

PROPOSAL SUMMARY FOR **ELECTRONIC BIDDING** AIRPORT WORK

Wisconsin Department of Transportation, Bureau of Aeronautics, Wis. Stat. §66.0901(7) (1971)

Owner
City of La Crosse

Airport Name
La Crosse Regional Airport

Project ID
LSE1019
AIP 3-55-0030-XX

This **ELECTRONIC** Bid Proposal as submitted via **Bidexpress.com**, to the Secretary of Transportation as agent for the owner, represented by the Bureau of Aeronautics, is submitted by the authorized bidder in accordance with the "Advertisement for Bids." The bidder is to furnish and deliver all materials, and to perform all work for the improvement of the designated project in the time specified, in accordance with the appended "Proposal Requirements and Conditions."

| | |
|--|--|
| <p>Bid Proposal Guarantee Required, 5 Percent of Total Amount Bid, by Bid Bond or Certified Check Payable to: Wisconsin Department of Transportation.</p> | <p>This Contract is being Electronically Bid through E-Bidding services provided by Bidexpress.com</p> <p>https://bidexpress.com/businesses/51671/home</p> |
| <p>Bid Submittal Due: Bidexpress.com prior to deadline below</p> <p>Date: February 26, 2026</p> <p>Time (Local Time): 2:00 pm</p> <p>Place Of E-Bid Opening:</p> <p>Microsoft Teams meeting Meeting ID: 273 385 397 96 Passcode: tLjwfv</p> <p>Or Dial in by phone (audio only) +1 608-571-2209 Phone Conference ID: 186 780 348#</p> | |
| <p>Contract Completion Time: 90 Calendar Days</p> | |
| <p>Assigned Disadvantaged Business Enterprise Goal: None Assigned</p> | |

The necessary components to submit a complete bid for this proposal can be found at **Bidexpress.com**. Any bid submitted indicated as incomplete after the close of bids will not be opened (electronically unsealed) and/or rejected.

Submission of a bid requires obtaining digital ID through Bidexpress.com and appropriate fee for submission per the contract documents.

Please see the special provisions and advisory notice to bidders, for additional information to properly complete and submit the Electronic bid proposal.

Submittal of the Electronic bid proposal with the digital ID certifies the following:

This certifies that the bidder Digital ID submitter is duly sworn, is an authorized representative of the firm named above; that the bidder has examined and carefully prepared the bid from the drawings and specifications and has checked the same in detail before submitting this bid proposal; and that the bidder or agents, officer, or employees have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this bid proposal.

Type of work: **Terminal Generator** New dual fuel gas engine (natural gas and propane) generator installed in winterized, outdoor enclosure on new concrete foundation to serve terminal building; two (2) new automatic transfer switches (ATSSs); add positioning functions for PBB's 2 and 3 to new generator system to enable passenger to deplane into terminal during utility power outage; new feeders from outdoor generator to ATSSs, branch circuits to generator set ancillaries (coolant heater, oil heater, battery heater, lights, GFCI receptacle); trenching for new direct buried conduit bedding and placement, new remote annunciator panel, new natural gas piping

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PROPOSAL REQUIREMENT AND CONDITIONS

The bidder, signing and submitting this proposal, agrees and declares as a condition thereof, to be bound by the following conditions and requirements.

The bidder declares that they have carefully examined the site of, and the proposal, plans, specifications and contract forms for the work contemplated, and it is assumed that the bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and quantities of work to be performed and materials to be furnished, and as to the requirements of the specifications, special provisions and contract. It is mutually agreed that submission of a proposal will be considered conclusive evidence that the bidder has made such examination.

The bidder submits herewith a bid bond, Certificate of Annual Bid Bond, certified, or cashier's check payable to the party as designated in the advertisement inviting proposals, to be retained by and become the property of the owner of the work in the event the undersigned fails to execute the contract and the contract bond, and return the same to the Bureau of Aeronautics within the 10 business days after having been notified in writing to do so; otherwise to be returned.

The bidder declares that they understand that the estimate of quantities in the attached schedule of prices is approximate only and that the attached quantities may be greater or less in accordance with the specifications.

The bidder agrees to perform the said work, for and in consideration of the payment of the amount becoming due on account of work performed, according to the unit prices bid in the following schedule of prices, and to accept such amounts in full payment for said work.

The bidder declares that all of the said work will be performed at their own proper cost and expense, that they will furnish all necessary materials, labor, tools, machinery, apparatus, and other means of construction in the manner provided in the approved plans and applicable specifications for the work together with all standard and special designs that may be designated on such plans, and the "Special Provisions" in the contract of which this proposal will become a part, if and when accepted. The bidder further agrees that the applicable specifications, all plans and working drawings are made a part hereof, as fully and completely as if attached hereto.

The bidder declares that if they are awarded the contract, they will execute the contract agreement; begin and complete the work within the time named herein; they will file a good and sufficient contract bond in the sum of the total amount of the contract to guarantee the successful execution of the work; and will comply with the requirements of worker's compensation according to Wis. Stat. §102 (2011).

The bidder declares that if they is awarded the contract, they will comply with the requirements of the "Special Provisions" and the applicable Wis. Stat. §66.0903 (3) (2000), relative to the maximum daily and weekly hours of employment of human labor and the Minimum Wage Rates pre-determined by the Secretary of Labor of the United States, and State of Wisconsin Department of Workforce Development for the several occupations or classifications of labor.

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BID BOND

State of Wisconsin
Department of Transportation
Bureau of Aeronautics

KNOW ALL MEN BY THESE PRESENT, that we _____ as principal, and _____ as surety, having been duly organized under the laws of the State of _____ and licensed to do business in the State of Wisconsin, are hereby held and firmly bound unto the Secretary of Transportation of the State of Wisconsin as Agent for the La Crosse County in the sum of five percent (5%) of the amount of the total bid submitted here for the payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

WHEREAS, the principal has submitted a bid for Generator under Contract No. 1 Project No. LSE1019.

NOW, THEREFORE, if the Secretary of Transportation (Secretary) accepts the bid of the principal, and the principal enters into a contract with the Secretary in accordance with the terms of such bid, and gives a bond or bonds as may be specified in the contract documents with good and sufficient surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof; or in the event of failure of the principal to enter such a contract and gives a bond or bonds, if the principal pays to the Secretary a total sum equal to five percent (5%) of his aggregate bid, or if the Secretary rejects all bids for the work described herein, then this obligation will be null and void, otherwise to remain in full force and effect; it being expressly understood and agreed that the liability of the surety for any claims hereunder will be for the full amount of the obligation as herein stated.

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

BID BOND (Con't.)

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

this _____ day of _____ 20____.

Witness _____ by:

Principal

Signature

Witness _____ by:

Surety

Address

Signature

Title

IMPORTANT: A certified copy of Power of Attorney of the signatory agent must be attached to the inside cover of the bid proposal.

