. 750KW GENERATOR SIZING IS BASED UPON THE FOLLOWING LOADS RUNNING:

HIGH HEAD BUILDING:
- (3) 100HP, 480V, 3PH, 3W, PUMPS

TOWERS LOOP BUILDING:
- (2) 125HP, 480V, 3PH, 3W, PUMPS

BOTH BUILDINGS:
- MISCELLANEOUS STATION LOADS

CERTIFICATION:

STATE OF CONNECTICUT · A. GRAHAM CURTIS · No. 15805 · LICENSED PROFESSIONAL ENGINEER

STATUS:
CONSTRUCTION DOCUMENTS

CONSULTANT:

DTC
2321 Whitney Avenue - Hamden Center II - Hamden CT 06518
Ph: 203 239 4200 Fax: 203 234 7376
www.teamdtc.com

REVISIONS:

MARK	DATE	DESCRIPTION
O	6/6/18	CONSTRUCTION DOCUMENTS
1	8/29/18	FINAL CONSTRUCTION DOCUMENTS

UNIVERSITY OF CONNECTICUT
FACILITIES OPERATIONS & BUILDING SERVICES
25 LEDOYT ROAD UNIT 3252
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (xxx)xxx-xxxx
FACSIMILE: (xxx)xxx-xxxx

UNIVERSITY OF CONNECTICUT 1881

PROJECT:

HIGH HEAD GENERATOR SYSTEM
Facilities Operations and Building Services
25 Ledoyt Rd.
Unit 3252, Storrs, CT 06269

PROJECT NO: LL170420
WORK ORDER NO:
FILE NAME:
P:\2009\09190-UCONN MEP ON-CALL\700 - HIGH HEAD EMERGENCY SYSTEM\108\0-CURRENT\E-001
AUTHOR: BP
DRAFTER: BP
SCALE: As Noted
PRINT DATE: 8-29-2018
SHEET TITLE:
ELECTRICAL NOTES, LEGENDS, & ABBREVIATIONS

SHEET:
E-001

SHEET: 1 of 9

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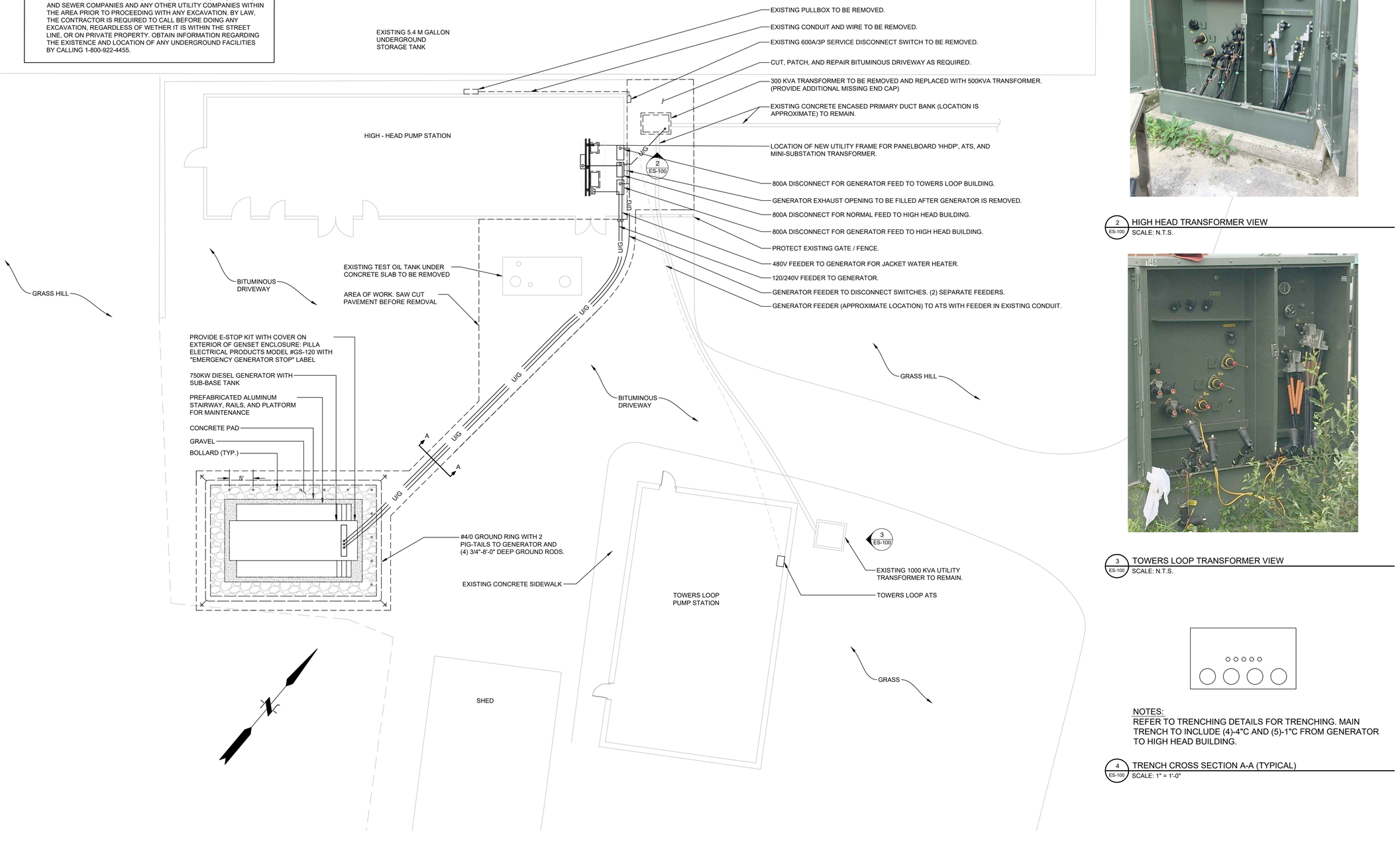
August 29, 2018

GENERAL WORK NOTES

1. ALL WIRE AND CONDUIT SIZES AND QUANTITIES SHOWN ON RISER DIAGRAM.
2. THE CONTRACTOR IS TO BE FULLY RESPONSIBLE FOR CONTACTING THE LOCAL CABLE TELEVISION, POWER, TELEPHONE, GAS, WATER, AND SEWER COMPANIES AND ANY OTHER UTILITY COMPANIES WITHIN THE AREA PRIOR TO PROCEEDING WITH ANY EXCAVATION. BY LAW, THE CONTRACTOR IS REQUIRED TO CALL BEFORE DOING ANY EXCAVATION, REGARDLESS OF WETHER IT IS WITHIN THE STREET LINE, OR ON PRIVATE PROPERTY. OBTAIN INFORMATION REGARDING THE EXISTENCE AND LOCATION OF ANY UNDERGROUND FACILITIES BY CALLING 1-800-922-4455.



1 ES-100 ELECTRICAL SITE PLAN
SCALE: 1" = 10'-0"

10 0 5 10 20 40

2 ES-100 HIGH HEAD TRANSFORMER VIEW
SCALE: N.T.S.

3 ES-100 TOWERS LOOP TRANSFORMER VIEW
SCALE: N.T.S.

NOTES:
REFER TO TRENCHING DETAILS FOR TRENCHING. MAIN TRENCH TO INCLUDE (4)-4"C AND (5)-1"C FROM GENERATOR TO HIGH HEAD BUILDING.

4 ES-100 TRENCH CROSS SECTION A-A (TYPICAL)
SCALE: 1" = 1'-0"

CERTIFICATION:

STATE OF CONNECTICUT · GRAHAM C. TUTTLE · No. 18305 · LICENSED PROFESSIONAL ENGINEER

STATUS:
CONSTRUCTION DOCUMENTS

CONSULTANT:

DTC
2321 Whitney Avenue - Hamden Center II - Hamden CT 06518
Ph: 203 239 4200 Fax: 203 234 7376
www.teamdtc.com

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FACILITIES OPERATIONS & BUILDING SERVICES
25 LEDOYT ROAD UNIT 3252
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (xxx)xxx-xxxx
FACSIMILE: (xxx)xxx-xxxx

PROJECT:
HIGH HEAD GENERATOR SYSTEM
Facilities Operations and Building Services
25 Ledoyt Rd.
Unit 3252, Storrs, CT 06269

PROJECT NO: LL170420
WORK ORDER NO:
FILE NAME:
P:\2009\09190-UCONN MEP ON-CALL\700 - HIGH HEAD EMERGENCY SYSTEM\108\0-CURRENT\ES-100
AUTHOR: BP
DRAFTER: BP
SCALE: As Noted
PRINT DATE: 8-29-2018
SHEET TITLE:
ELECTRICAL SITE PLAN