CERTIFICATE OF ANNUAL BID BOND Wisconsin Department of Transportation

| |
|--|
| Time Period Valid (From/To): |
| Name of Surety: |
| Name of Contractor: |
| Certificate Holder: Wisconsin Department of Transportation |

This is to certify that an annual bid bond issued by the above-named surety is currently on file with the Wisconsin Department of Transportation.

This certificate is issued as a matter of information; conveys no rights upon the certificate holder; and does not amend, extend, or alter the coverage of the annual bid bond.

Cancellation: Should the above policy be canceled before the expiration date, the issuing surety will give thirty (30) days written notice to the certificate holder indicated above.

Signature of Authorized Contractor Representative Date

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Federal Tax Delinquency and Conviction Certification

The applicant **must complete the following two certification statements.**

The applicant **must indicate** its current status as it relates to tax delinquency and felony conviction by indicating in following spaces below the applicable response. The applicant agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification in all lower tier subcontracts.

Certifications

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

Note

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

Term Definitions

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

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

Date

Signature

Company Name

Title

NOTE: No award can be made without this form being completed.

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NOTE:

Bidders should include and submit the appropriate Buy American certification (below) with their bid submittal on federally funded (AIP) projects. No award can be made unless the Buy American Certificate has been provided in accordance with Section 20 and Section 30 of the General Provisions. Failure to submit this certification within the specified time may result in the bid being rejected.

See Federal Requirements # 5 - Buy American Preference

* * * * *

Agreement to Comply with Buy American Requirements for Total Facility

(Civil & Architectural Building projects; such as Terminal, Hangars, and for Equipment projects where labor is involved such as installation of Navigational aids)

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101 by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e. not both) by inserting a checkmark (✓) or the letter "X".

- Bidder or offeror hereby certifies that it will comply with 49 USC. 50101 by:
- a) Only installing steel and manufactured products produced in the United States; or
 - b) Installing manufactured products for which the FAA has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
 - c) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

- 1. To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
- 2. To faithfully comply with providing US domestic products
- 3. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

- The bidder or offeror hereby certifies it **cannot** comply with the 100% Buy American Preferences of 49 USC § 50101(a) but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

- 1. To submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that support the type of waiver being requested.
- 2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination may result in rejection of the proposal.
- 3. To faithfully comply with providing US domestic products at or above the approved US domestic content percentage as approved by the FAA.
- 4. To furnish US domestic product for any waiver request that the FAA rejects.
- 5. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 3 Waiver - The cost of components and subcomponents produced in the United States is more than 60% of the cost of all components and subcomponents of the "facility". The required documentation for a type 3 waiver is:

- a) Listing of all manufactured products that are not comprised of 100% US domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety)
- b) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
- c) Percentage of non-domestic component and subcomponent cost as compared to total "facility" component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

Type 4 Waiver – Total cost of project using US domestic source product exceeds the total project cost using non-domestic product by 25%. The required documentation for a type 4 waiver is:

- a) Detailed cost information for total project using US domestic product
- b) Detailed cost information for total project using non-domestic product

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date

Signature

Company Name

Title

FEDERAL REQUIREMENTS

1. GENERAL FEDERAL REQUIREMENTS

These contract provisions shall apply to all work performed by the Contract by the Contractor's own organization and with the assistance of workers under the Contractor's immediate superintendence and to all work permitted on the contract by piecework, station work, or by subcontract.

Except as otherwise provided for in each section, the Contractor shall insert in each subcontract all of the stipulations contained in these Federal Requirements, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Federal Requirements shall not be incorporate by reference in any case. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Federal Requirements.

2. ACCESS TO RECORDS AND REPORTS. (ALL CONTRACTS AND SUBCONTRACTS) (Reference: 2 CFR § 200.333, 2 CFR § 200.336 & FAA Order 5100.38)

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

3. AFFIRMATIVE ACTION REQUIREMENT (ALL CONTRACTS EXCEEDING \$10,000) - (Reference: 41 CFR part 60-4, Executive Order 11246)

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

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

Goals for minority participation for each trade (Vol. 45 Federal Register pg. 65988 10/3/80)

Goals for Minority Participation for Each Trade:

| <u>County</u> | <u>%</u> | <u>County</u> | <u>%</u> |
|---------------|----------|---------------|----------|
| Adams | 1.7 | Marathon | 0.6 |
| Ashland | 1.2 | Marinette | 1.0 |
| Barron | 0.6 | Marquette | 1.7 |
| Bayfield | 1.2 | Menominee | 1.0 |
| Brown | 1.3 | Milwaukee | 8.0 |
| Buffalo | 0.6 | Monroe | 0.6 |
| Burnett | 2.2 | Oconto | 1.0 |
| Calumet | 0.9 | Oneida | 0.6 |
| Chippewa | 0.5 | Outagamie | 0.9 |
| Clark | 0.6 | Ozaukee | 8.0 |
| Columbia | 1.7 | Pepin | 0.6 |
| Crawford | 0.5 | Pierce | 2.2 |
| Dane | 2.2 | Polk | 2.2 |

| County | % | County | % |
|---------------|----------|---------------|----------|
| Dodge | 7.0 | Portage | 0.6 |
| Door | 1.0 | Price | 0.6 |
| Douglas | 1.0 | Racine | 8.4 |
| Dunn | 0.6 | Richland | 1.7 |
| Eau Claire | 0.5 | Rock | 3.1 |
| Florence | 1.0 | Rusk | 0.6 |
| Fond du Lac | 1.0 | St. Croix | 2.9 |
| Forest | 1.0 | Sauk | 1.7 |
| Grant | 0.5 | Sawyer | 0.6 |
| Green | 1.7 | Shawano | 1.0 |
| Green Lake | 1.0 | Sheboygan | 7.0 |
| Iowa | 1.7 | Taylor | 0.6 |
| Iron | 1.2 | Trempealeau | 0.6 |
| Jackson | 0.6 | Vernon | 0.6 |
| Jefferson | 7.0 | Vilas | 0.6 |
| Juneau | 0.6 | Walworth | 7.0 |
| Kenosha | 3.0 | Washburn | 0.6 |
| Kewaunee | 1.0 | Washington | 8.0 |
| LaCrosse | 0.9 | Waukesha | 8.0 |
| LaFayette | 0.5 | Waupaca | 1.0 |
| Langlade | 0.6 | Waushara | 1.0 |
| Lincoln | 0.6 | Winnebago | 0.9 |
| Manitowoc | 1.0 | Wood | 0.6 |

Goals for female participation in each trade: 6.9%

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

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

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

3.4. As used in this notice and in the contract resulting from this solicitation, the "covered area" is defined as: The county in which each airport resides and the immediate adjacent surrounding counties.

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| <p>4. BREACH OF CONTRACT TERMS. (ALL CONTRACTS EXCEEDING \$150,000) (Reference 2 CFR § 200 Appendix II(A))</p> |
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Any violation or breach of terms of this contract on the part of the contractor or its subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement.

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

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

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| <p>5. BUY AMERICAN PREFERENCE. (ALL CONTRACTS & SUBCONTRACTS) (Reference: 49 USC § 50101)</p> |
|--|

5.1 APPLICABILITY.

The sponsor must meet the Buy American preference requirements found in 49 USC § 50101 in all AIP-funded projects that require steel or manufactured goods. The Buy America requirements flow down from the sponsor to first tier contractors, who are responsible for ensuring that lower tier contractors and subcontractors are in compliance. The Buy American preference also applies to professional service agreements if the agreement includes any manufactured product as a deliverable.

5.2 REQUIREMENTS.

The Buy American Preference requirement in 49 USC § 50101 requires that all steel and manufactured goods used on AIP projects be produced in the United States. The statute gives the FAA the ability to issue a waiver to a sponsor to use non-domestic material on an AIP funded project subject to meeting certain conditions. A sponsor may request that the FAA issue a waiver from the Buy American Preference requirements if the FAA finds that:

- 1) Applying the provision is not in the public interest;
- 2) The steel or manufactured goods are not available in sufficient quantity or quality in the United States;
- 3) The cost of components and subcomponents produced in the United States is more than 60 percent of the total components of a facility or equipment, and final assembly has taken place in the United States. Items that have an FAA standard specification item number (such as specific airport lighting equipment) are considered the equipment.
- 4) Applying this provision would increase the cost of the overall project by more than 25 percent.

5.3 NATIONAL BUY AMERICAN CONFORMANCE LIST.

The FAA Office of Airports maintains a listing of equipment that has received a nationwide waiver from the Buy American Preference requirements or that fully meet the Buy American requirements. The Nationwide Buy American Waiver List is available online at www.faa.gov/airports/aip/buy_american/. Products listed on the Buy American Conformance list do not require additional submittal of domestic content information under a project specific Buy American Preference waiver.

5.4 BUY AMERICAN CERTIFICATION

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

Bidders should include and submit the appropriate Buy American certification with their bid submittal on federally funded (AIP) projects. No award can be made unless the Buy American Certificate has been provided in accordance with Section 20 and Section 30 of the General Provisions. Failure to submit this certification within the specified time may result in the bid being rejected.

Type of Certification is based on Type of Project:

There are two types of Buy American certifications.

- For projects for a facility, the Certificate of Compliance Based on Total Facility (Terminal or Building Project) must be submitted.
- For all other projects, the Certificate of Compliance Based on Equipment and Materials Used on the Project (Non-building construction projects such as runway or roadway construction; or equipment acquisition projects) must be submitted.

6. GENERAL CIVIL RIGHTS PROVISIONS (ALL CONTRACTS)

(Reference: 49 USC § 47123)

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

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

7. CIVIL RIGHTS – TITLE VI ASSURANCES- COMPLIANCE WITH NONDISCRIMINATION REQUIREMENTS (ALL CONTRACTS)

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

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

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the **Title VI List of Pertinent Nondiscrimination Statutes and Authorities**, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.
3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor’s obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.
4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records,

accounts, other sources of information, and its facilities as may be determined by the sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:
 - a. Withholding payments to the contractor under the contract until the contractor complies; and/or
 - b. Cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the sponsor to enter into any litigation to protect the interests of the sponsor. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.
7. **Title VI List of Pertinent Nondiscrimination Acts and Authorities**
 - During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:
 - Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);
 - 49 CFR part 21 (Non-discrimination In Federally-Assisted Programs of The Department of Transportation—Effectuation of Title VI of The Civil Rights Act of 1964);
 - The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
 - Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR part 27;
 - The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
 - Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
 - The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
 - Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38;
 - The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
 - Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
 - Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination

because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

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

8. CLEAN AIR AND WATER POLLUTION CONTROL. (ALL CONTRACTS & SUBCONTRACTS OVER \$150,000) (Reference: 2 CFR § 200 Appendix II(G))

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

Contractor must include this requirement in all subcontracts that exceeds \$150,000.

9. CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS (ALL CONTRACTS & SUBCONTRACTS OVER \$100,000) (Reference 2 CFR § 200, Appendix II(E))

1. Overtime Requirements.

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

2. Violation; Liability for Unpaid Wages; Liquidated Damages.

In the event of any violation of the clause set forth in paragraph (1) above, the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 above, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) above.

3. Withholding for Unpaid Wages and Liquidated Damages.

The Federal Aviation Administration or the Sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 above.

4. Subcontractors.

The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1 through 4 of this section.

10. COPELAND "ANTI-KICKBACK" ACT (ALL CONTRACTS & SUBCONTRACTS OVER \$2,000) (Reference: 2 CFR § 200 Appendix II(D), 29 CFR § parts 3 & 5)

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

11. DAVIS-BACON REQUIREMENTS. (ALL CONTRACTS & SUBCONTRACTS OVER \$2,000)
(Reference: 2 CFR § 200 Appendix II(D), 29 CFR Part 5)

1. Minimum Wages

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

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

- (ii)
(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period

that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii) (B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding.

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

3. Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the

apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)

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

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

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

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (3)(i) of this section available for inspection, copying or transcription by authorized representatives of the Sponsor, the Federal Aviation Administration or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

- (i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (iii) **Equal Employment Opportunity.** The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance With Copeland Act Requirements.

The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

6. Subcontracts.

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

7. Contract Termination: Debarment.

A breach of the contract clauses in paragraph 1 through 10 of this section may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance With Davis-Bacon and Related Act Requirements.

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

9. Disputes Concerning Labor Standards.

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

10. Certification of Eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001

12. DEBARMENT AND SUSPENSION (NON-PROCUREMENT). (All contracts and subcontracts over \$25,000) (Reference: 2 CFR § part 180 (Subpart C), 2 CFR § part 1200, DOT Order 4200.5 DOT Suspension & Debarment Procedures & Ineligibility)

By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that at the time the bidder or offeror submits its proposal that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

CERTIFICATION REGARDING DEBARMENT AND SUSPENSION (SUCCESSFUL BIDDER REGARDING LOWER TIER PARTICIPANTS)

The successful bidder, by administering each lower tier subcontract that exceeds \$25,000 as a "covered transaction", must verify each lower tier participant of a "covered transaction" under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. The successful bidder will accomplish this by:

1. Checking the System for Award Management at website: <http://www.sam.gov>
2. Collecting a certification statement similar to the Certification of Offerer /Bidder Regarding Debarment, above.
3. Inserting a clause or condition in the covered transaction with the lower tier contract

If the FAA later determines that a lower tier participant failed to tell a higher tier that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedy, including suspension and debarment.

13. DISADVANTAGED BUSINESS ENTERPRISE. (ALL CONTRACTS AND SUBCONTRACTS)
(Reference: 49 CFR § part 26)

Contract Assurance (§ 26.13) - The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate which may include, but is not limited to:

- 1) Withholding monthly progress payments;
- 2) Assessing sanctions;
- 3) Liquidated damages; and/or
- 4) Disqualifying the Contractor from future bidding as non-responsible.