SHEET:
ES-100

SHEET: 2 of 9

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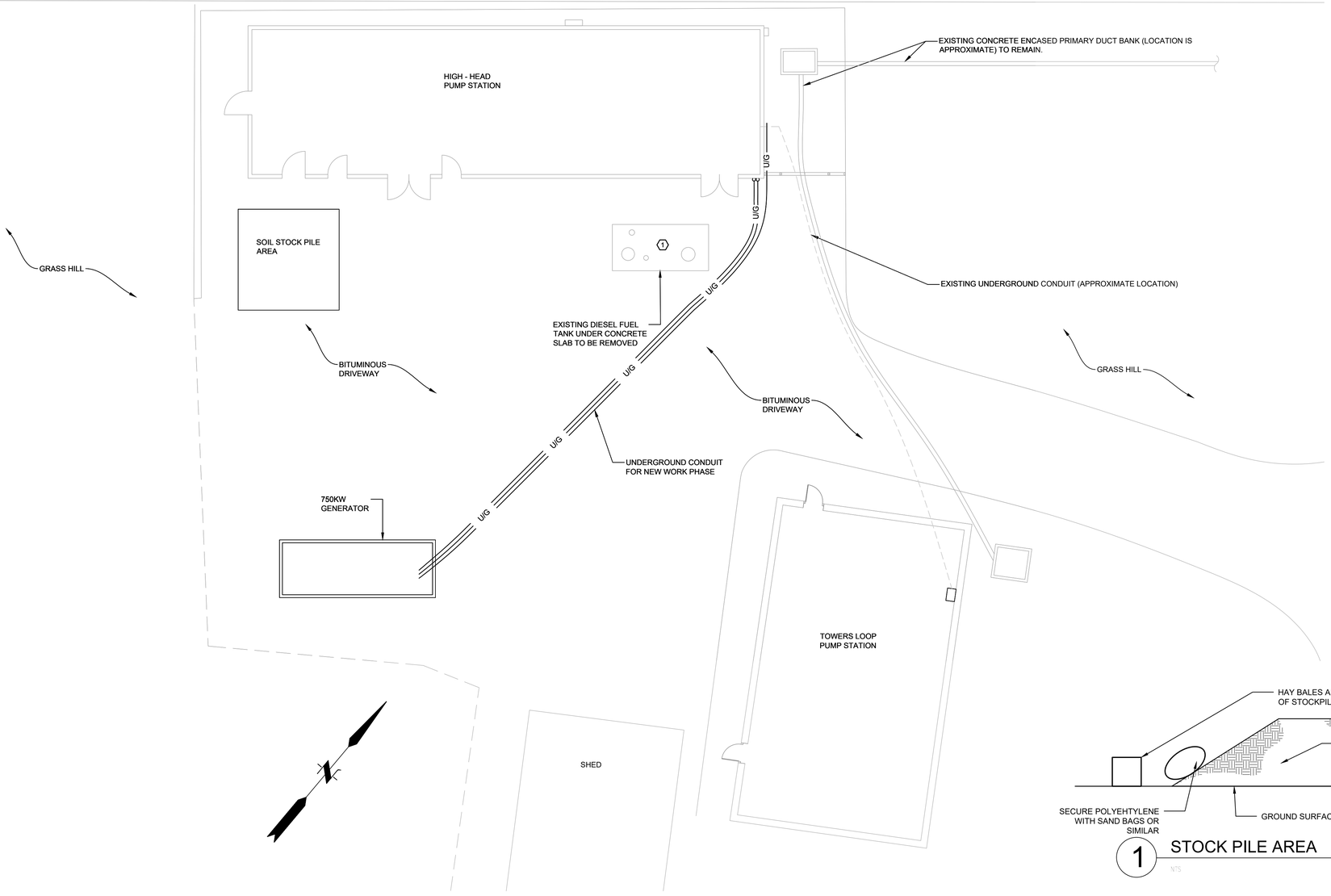
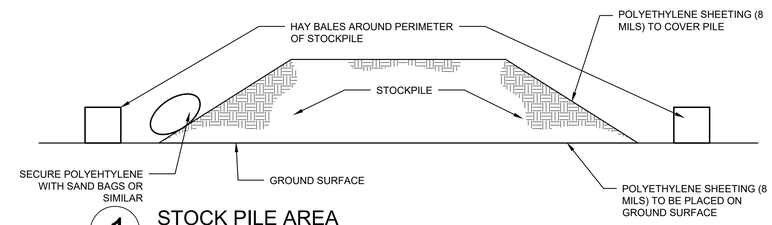
August 29, 2018



1 ENVIRONMENTAL SITE PLAN
EV-100
SCALE: 1" = 10'-0"

10 0 5 10 20 40



1 STOCK PILE AREA
NTS

UNDERGROUND STORAGE TANK REMOVAL NOTES:

1. CONTRACTOR TO REMOVE EXISTING OIL TANK AFTER TEMP. GENERATOR IS UP AND RUNNING AND CONNECTED TO EACH BUILDING.

THE HIGH HEAD PUMP HOUSE PROPERTY CONTAINS A 1,000 GALLON DIESEL FUEL UNDERGROUND STORAGE TANK (UST) BURIED WITHIN A PAVED AREA ON THE SOUTH SIDE OF THE HIGH HEAD PUMP HOUSE AS SHOWN.

THE CONTRACTOR WILL BE RESPONSIBLE FOR THE UNCOVERING, INERTING, CLEANING, REMOVING RESIDUAL CONTENTS AND CLEANING SOLVENTS FROM, EXCAVATING, TRANSPORTATION AND DISPOSAL OF THE UST AND TANK APPURTENANCES UP TO THE GENERATOR. THE QUANTITY OF THE RESIDUAL CONTENTS CONTAINED WITHIN THE UST IS UNKNOWN. THESE CONTENTS WILL REQUIRE REMOVAL AND DISPOSAL/RECYCLING AT A LICENSED FACILITY.

THIS WORK ALSO INCLUDES: UNCOVERING, REMOVING CONTENTS FROM, CLEANING, EXCAVATING, TRANSPORTATION AND DISPOSAL OF PRODUCT PIPING AND CAPPING OR PLUGGING OF THE REMAINING PIPING TO THE GENERATOR. THE CONCRETE SLAB COVERING THE TANK SHALL BE BROKEN UP AND REMOVED FOR OFF SITE DISPOSAL.

THIS WORK INCLUDES SITE RESTORATION INCLUDING BACKFILLING THE UST EXCAVATIONS AND RESTORING SURFACE IMPROVEMENTS TO THEIR ORIGINAL CONDITION.

CERTIFICATION:

STATUS:
CONSTRUCTION DOCUMENTS

CONSULTANT:

2321 Whitney Avenue - Hamden Center II - Hamden CT 06518
Ph: 203 239 4200 Fax: 203 234 7376
www.teamdtc.com

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FACILITIES OPERATIONS & BUILDING SERVICES
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STORRS, CONNECTICUT 06269-3038
TELEPHONE: (xxx)xxx-xxxx
FACSIMILE: (xxx)xxx-xxxx

PROJECT:
HIGH HEAD GENERATOR SYSTEM
Facilities Operations and Building Services
25 Ledoyt Rd.
Unit 3252, Storrs, CT 06269

PROJECT NO: LL170420
WORK ORDER NO:
FILE NAME:
P:\2009\09190-UCONN MEP ON-CALL\700 - HIGH HEAD EMERGENCY SYSTEM\108\0-CURRENT\EV-100
AUTHOR: MB
DRAFTER: BP
SCALE: As Noted
PRINT DATE: 8-29-2018
SHEET TITLE:
ENVIRONMENTAL SITE PLAN
SHEET:
EV-100
SHEET: 3 of 9

brian.poetti
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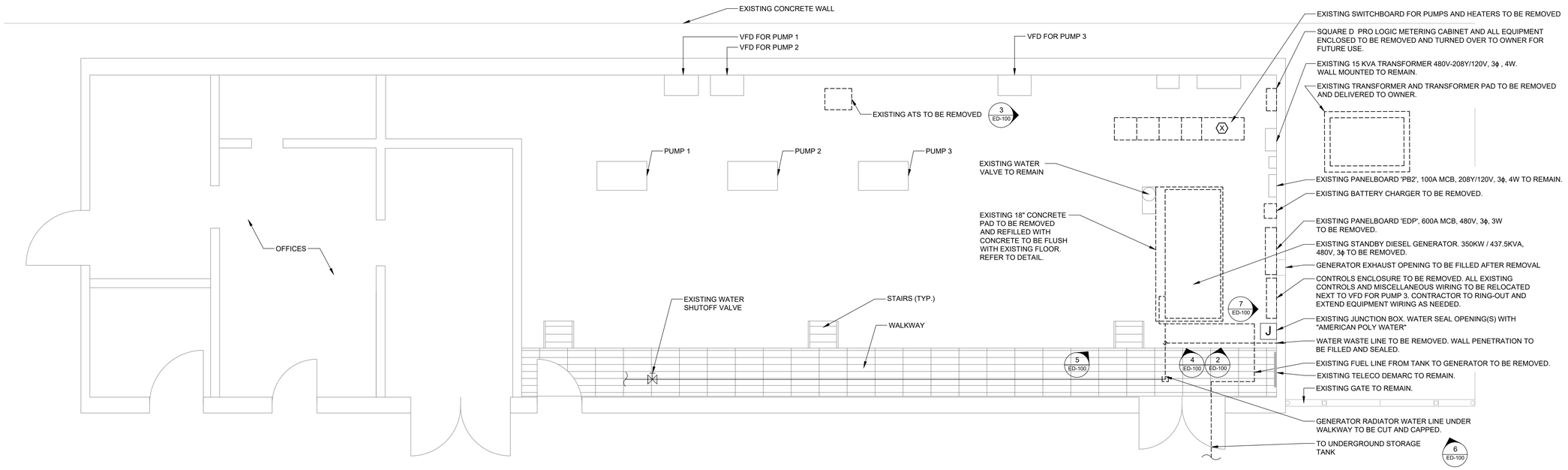
April 13, 2018



1 ED-100 HIGH HEAD PUMP STATION ELECTRICAL DEMO PLAN
SCALE: 1/4" = 1'-0"
4' 2' 0 4'

DEMO KEYED NOTES

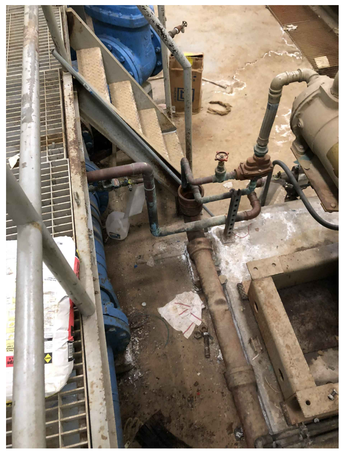
(X) CONNECTION POINT FOR TEMPORARY GENERATOR CABLES

DEMO WORK NOTES

1. CONTRACTOR TO REMOVE ALL UNUSED CONDUITS AND HANGERS/ SUPPORTS WHICH BECOME EMPTY OR HAVE ALREADY BEEN EMPTY PRIOR TO CONSTRUCTION THAT ARE ASSOCIATED WITH THE EQUIPMENT BEING REMOVED, OR REWORKED.
2. ALL PUMPS AND PUMP VFDS TO REMAIN.
3. REFER TO SITE PLAN FOR EXTERIOR EQUIPMENT TO BE REMOVED.