Prompt Payment (§26.29)- The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than ten (10) days from the receipt of each payment the prime contractor receives from the airport owner or its designated agent. The prime contractor agrees further to return retainage payments to each subcontractor within ten (10) days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Owner or the Owners authorized representative. This clause applies to both DBE and non-DBE subcontractors.

14. DISTRACTED DRIVING (ALL CONTRACTS & BE INCLUDED IN ALL SUBCONTRACTS)
(Reference: Executive Order 13513 and DOT Order 3902.10)

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

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

15. ENERGY CONSERVATION REQUIREMENTS. (ALL CONTRACTS AND SUBCONTRACTS)
(Reference 2 CFR § 200 Appendix II(H))

The contractor agrees to comply with mandatory standards and policies relating to energy efficiency that are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Public Law 94-163).

16. EQUAL OPPORTUNITY CLAUSE AND SPECIFICATIONS. (ALL CONTRACTS AND SUBCONTRACTS over \$10,000) (Reference 2 CFR 200 Appendix II(c), 41 CFR § 60-1.4, 41 CFR § 60-4.3, Executive Order 11246)

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

Equal Opportunity Clause:

- (1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- (2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
- (3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- (7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

Standard Federal Equal Employment Opportunity Construction Contract Specifications:

- (1) As used in these specifications:
 - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;

d. "Minority" includes:

(1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);

(3) Asian and 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); and

(4) American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

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

(3) If the contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors shall be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

(4) The contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in a geographical area where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

(5) Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the contractor has a collective bargaining agreement to refer either minorities or women shall excuse the contractor's obligations under these specifications, Executive Order 11246 or the regulations promulgated pursuant thereto.

(6) In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees shall be employed by the contractor during the training period and the contractor shall have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees shall be trained pursuant

to training programs approved by the U.S. Department of Labor.

(7) The contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following:

(a) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the contractor's employees are assigned to work. The contractor, where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

(b) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

(c) Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the contractor may have taken.

(d) Provide immediate written notification to the Director when the union or unions with which the contractor has a collective bargaining agreement has not referred to the contractor a minority person or female sent by the contractor, or when the contractor has other information that the union referral process has impeded the contractor's efforts to meet its obligations.

(e) Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The contractor shall provide notice of these programs to the sources compiled under 7b above.

(f) Disseminate the contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

(g) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with onsite supervisory personnel such as superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(h) Disseminate the contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the contractor's EEO policy with other contractors and subcontractors with whom the contractor does or anticipates doing business.

(i) Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students; and to minority and female recruitment and training organizations serving the contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(j) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.

(k) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

(l) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

(m) Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the contractor's obligations under these specifications are being carried out.

(n) Ensure that all facilities and company activities are non-segregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

(o) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

(p) Conduct a review, at least annually, of all supervisor's adherence to and performance under the contractor's EEO policies and affirmative action obligations.

(8) Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative action obligations (7a through 7p). The efforts of a contractor association, joint contractor union, contractor community, or other similar groups of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 18.7a through 18.7p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's and failure of such a group to fulfill an obligation shall not be a defense for the contractor's noncompliance.

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

(10) The contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

(11) The contractor shall not enter into any subcontract with any person or firm debarred from

Government contracts pursuant to Executive Order 11246.

(12) The contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

(13) The contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 18.7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

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

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

17. FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE) – (ALL CONTRACTS & SUBCONTRACTS) (Reference: 29 USC § 201, et seq.)

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part time workers.

The *contractor* has full responsibility to monitor compliance to the referenced statute or regulation. The *contractor* must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division

18. LOBBYING AND INFLUENCING FEDERAL EMPLOYEES. (ALL CONTRACTS & SUBCONTRACTS)

(Reference: 49 CFR § part 20, Appendix A, 2 CFR part § 200 Appendix II(J), 31 USC § 1352 Byrd-Anti-Lobbying Amendment)

The bidder or offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

- 1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the bidder or offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

- 2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- 3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

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| 19. NONSEGREGATED FACILITIES REQUIREMENT. (ALL CONTRACTS & SUBCONTRACTS OVER \$10,000) (Reference: 41 CFR § 60) PROHIBITION of SEGREGATED FACILITIES |
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(a) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Opportunity clause in this contract.

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

(c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Opportunity clause of this contract.

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| 20. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (ALL CONTRACTS & SUBCONTRACTS) (Reference 20 CFR § part 1910) |
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All contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 CFR Part 1910 with the same force and effect as if given in full text. Contractor must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The Contractor retains full responsibility to monitor its compliance and their subcontractor's compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (20 CFR Part 1910). Contractor must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

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| 21. PROCUREMENT OF RECOVERED MATERIALS (Reference: 2CFR § 200.322 & 40 CFR § Part 247, Solid Waste Disposal Act) |
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Contractor and subcontractor agree to comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part 247. In the performance of this contract and to the extent practicable, the Contractor and subcontractors are to use of products containing the highest percentage of recovered materials for items designated by the Environmental Protection Agency (EPA) under 40 CFR Part 247 whenever:

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

The list of EPA-designated items is available at www.epa.gov/epawaste/conservation/tools/cpg/products/. Section 6002(c) establishes exceptions to the preference for recovery of EPA-designated products if the contractor can demonstrate the item is:

- 1) Not reasonably available within a timeframe providing for compliance with the contract performance schedule;
- 2) Fails to meet reasonable contract performance requirements; or
- 3) Is only available at an unreasonable price

22. RIGHT TO INVENTIONS. (ALL CONTRACTS & INCLUDED IN ALL SUBCONTRACTS)
(Reference 2 CFR § 200 Appendix II(F) and 37 CFR § 401)

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

23. SEISMIC SAFETY (Reference: 49 CFR § part 41)

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

24. TERMINATION OF CONTRACT. (ALL CONTRACTS & SUBCONTRACTS OVER \$10,000)
(Reference 2 CFR § 200 Appendix II(B) and FAA AC 150/5370-10, Section 80-09)

Termination for Convenience (Construction & Equipment Contracts)

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

- 1. Contractor must immediately discontinue work as specified in the written notice.
- 2. Terminate all subcontracts to the extent they relate to the work terminated under the notice.
- 3. Discontinue orders for materials and services except as directed by the written notice.
- 4. Deliver to the owner all fabricated and partially fabricated parts, completed and partially completed work, supplies, equipment and materials acquired prior to termination of the work and as directed in the written notice.
- 5. Complete performance of the work not terminated by the notice.
- 6. Take action as directed by the owner to protect and preserve property and work related to this contract that Owner will take possession.

Owner agrees to pay Contractor for:

- 1) completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination;
- 2) documented expenses sustained prior to the effective date of termination in performing work and furnishing labor, materials, or equipment as required by the contract documents in connection with uncompleted work;
- 3) reasonable and substantiated claims, costs and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and
- 4) reasonable and substantiated expenses to the contractor directly attributable to Owner's termination action

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

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

Termination for Default (Construction)

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

Termination for Default (Equipment)

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

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

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

If within [10] days of the receipt of notice, the Contractor or Surety fails to remedy the breach or default to the satisfaction of the Owner, the Owner has authority to acquire equipment by other procurement action. The Contractor will be liable to the Owner for any excess costs the Owner incurs for acquiring such similar equipment.

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

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

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

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

25. TRADE RESTRICTION (ALL CONTRACTS & BE INCLUDED IN ALL SUBCONTRACTS)
(Reference: 49USC § 50104 & 49CFR part 30)

By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror –

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

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18 USC Section 1001.

The Offeror/Contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractors provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to an Offeror or subcontractor:

- 1) who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR or
- 2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list or
- 3) who incorporates in the public works project any product of a foreign country on such USTR list.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in all lower tier subcontracts. The Contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country included on the list of countries that discriminate against U.S. firms as published by USTR, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration (FAA) may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

26. VETERAN'S PREFERENCE (ALL CONTRACTS & BE INCLUDED IN ALL SUBCONTRACTS)
(Reference: 49 USC § 47112(c))

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

Part 1 – General Contract Provisions

Section 10 Definition of Terms

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

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

| Paragraph Number | Term | Definition |
|-------------------------|--|--|
| 10-11 | Building Area | An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon. |
| 10-12 | Calendar Day | Every day shown on the calendar. |
| 10-13 | Certificate of Analysis (COA) | The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications. |
| 10-14 | Certificate of Compliance (COC) | The manufacturer's certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer's authorized representative. |
| 10-15 | Change Order | A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for work within the scope of the contract and necessary to complete the project. |
| 10-16 | Contract | <p>A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment.</p> <p>The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.</p> |
| 10-17 | Contract Item (Pay Item) | A specific unit of work for which a price is provided in the contract. |
| 10-18 | Contract Time | The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date. |
| 10-19 | Contractor | The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work. |

| Paragraph Number | Term | Definition |
|-------------------------|--|---|
| 10-20 | Contractors Quality Control (QC) Facilities | The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP). |
| 10-21 | Contractor Quality Control Program (CQCP) | Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. |
| 10-22 | Control Strip | A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification. |
| 10-23 | Construction Safety and Phasing Plan (CSPP) | The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications. |
| 10-24 | Drainage System | The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area. |
| 10-25 | Engineer | The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering, inspection, and/or observation of the contract work and acting directly or through an authorized representative. |
| 10-26 | Equipment | All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work. |
| 10-27 | Extra Work | An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified. |
| 10-28 | FAA | The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative. |
| 10-29 | Federal Specifications | The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration. |

| Paragraph Number | Term | Definition |
|------------------|--|---|
| 10-30 | Force Account | <p>a. Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis.</p> <p>b. Owner Force Account - Work performed for the project by the Owner's employees.</p> |
| 10-31 | Intention of Terms | <p>Whenever, in these specifications or on the plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner.</p> <p>Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.</p> |
| 10-32 | Lighting | <p>A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.</p> |
| 10-33 | Major and Minor Contract Items | <p>A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.</p> |
| 10-34 | Materials | <p>Any substance specified for use in the construction of the contract work.</p> |
| 10-35 | Modification of Standards (MOS) | <p>Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.</p> |
| 10-36 | Notice to Proceed (NTP) | <p>A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.</p> |
| 10-37 | Owner | <p>The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean</p> |

| Paragraph Number | Term | Definition |
|-------------------------|---|---|
| | | airport Sponsor only. The Owner for this project is the City of La Crosse. |
| 10-38 | Passenger Facility Charge (PFC) | Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls. |
| 10-39 | Pavement Structure | The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit. |
| 10-40 | Payment bond | The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work. |
| 10-41 | Performance bond | The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract. |
| 10-42 | Plans | The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.' |
| 10-43 | Project | The agreed scope of work for accomplishing specific airport development with respect to a particular airport. |
| 10-44 | Proposal | The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications. |
| 10-45 | Proposal guaranty | The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner. |
| 10-46 | Quality Assurance (QA) | Owner's responsibility to assure that construction work completed complies with specifications for payment. |
| 10-47 | Quality Control (QC) | Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications. |
| 10-48 | Quality Assurance (QA) Inspector | An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being |

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

| Paragraph Number | Term | Definition |
|-------------------------|---|--|
| 10-59 | Supplemental Agreement | A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%; (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item. |
| 10-60 | Surety | The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor. |
| 10-61 | Taxilane | A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas. |
| 10-62 | Taxiway | The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas. |
| 10-63 | Taxiway/Taxilane Safety Area (TSA) | A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA. |
| 10-64 | Work | The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications. |
| 10-65 | Working day | A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days. |
| 10-66 | Owner Defined terms | None |

END OF SECTION 10

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Section 20 BIDDING REQUIREMENTS AND CONDITIONS

20.1 Prequalification Of Bidders.

- (1) The department will provide, upon request, information regarding departmental policy and procedures for prequalification of a bidder.
- (2) The department will indicate in the advertisement for bids if a contract does not require prequalification.
- (3) Each Bidder shall furnish the Department with satisfactory evidence of their competency to perform the Work contemplated prior to the Department accepting a proposal from the Bidder. The specific qualification type and requirements will be stated in the Advertisement for Bids. The proper departmental form for the various types of prequalification statements shall be received by the proper Department office by the deadline as specified in the advertisement for bids or as indicated in an addendum.
- (4) Any individual, partnership, or corporation desiring to bid on work under the jurisdiction or direct supervision of the Department shall submit a signed and dated statement, on the proper form provided by the Department, which fully states the financial ability, adequacy of plant, equipment and organization, prior experience, and other pertinent and material facts required. The Department shall receive these statements for examination and consideration no later than the time stated in the legal Advertisement for Bids or as amended. Statements received after the deadline listed may be processed, but the prospective bidder may not be allowed to bid on the specific project where the deadline has passed at the sole discretion of the department.
- (5) The Department will determine the classification of work and may establish the maximum capacity which the Bidder will be eligible to bid. The qualification, except as specifically extended, withdrawn, reduced or established by the Department, will remain valid for a period of time provided in the departmental policy.
- (6) For Bidders which have previously established competency which remains valid in the area of work as listed in the advertisement for bid, a separate additional prequalification statement submittal is not required.
- (7) In addition to being properly established as a prequalified firm, each Bidder shall submit a *Request to Bid/Current Workload* Form for each Proposal. The *Request to Bid/Current Workload* Form shall list all contracts and subcontracts representing all incomplete work in or out-of-State under contract at that given time. No contract will be awarded by the Department until the Department has received this information and made a determination that the Bidder is either within capacity in accordance with established prequalification limits, or the department is satisfied the bidder is able to complete the additional work bid. The Bidder should submit this statement as soon as possible and the department should receive this form no later than 24 hours prior to the time for opening of Bids. The determination of acceptability of the information submitted, and authorization to bid is at the sole discretion of the Department. The Department will provide notification to the Bidder with the Department's determination for authorization to bid. If multiple contracts or projects are sought to be bid, a separate request to bid/current workload forms shall be submitted.