2 ED-100 HIGH HEAD PUMP STATION ELECTRICAL DEMO PLAN (GEN, EXHAUST, PANELBOARD)
SCALE: N.T.S.

3 ED-100 HIGH HEAD PUMP STATION ELECTRICAL DEMO PLAN (SIDE VIEW SWITCHBOARD)
SCALE: N.T.S.



4 ED-100 HIGH HEAD PUMP STATION ELECTRICAL DEMO PLAN (WATER & WASTE PIPING)
SCALE: N.T.S.

5 ED-100 HIGH HEAD PUMP STATION ELECTRICAL DEMO PLAN (INDOOR GENERATOR)
SCALE: N.T.S.

6 ED-100 HIGH HEAD PUMP STATION ELECTRICAL DEMO PLAN (TRANSFORMER & EXHAUST)
SCALE: N.T.S.

7 ED-100 HIGH HEAD PUMP STATION ELECTRICAL DEMO PLAN (CONTROL ENCLOSURE)
SCALE: N.T.S.

CERTIFICATION:

STATE OF CONNECTICUT · GRAHAM · No. 16026 · LICENSED PROFESSIONAL ENGINEER

STATUS:
CONSTRUCTION DOCUMENTS

CONSULTANT:

DTC
2321 Whitney Avenue - Hamden Center II - Hamden CT 06518
Ph: 203 239 4200 Fax: 203 234 7376
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DRAFTER: BP
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SHEET TITLE:
ELECTRICAL DEMO HIGH HEAD PLANS
SHEET:
ED-100
SHEET: 4 of 9

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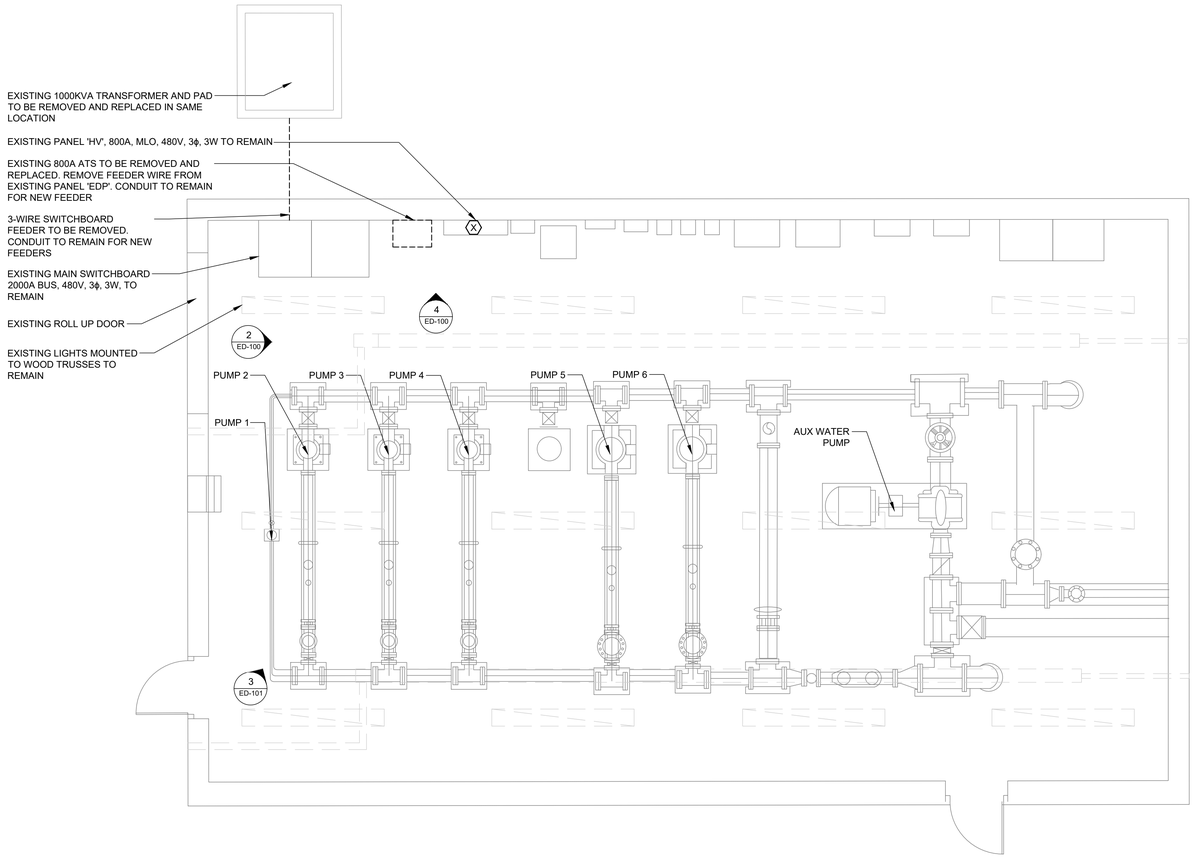
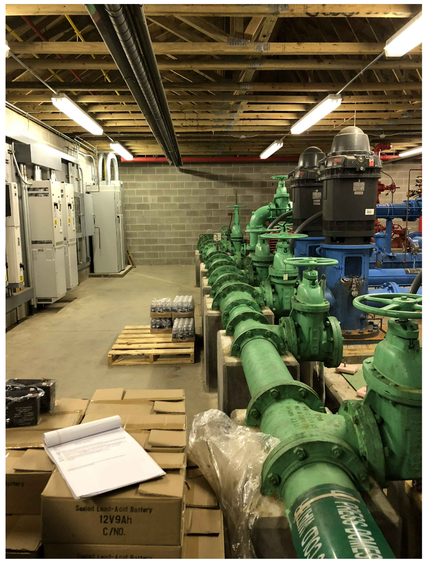
June 6, 2018



1 ED-101 TOWER LOOP PUMP STATION ELECTRICAL DEMO PLAN
SCALE: 1/4" = 1'-0"

4' 2' 0 4'



2 ED-101 TOWERS LOOP PUMP STATION ELECTRICAL DEMO PLAN
SCALE: N.T.S.

3 ED-101 TOWERS LOOP PUMP STATION ELECTRICAL DEMO PLAN
SCALE: N.T.S.

4 ED-101 TOWERS LOOP PUMP STATION ELECTRICAL DEMO PLAN
SCALE: N.T.S.

DEMO WORK NOTES

1. CONTRACTOR TO REMOVE ALL UNUSED CONDUITS AND HANGERS/ SUPPORTS WHICH BECOME EMPTY OR HAVE ALREADY BEEN EMPTY PRIOR TO CONSTRUCTION THAT ARE ASSOCIATED WITH THE EQUIPMENT BEING REMOVED, OR REWORKED.
2. ALL PUMPS AND PUMP VFDS TO REMAIN.
3. REFER TO SITE PLAN FOR EXTERIOR EQUIPMENT TO BE REMOVED.

DEMO KEYED NOTES

X CONNECTION POINT FOR TEMPORARY GENERATOR CABLES

CERTIFICATION:

STATUS:
CONSTRUCTION DOCUMENTS

CONSULTANT:

DTC
2321 Whitney Avenue - Hamden Center II - Hamden CT 06518
Ph: 203 239 4200 Fax: 203 234 7376
www.teamdtc.com

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FACILITIES OPERATIONS & BUILDING SERVICES
25 LEDOYT ROAD UNIT 3252
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (xxx)xxx-xxxx
FACSIMILE: (xxx)xxx-xxxx

PROJECT:
HIGH HEAD GENERATOR SYSTEM
Facilities Operations and Building Services
25 Ledoyt Rd.
Unit 3252, Storrs, CT 06269

PROJECT NO: LL170420
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P:\2009\09190-UCONN MEP ON-CALL\700 - HIGH HEAD EMERGENCY SYSTEM\108\0-CURRENT\ED-100
AUTHOR: BP
DRAFTER: BP
SCALE: As Noted
PRINT DATE: 8-29-2018
SHEET TITLE:
ELECTRICAL DEMO TOWERS LOOP PLANS
SHEET:
ED-101
SHEET: 5 of 9

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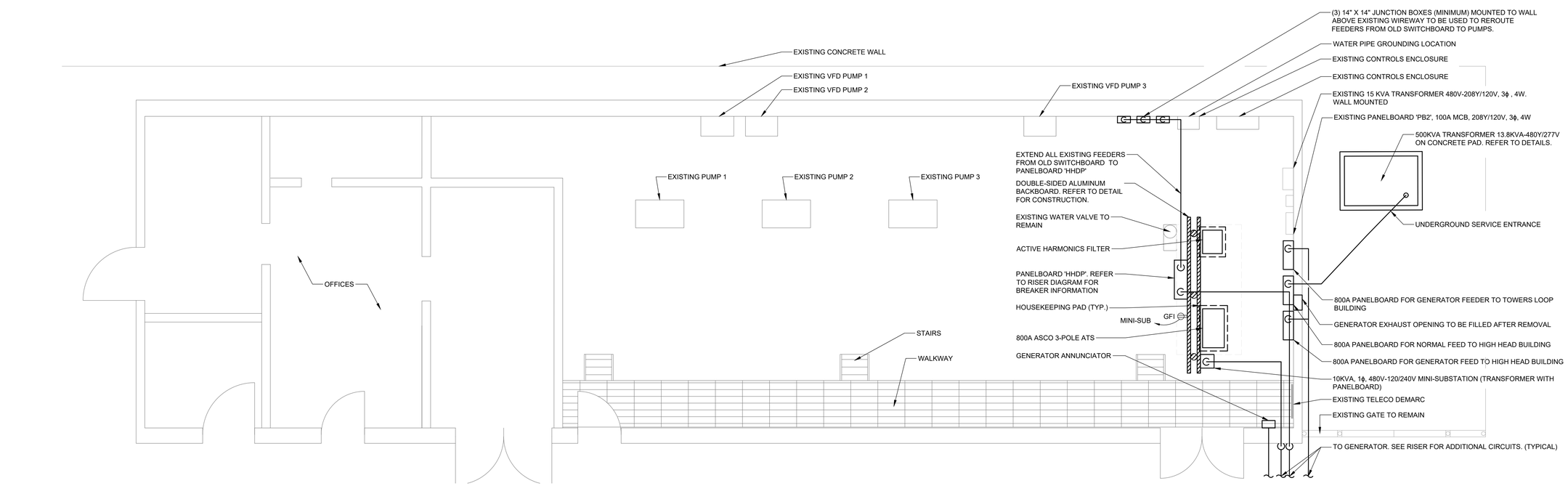
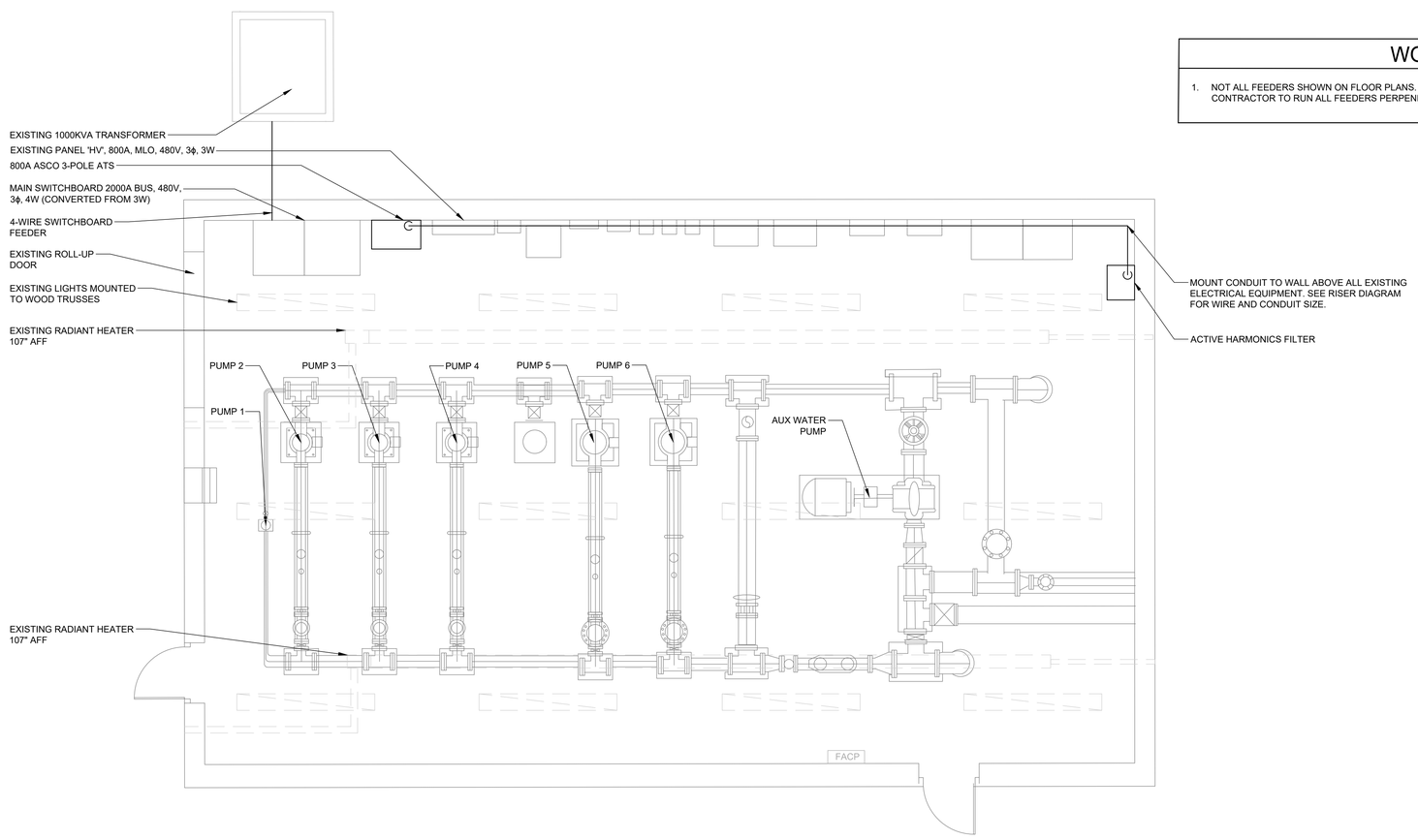
P:\2009\09190-UCONN MEP On-Call\700 - High Head Emergency System\108\0-Current\ED-100
June 6, 2018



1 E-100 HIGH HEAD PUMP STATION ELECTRICAL PLAN
SCALE: 1/4" = 1'-0"
4' 2' 0 4'

WORK NOTES

1. NOT ALL FEEDERS SHOWN ON FLOOR PLANS. REFER TO RISER DIAGRAM ON SHEET E-200 FOR ALL FEEDERS. CONTRACTOR TO RUN ALL FEEDERS PERPENDICULAR OR PARALLEL TO BUILDING LAYOUT.



2 E-100 TOWER LOOP PUMP STATION ELECTRICAL PLAN
SCALE: 1/4" = 1'-0"
4' 2' 0 4'

CERTIFICATION:

STATUS:
CONSTRUCTION DOCUMENTS

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SHEET TITLE:
ELECTRICAL FLOOR PLANS
SHEET:
E-100
SHEET: 6 of 9

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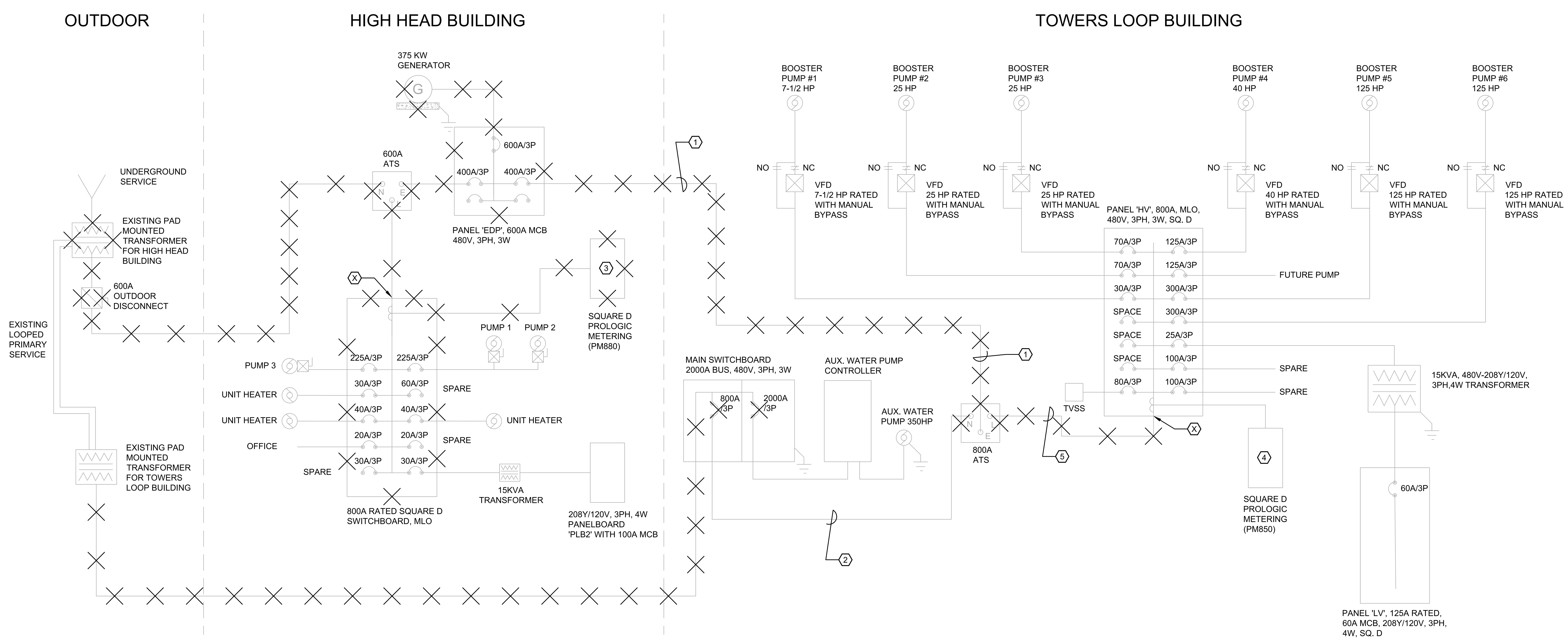
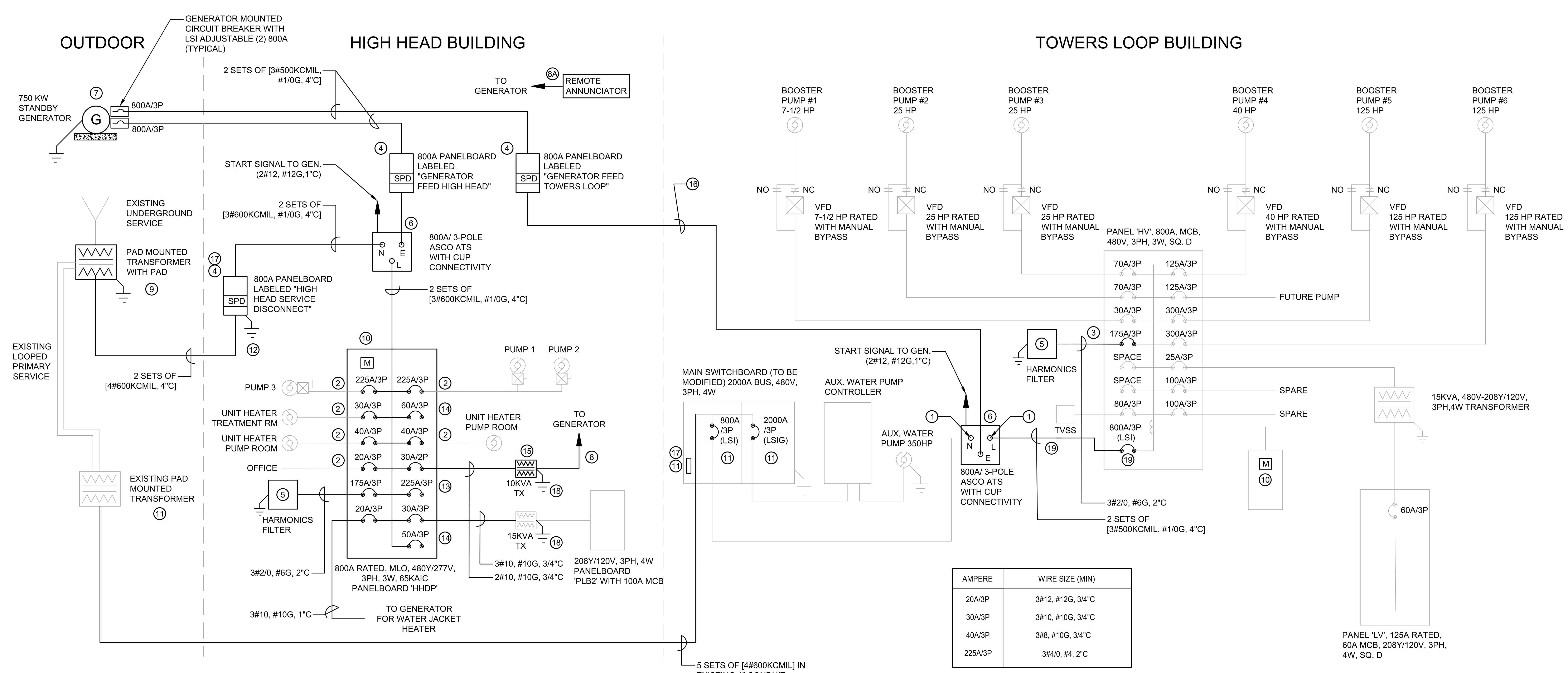
P:\2009\09190-UCONN MEP On-Call\700 - High Head Emergency System\108\0-Current\E-100
June 6, 2018



1 E-200 EXISTING ELECTRICAL RISER DIAGRAM FOR HIGH HEAD AND TOWER LOOP PUMP STATIONS
SCALE: N.T.S.



AMPERE	WIRE SIZE (MIN)
20A/3P	3#12, #12G, 3/4"C
30A/3P	3#10, #10G, 3/4"C
40A/3P	3#8, #10G, 3/4"C
225A/3P	3#4/0, #4, 2"C

2 E-200 PROPOSED ELECTRICAL RISER DIAGRAM FOR HIGH HEAD AND TOWER LOOP PUMP STATIONS
SCALE: N.T.S.

DEMO GENERAL NOTES

ALL DEMOLITION TO BE DONE IN PHASES. REFER TO LOGISTIC NOTES ON SHEET E-001 FOR MORE INFORMATION.