20.2 Contents Of Proposal Forms.

- (1) The bidding proposal as furnished by the department or its representative engineering firm is the required form the prospective bidder must use to prepare and submit bids for the work. The provided the bidding proposal will include:
 1. Airport owner, airport name, and project Identification number.
 2. Amount of the proposal guaranty.
 3. Departments deadline for receiving completed proposals.
 4. Time to complete the work.
 5. A location for the bidder to indicate the name and address of the prospective bidder.

6. A summary of the type of work to be performed or materials to be furnished.
7. Locations for the authorized bidders representatives Signature & notary public (if not electronically bid)
8. Contract requirements not contained in the standard specifications.
9. Special provisions
10. Schedule of items.

(2) Documents bound with or attached to the bidding proposal are a part of the proposal. Do not detach or alter bound documents when submitting the proposal. The plans, standard specifications, and other documents designated in the bidding proposal are a part of the proposal, whether attached or not, and need not be returned when the proposal is submitted.

(3) Documents inserted within, but not attached or bound to the bidding proposal are not part of the contract proposal and are furnished for information purposes.

20.3 Furnishing Of Proposal Forms, Plans, And Specifications.

(1) Bidding proposals may be obtained from the source as indicated in the Advertisement for Bids. Proposal Forms are included with the Plans and Specifications. Proposals are subject to the provisions of chapter 66.0901 and Chapter 114 of the Wisconsin Statutes.

(2) The prospective bidder shall ensure that they have met the prequalification requirements as stated in the Advertisement for Bids. Subsection 20.1, Prequalification of Bidders, and the Advertisement for Bids provide the requirements for the establishment of the competency of prospective Bidders for the submittal of their Proposal. Subsection 20.13, Disqualification of Bidders and Subsection 20.7 Irregular Bids, outlines some of the causes for disqualification of the Bidder and rejection of Bid(s).

(3) Plans and Specifications that govern the work are on file and available for office examination at the office of the Wisconsin Bureau of Aeronautics, Room 701, Hill Farms State Transportation Building, 4802 Sheboygan Avenue, Madison, Wisconsin and at other locations as stated in the Advertisement for Bids. The Advertisement for Bids provides the location for obtaining Bidding Documents.

(4) The department may refuse to issue bidding proposals to a prospective bidder for one or more of the following reasons:

1. The department's estimate of the cost of the proposal, together with the value of the prospective bidder's uncompleted contract work, exceeds the prospective bidder's established ratings, as determined in 20.1, at the time set for receiving proposals.
2. The prospective bidder has work under way or has performed work not up to the proper standard of progress or quality. The prospective bidder may request, in writing, that the department review its refusal to issue a bidding proposal as provided in the department's prequalification policy.
3. The award of additional work, in the department's opinion, would preclude the satisfactory performance of the additional work or work already under way. The prospective bidder may request, in writing, that the department review its refusal to issue a bidding proposal as provided in the department's prequalification policy.
4. Any of the causes for disqualification of a bidder specified in 20.13.

(5) The department will not issue bidding proposals for the following reasons:

1. The department to a prospective bidder has been suspended or debarred from bidding on department contracts under Trans 504 of the Wisconsin administrative code.
2. The department will not issue bidding proposals to 2 or more prospective bidders on the same contract who are affiliated with each other.

20.4 Interpreting Bid Proposal Quantities

- (1) Submit unit bid prices for the estimated quantities as given in the schedule of items. These quantities are approximate and the department only uses them for the comparison of bids. Do not plead misunderstanding or deception because of these quantities as to the character, location, or other conditions pertaining to the work.
- (2) The department will only pay the contractor for the actual quantities of the work performed or materials furnished under the contract. The department may increase or decrease the contractor's scheduled quantities of work as provided in 90 without invalidating the bid prices.

20.5 Examining Contract Documents And Work Site

- (1) Carefully examine the contract documents and perform a reasonable site investigation before submitting a proposal. Submitting a proposal is an affirmative statement that the bidder has examined the contract documents, investigated the site, and is satisfied as to the character, quality, quantities, and the conditions the bidder will encounter in performing the work that the bidder could determine by walking the project site. A reasonable site investigation also includes investigating borrow sites, hauling routes, and all other locations related to the performance of the work.
- (2) Before the department's execution of the contract, obtain permission from the airport owner before physically entering onto airport property, performing excavations, borings, or other activities on airport property. Obtain the necessary permission from the airport owner or authorized representative such as the airport manager.
- (3) The department may include in the contract documents, or make available for the bidder's review at the design engineering consultant or other offices, one or more of the following:
 1. As built drawings.
 2. Available information relative to subsurface exploration, borings, soundings, water levels, elevations, or profiles.
 3. The results of other preliminary investigations.
- (4) The department provides information under 20.5(3) for the bidder's general knowledge only. This information is not a substitute for the bidder's own investigation, interpretation, or judgment. The information provided applies only to the locations and at the times indicated.

20.6 Preparing The Proposal

- (1) Submit completed proposals on the department's bidding proposal described in 20.2. Submit legible information only. Write everything in ink, by typewriter, or by computer-controlled printer. Provide all dollar amounts in dollars and cents, in numerals. Attach or acknowledge receipt of all addenda to the submitted proposal.
- (2) Properly execute the proposal. Place the required signatures, in ink, in the space provided on the bidding proposal as indicated below:

ENTITY SUBMITTING PROPOSAL

REQUIRED SIGNATURE

| | |
|----------------------------------|--|
| Individual | The individual or a duly authorized agent. |
| Partnership | A partner or a duly authorized agent. |
| Joint venture | A member or a duly authorized agent of at least one of the joint venture firms. |
| Corporation | An authorized officer or duly authorized agent of the corporation. Also show the name of the state chartering that corporation and affix the corporate seal. |
| Limited liability company | A manager, a member, or a duly authorized agent. |

- (3) Complete and execute and include the proposal guarantee in accordance with 20.8.
- (4) The list of subcontractors should be completed and signed.
- (5) It is recommended to complete and sign the Buy American Certificate if included. The contract cannot be awarded as specified in 30.1(4) without this documentation on federally funded projects as specified in The Federal Requirements. Only the lowest bidder will be required to submit the Buy American Certificate on federally funded projects.
- (6) Instead of using the schedule of items provided on the department's bidding proposal, the bidder may submit a substitute schedule with the proposal. Submit the proposed substitute schedule and obtain the department's written approval before using a substitute schedule. Approval by the department will not relieve the bidder of any errors or omissions which may result in an irregular proposal and possible rejection.
- (7) Provide a unit price for each bid item listed in the schedule of items including alternate bids. Calculate and show, in the bid amount column, the products of the respective unit prices and quantities. For a lump sum bid item, show the same price in the unit price column and in the bid amount column pertaining to that bid item. Show the total bid obtained by adding the values entered in the bid amount column for the listed bid items.
- (8) If a unit price or lump sum bid already entered in the proposal needs to be altered, cross out or obliterate the entered unit price or lump sum bid with ink or typewriter and enter the new price immediately adjacent to the original entry clearly identifying which unit price is being corrected, and initial it in ink.
- (9) A change that the bidder makes in the proposal is not an alteration if the bidder makes that change as directed in a specific instruction contained in an addendum.
- (10) Attach and include acknowledgment of all addenda to the submitted proposal.