DEMO WORK KEYED NOTES

1. EXISTING CONDUIT TO REMAIN FOR NEW WORK PHASE. ONLY WIRE TO BE REMOVED.
2. REMOVE UNUSED NEUTRAL WIRE FROM SWITCHBOARD TO ATS.
3. REMOVE EXISTING SQUARE D PROLOGIC METERING CABINET INCLUDING ALL WIRING AND CONDUIT ASSOCIATED IN THEIR ENTIRETY.
4. REMOVE EXISTING SQUARE D PROLOGIC METERING (TO BE UPGRADED). EXISTING WIRING AND CONDUIT TO BE REUSED.
5. REMOVE ENTIRE FEEDER.

X. CONNECTION POINT FOR TEMPORARY GENERATOR CABLES

GENERAL NOTES

ALL WORK TO BE DONE IN PHASES. REFER TO LOGISTIC NOTES ON SHEET E-001 FOR MORE INFORMATION.

KEYED WORK NOTES

1. CONTRACTOR TO RECONNECT EXISTING ELECTRICAL CONNECTION. PROVIDE JUNCTION BOX OR WIRE TROUGH AS REQUIRED.
2. CONTRACTOR TO UTILIZE A WALL MOUNTED JUNCTION BOXES MOUNTED ABOVE EXISTING WIREWAY TO SPLICE AND EXTEND EXISTING PUMP, HEATER, AND OTHER FEEDERS TO PANELBOARD 'HHDP'. SEE WIRE SIZE TABLE FOR SIZING.
3. CONTRACTOR TO INSTALL 175A/3P CIRCUIT BREAKER IN EXISTING SQUARE D PANELBOARD 'HV' IN AVAILABLE SPACE AND WIRE TO HARMONICS FILTER. SEE FLOOR PLANS FOR LOCATION AND ROUTING.
4. 800A, 3PH, 4W, 65KAIC PANELBOARD. SQUARE D "I-LINE HCP-SU" OR APPROVED EQUAL WITH 800A/3P MCB, SUBFEED LUG KIT, AND 60A/3P CB FOR SPD WITH PEAK SURGE RATING/ PHASE OF 240KA.
5. PROVIDE AND INSTALL ACTIVE HARMONIC FILTER BY FLOW TECH INC. MODEL # ALC150A01H0100 WITH #HGAF01E1 FLOOR STAND OR ENGINEER APPROVED EQUAL. GROUND FILTER IN ACCORDANCE WITH NEC ARTICLE 250.
6. RECONNECT LOW VOLTAGE WIRING TO NEW ASCO ATS(S).
7. 750KW, 480Y/277V, 3PH, 3W, SEPARATELY DERIVED GENERATOR SET WITH OUTDOOR ENCLOSURE MOUNTED ON CONCRETE PAD. PROVIDE STAIRS AND WALKWAY AS SHOWN ON SITE PLAN FOR ACCESS TO ELEVATED CONTROLS.
8. PROVIDE (1) DEDICATED 30A-2P CIRCUIT TO FACTORY INSTALLED LOAD CENTER MOUNTED IN GENERATOR ENCLOSURE FOR RECEPTACLE, BATTERY HEATER, AND BATTERY CHARGER- 3#6, #6G, 1"C.

8A. PROVIDE (1) 12/2 STRANDED CABLE (FUEL AND OIL RESISTANT) AND (1)-16/3 STRANDED SHIELDED TWISTED TRIAD (FUEL AND OIL RESISTANT) IN 1"C FOR REMOTE ANNUNCIATOR (LOCATION SHOWN ON PLANS) TO GENERATOR.

9. REFER TO DETAILS FOR MORE INFORMATION ON TRANSFORMER PAD. PROVIDE TRANSFORMER GROUNDING RING.
10. CONTRACTOR TO PROVIDE INTEGRAL SMART CELL ASSEMBLY (LISTED BELOW) FOR PM5560 METERING WITH CTS, SHORTING BLOCKS, DISPLAYS, ETHERNET COMM. CARDS, RS485 SERIAL PORT, ETC. AND TO CONFIGURE THE PM5560 METER SETUP FOR 4 WIRE AND TO COORDINATE ONE DAY OF SQUARE D POWER SOLUTIONS APPLICATION ENGINEER TO MAKE THE CHANGES IN THE PME SOFTWARE AND UPDATE THE GRAPHICS IF NEEDED. CONTRACTOR TO RUN (1) CAT5 CABLE FROM METER TO TELECO BACKBOARD IN 3/4"C.

    HIGH HEAD MODEL #: ICWL263X5563
    TOWERS LOOP MODEL #: 9761E5560R1Z W/ I/0 WIRED OUT TO TERMINAL STRIPS

11. INSTALL 4-WIRE SECONDARY FEEDER FROM TRANSFORMER TO SWITCHBOARD WITH NEW CABLE LUG CONNECTIONS TO TRANSFORMER. REWORK SWITCHBOARD TO PROVIDE (1) 800A LSI AND (1) 2000A R-FRAME 6.0P LSIG TRIP UNIT WITH THE FOLLOWING FOR EACH BREAKER: CIRCUIT BREAKER COMMUNICATION MODULE, NEUTRAL CURRENT TRANSFORMER, AND ERMS MATERIAL KIT. LABEL SWITCHBOARD AS "3PH, 4W, WITH SERVICE ENTRANCE BONDING". INCLUDE SQUARE D SERVICE TECHNICIAN VISIT.
12. CONTRACTOR TO GROUND SERVICE TO NEW OUTDOOR GROUND RODS (1#3/0 COPPER IN 1"C TO (2) 3/4" X 10' STEEL COPPERCLAD DRIVEN GROUND RODS), EXISTING WATER MAIN (LOCATION SHOWN ON DRAWINGS), AND BUILDING STEEL.
13. SPARE 225A/3P CIRCUIT BREAKER FOR FUTURE PUMP 4.
14. SPARE CIRCUIT BREAKER.
15. MINI-UNIT SUBSTATION WITH INTEGRAL TRANSFORMER. 10KVA, 480V-120/240V, SINGLE PHASE, WALL MOUNTED TO BACKBOARD, WITH (1) 30A/2P (FOR GENERATOR), (1) 20A/1P FOR WORK OUTLET MOUNTED TO BACKBOARD WITH 2#12, #12G, 3/4"C , AND (5) 20A/1P SPARE CIRCUIT BREAKERS.
16. PULL WIRE IN EXISTING CONDUIT. 2 SETS OF [3#600KCMIL, #1/0G, 4"C]. MOUNT 800A DISCONNECT WHERE EXISTING (2) 4" CONDUITS PENETRATE HIGH HEAD WALL. CONTRACTOR TO UTILIZE A PULLBOX IF DISCONNECT CANNOT BE LOCATED IN SAME LOCATION AS CONDUITS.'
17. A SIGN SHALL BE PLACED AT THE SERVICE-ENTRANCE EQUIPMENT THAT INDICATES THE TYPE AND LOCATION OF ON-SITE OPTIONAL STANDBY POWER SOURCES.
18. CONTRACTOR TO GROUND TO BUILDING STEEL WITH #10AWG. (TYPICAL)
19. CONTRACTOR TO RETROFIT EXISTING PANELBOARD 'HV' TO HAVE AN 800A/3P MAIN CIRCUIT BREAKER. MODEL# PGA36080U41A WITH LSI FUNCTIONS. REMOVE TOP (2) EXISTING PLASTIC FILLERS AND INSTALL MCB AT TOP OF EXISTING BOARD. CONTRACTOR TO EXTEND EXISTING CABLES FROM ATS TO MCB LOCATION IN PANELBOARD.

CERTIFICATION:

STATE OF CONNECTICUT GRAHAM CURTIS No. 15805 LICENSED PROFESSIONAL ENGINEER

STATUS: CONSTRUCTION DOCUMENTS

CONSULTANT:

DTC
2321 Whitney Avenue - Hamden Center II - Hamden CT 06518
Ph: 203 239 4200 Fax: 203 234 7376
www.teamdtc.com

REVISIONS:

MARK	DATE	DESCRIPTION
O	6/6/18	CONSTRUCTION DOCUMENTS
1	8/29/18	FINAL CONSTRUCTION DOCUMENTS

UNIVERSITY OF CONNECTICUT
FACILITIES OPERATIONS & BUILDING SERVICES
25 LEDOYT ROAD UNIT 3252
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (xxx)xxx-xxxx
FACSIMILE: (xxx)xxx-xxxx

PROJECT:

HIGH HEAD GENERATOR SYSTEM
Facilities Operations and Building Services
25 Ledoyt Rd.
Unit 3252, Storrs, CT 06269

PROJECT NO: LL170420
WORK ORDER NO:
FILE NAME: P:\2009\09190-UCONN MEP ON-CALL\700 - HIGH HEAD EMERGENCY SYSTEM\108\0-CURRENT\E-001
AUTHOR: BP
DRAFTER: BP
SCALE: As Noted
PRINT DATE: 8-29-2018
SHEET TITLE:

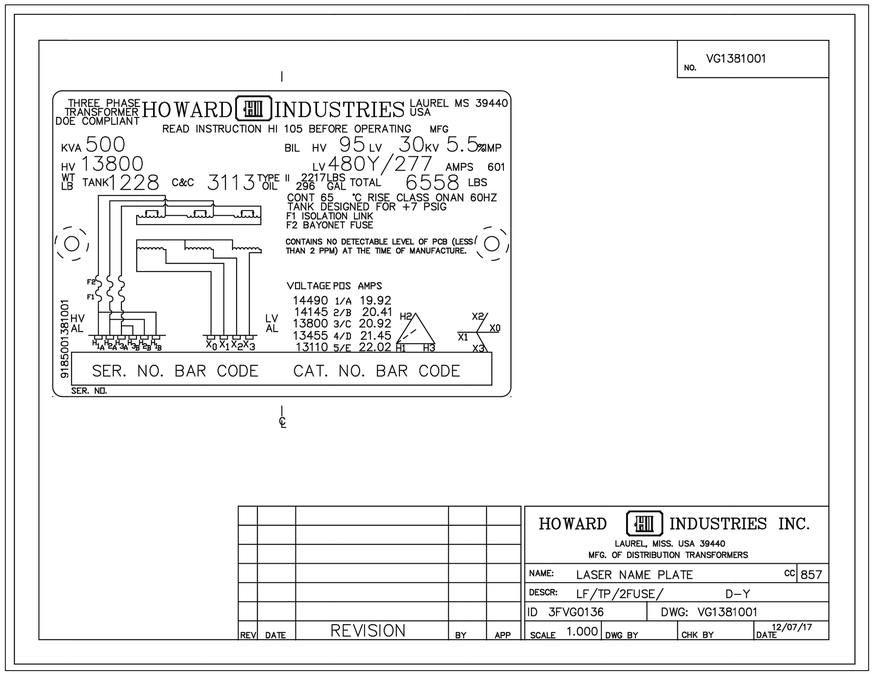
ELECTRICAL RISER DIAGRAMS

SHEET:

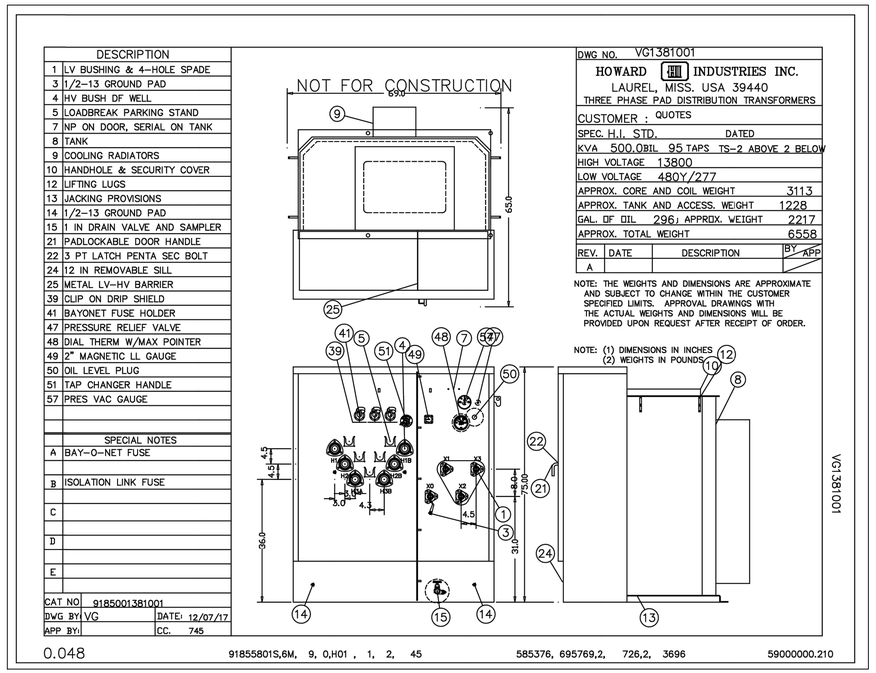
E-200

SHEET: 7 of 9

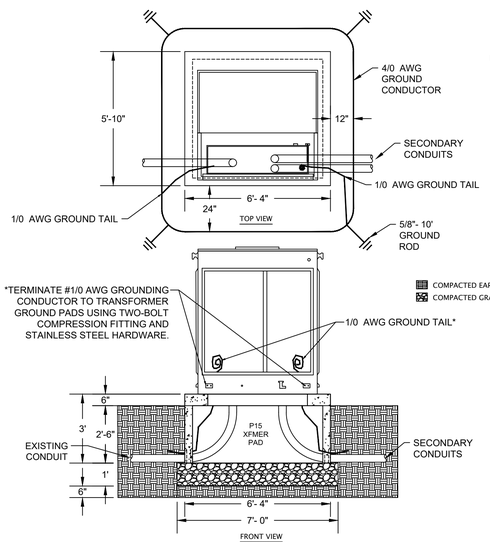
brian.poetl
P:\2009\09190-UCONN MEP On-Call\700 - High Head Emergency System\108\0-Current\E-001
August 29, 2018



1 E-300 500KVA TRANSFORMER DETAILS
NOT TO SCALE



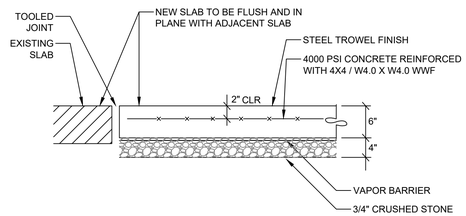
2 E-300 500KVA TRANSFORMER DETAILS
NOT TO SCALE



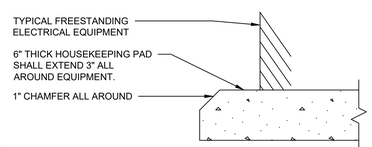
NOTES:
A) TRANSFORMER FOUNDATION.
1. THE FOUNDATION SHALL COMPRISE OF A PRECAST CONCRETE PAD, 76"x70"x36" WITH A MINIMUM STRENGTH OF 5000PSI, 28 DAYS.
2. THE REINFORCING - ASTM A-615, GRADE 60
3. THE FOUNDATION SHALL BE INSTALLED WITH THE TOP SURFACE APPROXIMATELY 6" ABOVE FINAL GRADE, ON A FIRM, LEVEL AND COMPACTED BASE OF 12" OF CRUSHED STONE.

B) GROUNDING AND BONDING
1. THE SYSTEM SHALL BE SOLIDLY GROUNDED.
2. TWO COPPERWELD GROUND RODS AND A #4/0 BARE COPPER GROUND GRID SHALL BE INSTALLED AND CONNECTED AS SHOWN.
3. THE GROUND GRID TAILS SHALL BE BROUGHT BELOW GRADE INTO THE FOUNDATION WINDOW AS SHOWN.
4. EACH END SHALL HAVE SUFFICIENT LENGTH TO CONNECT TO THE TRANSFORMER TANK GROUND PAD. THIS REQUIRES A MINIMUM OF 48" ABOVE FINISHED GRADE.
5. THE GROUND RODS, GROUND GRID, PRIMARY NEUTRALS, TRANSFORMER TANK AND AND METAL CONDUITS SHALL ALL BE EFFECTIVE BONDED TOGETHER. GROUNDING AND BONDING OF NEUTRAL TO ORIGINATE AT THE MAIN SERVICE ENTRANCE LABELED PANELBOARD LOCATION.
6. GROUND ROD / GROUND GRID CONNECTORS MUST BE TIGHTENED UNTIL THE BOLT HEAD SHEARS IN ORDER FOR THE CONNECTION TO BE EFFECTIVE.

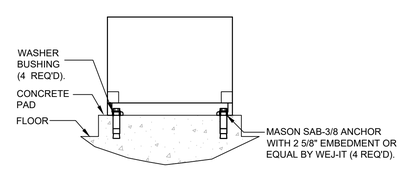
3 E-300 CONCRETE PAD DETAIL FOR PHASE-THREE TRANSFORMER (P-15) AND GROUNDING
N.T.S.



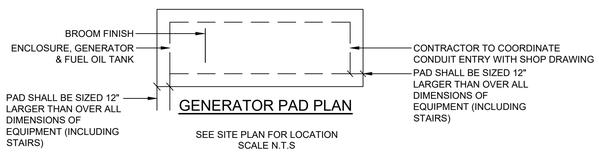
4 E-300 CONCRETE SLAB (INTERIOR)
NOT TO SCALE

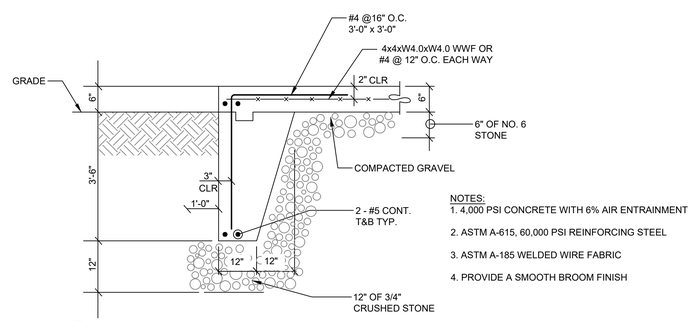


5 E-300 HOUSEKEEPING PAD DETAIL
NOT TO SCALE



6 E-300 EQUIPMENT HOUSEKEEPING PAD MOUNTING DETAIL
NOT TO SCALE





7 E-300 GENERATOR & FUEL TANK CONCRETE EQUIPMENT PAD (EXTERIOR)
NOT TO SCALE

CERTIFICATION:
STATE OF CONNECTICUT ABRAHAM GOLDMAN No. 18806 LICENSED PROFESSIONAL ENGINEER
STATUS:
CONSTRUCTION DOCUMENTS

CONSULTANT:
DTC
2321 Whitney Avenue - Hamden Center II - Hamden CT 06518
Ph: 203 239 4200 Fax: 203 234 7376
www.teamdtc.com

REVISIONS:

MARK	DATE:	DESCRIPTION
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1	8/9/18	FINAL CONSTRUCTION DOCUMENTS

UNIVERSITY OF CONNECTICUT
FACILITIES OPERATIONS & BUILDING SERVICES
25 LEDOYT ROAD UNIT 3252
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (xxx)xxx-xxxx
FACSIMILE: (xxx)xxx-xxxx