20.7 Irregular Proposals

20.7.1 Department Will Correct

20.7.1.1 All Schedules of Items

- (1) The department will correct arithmetic errors or omissions found in the completed schedule of items as follows:
 1. Discrepancy between a unit price and the corresponding bid amount, or in the absence of a bid amount: the department will use the unit price to determine the correct bid amount.

2. Bidder leaves the unit price column or the bid amount column blank for a lump sum bid item: the department will use the single value shown to obtain the correct unit price and the correct bid amount for that bid item.
3. Discrepancy between the total bid and the sum of the correct bid amounts, or in the absence of a total bid: the department will use the correct bid amounts to determine the correct total bid.

20.7.1.2 Bidder-Generated Schedules of Items

- (1) The department will also correct errors in bidder-generated schedules of items as follows:
 1. Quantity is incorrect, and both the bid item number and description are correct: the department will correct the quantity and recalculate the bid amount.
 2. Item number is correct and the description is incorrect: the department will correct the description.
 3. Item number is incorrect and the description is correct: the department will correct the bid item number.
 4. Item number is correct but out of sequence and the description is correct: the department will ignore the error.

20.7.2 Department May Reject

- (1) Proposals are irregular and the department may reject them for one or more of the following reasons:
 1. The proposal contains unauthorized alterations of format, words, or figures.
 2. The schedule of items contains errors, alterations, or omissions in, bid item numbers, quantities, descriptions, or units of measure, that cannot be corrected as specified in 20.7.1.
 3. The proposal is not prepared as specified in 20.6.
 4. There are unauthorized alterations, additions, conditional or alternate bids, amendments, attachments, or irregularities that may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.
 5. There are unauthorized erasures or alterations appearing on the designation of the party to whom the department issued the bidding proposal.
 6. The award of the bid, together with the value of the bidder's uncompleted contract work, exceeds the bidder's established ratings, as determined in 20.1, or in the judgment of the department determines that the bidder does not have the sufficient capacity to undertake the additional work at the time set for awarding the work.
 7. A single entity, under the same or different names, or affiliated entities submit more than one proposal for the same work. The submitting entity may be an individual, partnership, joint venture, corporation, or limited liability company.

8. The department reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.
9. The bidder did not include, attach or acknowledge receipt of all addenda within the proposal submittal.
10. Failure to provide (if not included in the bid proposal) a completed Buy American Certificate on federally funded projects as specified in sections 20.6(5) and 30.1(4) and the federal requirements.

20.7.3 Department Will Reject

(1) Proposals are irregular and the department will reject them if the bidder:

1. Has not established prequalification as specified in 20.1
2. Does not properly sign the proposal.
3. Does not furnish the required proposal guaranty in the proper form and amount as specified in 20.8.
4. Does not submit a unit price for each bid item listed including alternate bids, except for lump sum bid items where the bidder may show the price in the bid amount column for that bid item or allowed corrections in accordance with 20.7
5. Includes conditions or qualifications not provided for in the department-supplied bidding proposal.
6. Submits a schedule of prices with illegibly printed bid item numbers, descriptions, or unit prices.
7. Submits a schedule of prices for the wrong contract.
8. Submits a bidder-generated schedule of prices with an incorrect bid item number and incorrect description for a single bid item.
9. Omits a bid item or bid price on a bidder-generated schedule of items.
10. Submits a materially unbalanced bid.
11. The Department finds evidence of collusion.

20.8 Proposal Guaranty

(1) The department will reject and will not post a proposal submitted without a proposal guaranty in the amount not less than 5% of the total bid amount or as designated and payable to the party designated in the proposal and advertisement for bids. Submit the required proposal guaranty in one of the following forms:

1. Properly executed proposal bid bond submitted on the department's form.
2. Properly executed annual bid bond submitted on the department's form.
3. Certified check drawn on the account of the bidder submitting the proposal.

4. Bank's check.
 5. Cashier's check.
 6. Postal money order.
- (2) When submitting a bid bond, ensure that the surety is licensed to do business in Wisconsin and has an equivalent A.M. Best rating of A- or better.
 - (3) If the proposal includes alternate bids, each alternate must be bid in their entirety, the proposal guaranty must cover the combined total of base bid and all alternates.
 - (4) If the proposal includes mutually exclusive option(s), the proposal guaranty must cover the combined aggregate of base bid, any and all alternates, and the least expensive of the option(s) specified.
 - (5) If the department invites combined bids and the bidder elects to bid one or more individual proposal in addition to the combined proposal, the bidder must submit a proposal guaranty in the amount required for the combined proposal. The combined proposal guaranty covers each individual proposal bid.

20.9 Proposal Delivery

- (1) Submit bids as directed in the advertisement for bids or as directed in the specifications or addenda.
- (2) If submitting a bid on paper, place each proposal, together with the proposal guaranty, and all addenda acknowledgement in a sealed envelope, furnished by the department. On each envelope, indicate the proposal number and the name of the bidder. For mailed submittals, mark the sealed proposal as indicated above and enclose in an additional envelope. The department will receive proposals at the place, until the hour, on the date designated in the notice to contractors. The department will return proposals received after the designated time to the bidder unopened.
- (3) In the event an addendum is issued after the bidder has placed his bid into the mail or delivery service, notify the department immediately and follow instructions directed by the department on how to proceed.
- (4) If electronically bid, submit the bid in accordance with departmental policy, or as the specifications or addenda direct.
- (5) Proposals will only be received by the Department from Bidders that have established and maintain valid prequalification status regardless of omission of the Request to Bid/Current Workload form in accordance with 20.1(7). However no award will be made until the current workload information is provided.

20.10 Withdrawing Or Returning Proposals Prior To Opening

- (1) Provide a written request to withdraw a proposal already filed with the department. Submit the withdrawal request before the deadline set for receiving proposals. The bidder named on a withdrawn proposal cannot subsequently bid on that contract unless the department issues a new invitation for bids.
- (2) The department may withdraw a bidding proposal already issued or return unopened a proposal already filed with the department if, after issuing the bidding proposal, the bidder is found to be ineligible to bid on that contract.

20.11 Withdrawing Proposal After Opening

- (1) After opening, a bidder will not be permitted to alter a proposal and resubmit it under any circumstance.
- (2) The Department may permit the withdrawal of a proposal due to error after their proposal has been opened subject to the requirements of applicable laws including 66.0901(5) of Wisconsin statutes, upon written request by the bidder due to a serious and honest error in proposal preparation. The written request shall provide documentation supporting such claim with evidence satisfactory to the department. If a withdrawal is granted by the department, the proposal guarantee may be returned at the discretion of the department. The proposal guarantee will only be retained in payment for liquidated damages for costs incurred to the public.
- (3) Action on remaining bids will proceed as though any withdrawn proposal had not been received.