PROJECT:
HIGH HEAD GENERATOR SYSTEM
Facilities Operations and Building Services
25 Ledoyt Rd.
Unit 3252, Storrs, CT 06269

PROJECT NO: LL170420
WORK ORDER NO:
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AUTHOR: BP
DRAFTER: BP
SCALE: As Noted
PRINT DATE: 8-29-2018
SHEET TITLE: ELECTRICAL DETAILS
SHEET: E-300
SHEET: 8 of 9

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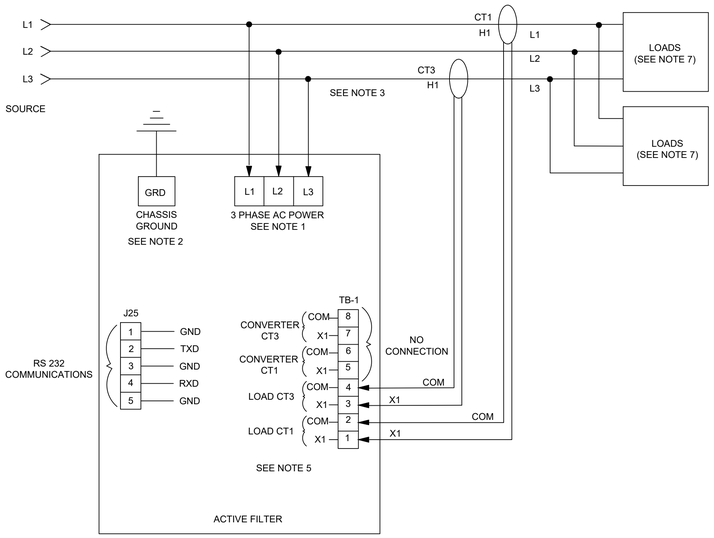
P:\2009\09190-UCONN MEP On-Call\700 - High Head Emergency System\100\0-Current\E-001
August 29, 2018



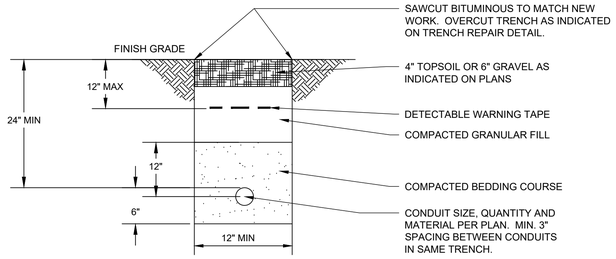
CHASSIS SIZE	POWER TERMINALS		
	BREAKER IC	WIRE SIZE	TORQUE IN - LBS (NM)
150 TO 200 AMP	25 TO 100 kA	6 AWG - 350 MCM	274 (31)
150 TO 200 AMP	NONE	6 AWG - 350 MCM	274 (31)
CONTROL TERMINALS	WIRE SIZE 28 TO 14 AWG TORQUE 4.4 IN-LB (.5 NM)		

GROUND LUG.

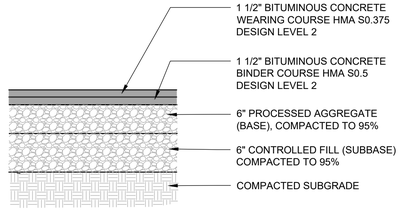
WIRE SIZE (AWG)	RATED TORQUE (IN - LBS)
2/0 -3	50
4-6	45
8	40
10-14	35

NOTES:
1) WIRING SHOULD BE 75 DEGREES CELSIUS OR HIGHER INSULATED COPPER, WITH THE APPROPRIATE VOLTAGE AND CURRENT RATING.
2) CHASSIS GROUND MUST BE CONNECTED TO THE GROUND OF THE PREMISES WIRING SYSTEM, IN ACCORDANCE WITH NEC AND LOCAL CODES. CONNECTION MUST BE MADE USING A WIRE CONDUCTOR.
3) CUSTOMER IS RESPONSIBLE FOR BRANCH CIRCUIT PROTECTION.
4) TERMINAL J25 WIRE RANGE IS 30-12 AWG, TIGHTENING TORQUE IS 4.4 IN-LB (.5 NM).
5) OPERATING CURRENT TRANSFORMERS WITH THE SECONDARY WINDING OPEN CAN RESULT IN A HIGH VOLTAGE ACROSS THE SECONDARY TERMINALS WHICH MAY BE DANGEROUS TO PERSONNEL OR EQUIPMENT.
6) CURRENT TRANSFORMERS SHOULD BE CENTERED AROUND CONDUCTOR.
7) LOAD(S) HAVE AN INTEGRAL 5% LINE REACTANCE OR EQUIVALENT DC BUS CHOKE TO OPTIMIZE ACTIVE FILTER UTILIZATION, CONSULT TCI FOR ACTIVE FILTER CAPACITY WITH LESS THAN 5%.
8) SOURCE CT'S ARE CUSTOMER INSTALLED AND EXTERNAL TO THE ACTIVE FIBER.

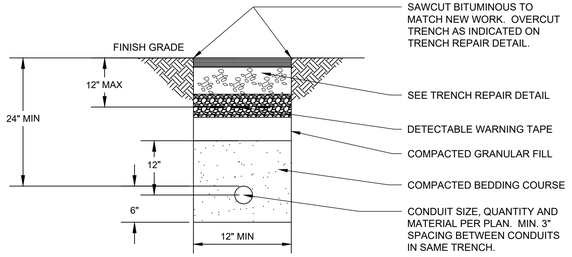
1 E-301 ACTIVE HARMONICS FILTER WIRING DIAGRAM - LOAD SIDE CT PLACEMENT
NOT TO SCALE



2 E-301 CONDUIT INSTALLED IN GRASS / GRAVEL AREAS
NOT TO SCALE

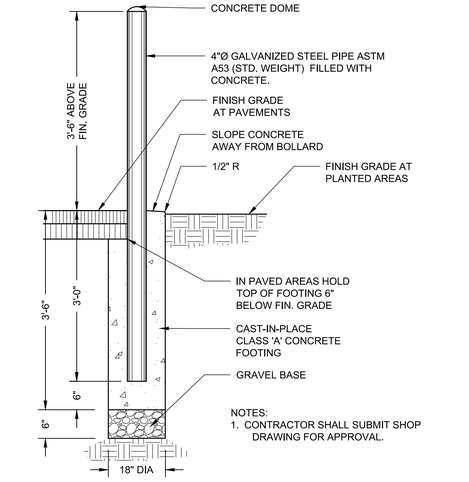


3 E-301 FULL DEPTH BITUMINOUS CONCRETE PAVEMENT SECTION
NOT TO SCALE



NOTES:
1. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.

4 E-301 CONDUIT INSTALLED IN BITUMINOUS
NOT TO SCALE

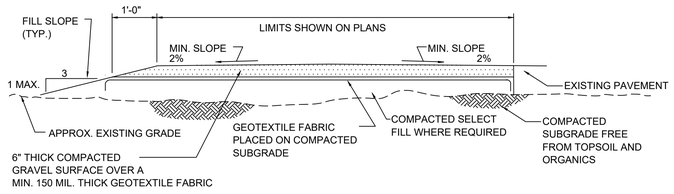


NOTES:
1. CONTRACTOR SHALL SUBMIT SHOP DRAWING FOR APPROVAL.

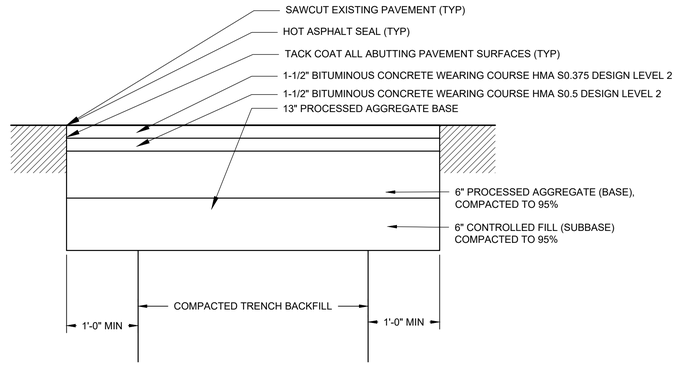
5 E-301 STEEL BOLLARD
NOT TO SCALE

GRAVEL SURFACE TREATMENT NOTES:

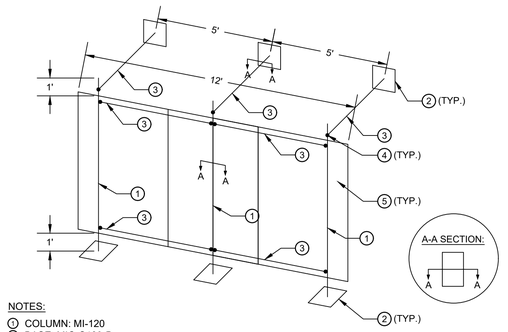
1. GEOTEXTILE FABRIC SHALL HAVE A MINIMUM 150 MIL THICKNESS.
2. GRAVEL MATERIAL SHALL BE AN EVENLY GRADED MIXTURE OF PROCESSED CRUSHED STONE WITH 100% PASSING THROUGH A 1-1/2" SIEVE AND NOT MORE THAN 5 PERCENT PASSING A NO. 4 SIEVE.
3. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.



6 E-301 GRAVEL SURFACE TREATMENT
NOT TO SCALE



7 E-301 TRENCH REPAIR DETAIL
NOT TO SCALE



NOTES:
1. COLUMN: MI-120
2. BASE: MIC-C120-D
3. GIRDER: MI-120
4. TYPICAL CONNECTION: MI-120-U
5. 1/4" THICK ALUMINUM 1100 PLATE (OR ENGINEER APPROVED EQUAL) : 4' X 8'. FASTEN TO HORIZONTAL GIRDERS AT 12" O.C.

BASIS OF DESIGN IS HILTI MI SYSTEM. ALL FASTENERS PER HILTI PUBLISHED RECOMMENDATIONS. CONTRACTOR TO SUBMIT SHOP DRAWINGS OF ENTIRE SYSTEM WITH EQUIPMENT LAYOUT DESIGN BEFORE FABRICATION.

ADHESIVE FOR MASONRY WALL: HY-70.
ADHESIVE FOR CONCRETE: HY-200

8 E-301 ALUMINUM BACKBOARD DETAIL
NOT TO SCALE

CERTIFICATION:

STATE OF CONNECTICUT GRAHAM C. SMITH No. 18005 LICENSED PROFESSIONAL ENGINEER

STATUS:
CONSTRUCTION DOCUMENTS

CONSULTANT:

DTC
2321 Whitney Avenue - Hamden Center II - Hamden CT 06518
Ph: 203 239 4200 Fax: 203 234 7376
www.teamdtc.com

REVISIONS:

MARK	DATE:	DESCRIPTION
0	6/6/18	CONSTRUCTION DOCUMENTS
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UNIVERSITY OF CONNECTICUT
FACILITIES OPERATIONS & BUILDING SERVICES
25 LEDOYT ROAD UNIT 3252
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (xxx)xxx-xxxx
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Facilities Operations and Building Services
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AUTHOR: BP
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ELECTRICAL DETAILS

SHEET:
E-301

SHEET: 9 of 9

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P:\2009\09190--UCONN MEP On--Call\700 -- High Head Emergency System\108\0--Current\E--001
August 29, 2018

UCONN | UNIVERSITY OF CONNECTICUT

Capital Projects and Contract Administration
Planning, Architectural and Engineering Services

HOURLY LABOR RATE WORKSHEET

This worksheet is to be completed by the contractor or the subcontractor to calculate the hourly labor rate to be included in the contract documents for change order work (refer to 'Change Orders' in contract General Conditions for further information). All fields highlighted in pale yellow require completion, and fields highlighted in pale blue will automatically populate. Refer to tab "Instructions" for additional guidance on how to complete the form.

PROJECT NAME:		**PROJECT NO.:**	
CONTRACTOR / SUBCONTRACTOR:		**DATE:**	
TRADE:		**CLASSIFICATION:**	

Item	Benefit Paid Cash	Benefit Provided	Percent Rate	Wage Rate Calculation: Regular Time	Overtime	Double Time	Notes
	(put X in appropriate box)						
Base Labor Rate					$ -	$ -	*Use certified payroll to verify, if applicable*
Fringe Benefits: [1]							
Medical / Health [1]					-	-	
Pension / Ret [1]					-	-	
Life Insurance [1]					-	-	
Disability [1]					-	-	
Vacation/Holiday [1]					-	-	
Union Fund Costs [1]					-	-	
OT Fringe Cost [1]							
Fringe Benefits Subtotal				$ -	$ -	$ -	
Total Wage Hourly Rate				$ -	$ -	$ -	*= Base Labor Rate + Fringe Benefit Subtotal*
Benefits Paid Cash				$ -	$ -	$ -	
Total Cash Hourly Rate				$ -	$ -	$ -	*= Base Labor Rate + Benefits Paid Cash*
Burden: Taxes & Insurance [2]							
Social Security			6.20%	-	-	-	*Rate verified annually*
Medicare			1.45%	-	-	-	*Rate verified annually*
Federal Unemployment (FUTA) [3]				-	-	-	*See Instructions for Sample Calculation*
State Unemployment (SUTA) [3]				-	-	-	*See Instructions for Sample Calculation*
Workers Compensation [3]				-	-	-	*See Instructions for Sample Calculation*
Burden Subtotal				$ -	$ -	$ -	
Other (GL insurance, travel, safety, indirect labor, small tools, parking, training, non-hourly union expense, etc.)				N/A	N/A	N/A	*Included in OH&P per AIA 201*
TOTAL HOURLY RATE (Total Hourly Rate + Burden):				$ -	$ -	$ -	

Note: For change order work, mark-ups for overhead and profit shall be applied to the Total Hourly Rate above in accordance with the provisions within AIA 201 General Conditions, under 'Change in the Work'. The Total Hourly Rate, including the various components, are subject to audit and may be adjusted, with due process, based on the outcome of these procedures.

[1] Fringe Benefits must be exclusive of overhead and profit, and must be supportable by certified payroll, if applicable. Place an "X" in column "Benefit Paid Cash" if appropriate. Union jobs may have certain allowable costs on an hourly basis in excess of standard employee benefits; utilize "Union Fund Costs" for these instances. On rare occasions, certain unions have increased fringe costs when overtime / double time are incurred; utilize "OT Fringe Cost" to capture these situations; otherwise leave these cells blank.

[2] Tax & Insurance Burden is applied to the Total Cash Hourly Rate, which includes Base Labor Rate plus Benefits Paid Cash. Refer to instructions for additional information and assistance with completing this section.

[3] SUTA, FUTA & WCI rates which received an adjustment within the instruction page require justification; the adjustment and justification are reiterated below:

Adjustment to Rate: **SUTA 0.00%** **FUTA 0.00%** **WCI -**

By signing below, the submitter certifies and declares under penalty of perjury under the laws of the State of Connecticut that the foregoing is true and correct.

Rates certified by: _____ (print name) Company Name: _____

Signature: _____

HOURLY LABOR RATE WORKSHEET INSTRUCTIONS

UCONN | UNIVERSITY OF CONNECTICUT

Capital Projects and Contract Administration
Planning, Architectural and Engineering Services

The following instructions provide guidance and assistance in completing the Hourly Labor Rate Worksheet (HLRW). Where practical, additional instruction and drop-down lists have been included in the HLRW in specific fields. Data should be entered into all fields highlighted in pale yellow; all fields highlighted in pale blue will automatically populate and are locked for editing. Required fields in these instructions are indicated by "**" and are highlighted in pale red. Once accepted by the University, the resulting Total Hourly Rates at the bottom of the HLRW are the labor rates that should be used on all change order requests when labor hours are broken out.

These instructions contain sample calculations to assist in the determination of acceptable rates for FUTA, SUTA and Workers' Compensation Insurance (WCI). These calculations are *not* to be submitted with the HLRW, and the HLRW is *not* linked to the rate determined by the sample calculation; however a brief rationale to document a departure from the sample calculation is required within the relevant section below (refer to pale red fields). The rationale and the amount of departure from the sample calculation *is* included on the HLRW via electronic linking, and is attested to by the signor.

General Information Section:
Complete the basic information requested, noting the following: a) the form may be completed by the contractor or sub-contractor, if applicable; however the company and individual signing the document are responsible for the content provided, including errors and / or omissions; b) the trade selected should agree with the contractor's workers' compensation policy; c) if multiple worker classifications are applicable to this project, select the classification that best describes the labor rate from the options provided and prepare additional rate sheets for the other classifications. General Foreman classification is intentionally excluded from the listing as this management position is included within overhead and profit.

Wage Rate Calculation Section: Comprised of Base Labor Rate, Fringe Benefits and Burden on these costs. Refer to the following sections for further detail.

Base Labor Rate: This rate **should agree with the certified payroll**, if applicable, and is often the prevailing wage or union wage rate. For non-rate / non-union projects, the rate must be a reasonable blend of the workers performing the trade work.

Fringe Benefits: The total of the Fringe Benefit column should match the total of the fringe benefits from the prevailing wage or union wage agreements, **should agree with certified payroll**, and often can come directly from the Collective Bargaining Agreement, if applicable. The categories listed in the HLRW detail the various types of benefits and are consistent with the certified payroll form; however the fringe category 'other' is narrowly defined on the HLRW as certain hourly union related costs. This line would include amounts that, combined with the other fringe categories, comprise the total package for the union agreement. Other costs commonly identified as 'other', such as training and/or safety, are components of overhead and profit, and are excluded from the hourly labor rate.

Burden: Burden includes Taxes and Workers' Compensation Insurance (WCI).

Taxes: Taxes are comprised of FICA, SUTA and FUTA (described in greater detail below). The employer portion of FICA taxes (combination of Social Security and Medicare taxes) are hardcoded into the form and contractors are reimbursed 100% for this tax burden. The rates for SUTA and FUTA are to be entered by the contractor utilizing the following information / calculation:

SUTA (a.k.a. State Unemployment Tax): Paid by the employer; imposed on the first $15K of annual earnings only, at a variable rate determined by the Department of Labor for each employer.

FUTA (a.k.a. Federal Unemployment Tax): Paid by the employer; imposed on the first $7K of annual earnings only, at a constant rate for all employers nationally, plus a potential incremental rate linked to State borrowings from the Federal Unemployment Fund (a.k.a. Credit Reduction).

The calculations below are based on an averaging methodology, which is an allowable technique to determine an appropriate tax rate for the burden of SUTA and FUTA taxes. Due to the timing of the tax burden, where the majority of the cost is typically incurred in the first quarter of a calendar year, and special SUTA assessments, which are periodically issued from the Department of Labor, an adjustment field has been included to tailor the average rate to the specific needs of the contractor. Any adjustments must be supportable and the total tax rate can not exceed the statutory maximum rate. All adjustments require a rationale to be provided on these instructions, and the adjustment and the rationale are included on the HLRW automatically, which are being attested to by the signor. For convenience, the most common rationales can be selected from a drop down list. The Total Rate for both SUTA and FUTA will need to be populated in the appropriate cell in the HLRW - the HLRW will not automatically update based on the calculations below.

	SUTA		FUTA	
Total Payroll:			-	
Tax Paid:				
Average Rate:	0.00%		0.00%	
Adjustment to Rate:**				
Total Rate:	0.00%	Manually populate this rate on HLRW	0.00%	Manually populate this rate on HLRW
Rationale for Adjustment:**				

Workers' Compensation Insurance: WCI is based upon several factors, and is primarily composed of the Trade Rate, based on the type of work the Contractor performs, and the firm's Experience Modification Rating (EMR), which is based on the Contractor's specific claim history. The Trade Rate is statutorily mandated and can be derived directly from the WCI policy premium calculation provided by the insurance company. To reward Contractors with a low EMR or that have earned other discounts on their WCI policy, the Trade Rate used on the HLRW will not be adjusted lower than the rate incurred by the Contractor, which would effectively reduce the labor rate for these earned discounts. However, to properly compensate Contractors that incur additional WCI premiums for higher EMR's, or pay other adjustments to their premiums, an adjustment field has been provided to capture these increases in WCI cost. *This adjustment field should only be used if the net of all adjustments to the policy premium results in higher premium charges.* Once the combined WCI rate has been determined, populate the appropriate cell in the HLRW - the HLRW will not automatically update based on the calculations below.

WCI Trade Rate:			
Adjustment to Rate:**		**Rationale for Adiustment**:**	
Combined WCI Rate:	0.00%	Manually populate this rate on HLRW	