20.12 Public Opening Of Proposals

- (1) The department will publicly open proposals at the time and place indicated in the proposal and advertisement for bids or as amended in an addenda. The department as soon as practical after the bid opening except as specified in 20.8 will post the as read total bid for each base bid, alternate bid, and grand total if provided for each proposal on the department's aeronautics web site.

<http://wisconsin.gov/Pages/doing-bus/aeronautics/airports/arpt-applow.aspx>

If a proposal has no total bid shown, the department will not post the total bid.

- (2) Bidders or their authorized agent and other interested persons are invited to be present.
- (3) The department may postpone the receipt of bids time or the opening of bids time due to emergencies or unforeseen conditions. If the department changes the hour or the date of the receipt of bids time or the opening of bids time, the department will issue an addendum or public notice to notify prospective bidders.
- (4) After verification for accuracy as specified in Section 30 and an award has been made, the department will post bid tabulations for accepted bids, including unit prices (no unit prices will be provided for alternates not awarded, or bids that have been rejected.) on the department's aeronautics web site.

<http://wisconsin.gov/Pages/doing-bus/aeronautics/airports/bidtabs.aspx>

20.13 Disqualification Of Bidders

20.13.1 General

- (1) If the department disqualifies a Bidder, the department will notify that Bidder in writing. The department will give the reason for disqualification, the term of disqualification, and instructions for reestablishing eligibility to bid on departmental contracts.

20.13.2 Department May Disqualify

- (1) The department may disqualify the Bidder from further bidding for a period of time determined by the department for one or more of the following reasons:
 1. The department has notified the Bidder that it has initiated a debarment or suspension action against the bidder under Trans 504 of the Wisconsin administrative code.

2. Developments, subsequent to establishment of a Bidder's competency and qualifications, which in the department's judgment affect the responsibility of the bidder.
3. Not complying, within a reasonable time, with the department's request to update a prequalification statement.
4. Documented record of Contractor default under previous contracts with the Owner or department.
5. Documented record of unsatisfactory work on previous contracts with the Owner or department.

20.13.3 Department Will Disqualify

- (1) The department will disqualify the Bidder from further bidding, for a period of time the department determines, if the Bidder has been suspended or debarred from bidding on department contracts under Trans 504 of the Wisconsin administrative code.

END OF SECTION 20

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SECTION 30. CONTRACT AWARD AND EXECUTION

30.1 Consideration Of Proposals

- (1) Following the public opening of the proposals received, the Department will compare them on the basis of the summation of the products of the quantities of work listed and the contract unit prices offered. In case of discrepancies, errors, or omissions, the department will make corrections as specified in [20.7.1](#). In awarding contracts, the Department, in addition to considering the amounts stated in the proposals, may consider one or more of the following:
 1. The responsibility of the various Bidders as determined from a study of the data required under [20.1](#).
 2. The information required on the bidding proposal.
 3. Information from other investigations that the Department may make.
- (2) The Department will also review the proposals for the irregularities described in [20.7](#) and review the eligibility of the Bidder as specified in [20.13](#). The Department will determine whether irregularities are matters of form rather than substance and can be waived without prejudice to other Bidders or the public interest.
- (3) If a *Request to Bid/Current Workload* form is not received by the apparent low bidder prior to bid opening in accordance with 20.1(7), Or included within the bid submittal itself, no award will be made until the Bidder has provided workload information and the Department has determined the Bidder to be within prequalification rating limit or has determined that the Bidder can reasonably assume the added work and adequately complete the contract acceptably.
- (4) No award will be made until the Buy American Certificate, if required, has been provided within five business days after the lowest bidder has been notified by the Department of its omission. After this time, the Department may reject as specified in 20.7.2
- (5) The bidder may submit individual proposals for more than one contract being let. Although each individual proposal may not exceed the Bidder's rating, a combination of more than one proposal and incomplete work currently under contract may exceed the bidder's rating. If the bidder exceeds its rating, the Department may award a proposal or combination of proposals within the Bidder's rating and most advantageous to the Department.
- (6) The Department may reject any or all proposals, or waive technicalities if the waiver is in the best interest of the Department and Owner and is in conformance with applicable State and local laws or regulations pertaining to the letting of construction contracts. The Owner/Department, in its own interest, may re-advertise for bids or proceed with the work in another manner. All such actions shall promote the Owner's best interest.

30.2 Awarding the Contract

- (1) Unless rejecting all proposals, the Department will award the contract to the lowest qualified and responsible bidder whose proposal complies with [30.1](#). If two or more Bidders submit identical low bids, the Department will determine the successful bidder by flipping a coin.
- (2) The Bidder, by written notice before the time set for opening of bids, may limit the bidder's total dollar volume of work or number of contracts to be awarded in a letting, and the Department will determine which contract or contracts to award in compliance with the Bidder's self-imposed capacity limit.

- (3) If the Department does not make an award on **September 30, 2026**, after opening the proposals, the lowest responsible Bidder, after **September 30, 2026**, may request, in writing, that the Department make the award. Stipulate a deadline of 10 business days or more, after the date of the request, for the department to make the award. If the Department does not make the award within the stipulated time, the Bidder is relieved of its obligation to execute a contract and contract bond.

30.3 Canceling the Award

- (1) The department may cancel a contract award before execution without liability.

30.4 Returning Proposal Guaranty

- (1) The Department will return the proposal guaranties of all except the two lowest responsible Bidders within 5 business days after determining the lowest qualified and responsible Bidder and making the award of contract. The Department will return the two lowest qualified and responsible Bidder's proposal guaranty as soon as the lowest Bidder executes and submits in the proper form the contract, contract bond, and other required documents as specified under 30.5
- (2) If the Department does not make the award within the time stipulated by the lowest responsible Bidder as specified in [30.2\(3\)](#), the Department will return their proposal guaranty within 5 business days after that deadline.

30.5 Contract Bond

- (1) At the time of submitting the contract for execution by the department, deposit a valid surety bond with the Department in the amounts designated on the bond form covering both performance and payment. Submit the contract bond on a Department-furnished form. For contracts exceeding \$100,000 the amount shall be no less than 100 percent performance and 100 percent payment bonds.
- (2) Ensure that the surety is licensed to do business in Wisconsin and has an equivalent A.M. Best rating of A- or better. The surety is subject to the department's approval, and to the governor's approval, if required by law.

30.6 Executing and Approving the Contract

- (1) The Bidder shall execute the contract. The principal and the sureties shall execute the contract bond. Present the contract, the contract bond, and all other Department-required forms within 10 business days after the date of notice of the award, or receipt of the contract documents.
- (2) Prior to executing the contract, the Department may request the bidder to furnish documentation providing evidence that the bidder will retain that portion of the work as specified in Section 80
- (3) The contract is not binding on the Department until the final execution of the contract. The contract final execution date is the date the final signer signs the contract.

30.7 Failure to Execute Contract

- (1) The Department may cancel the award if, within 10 business days after the date of notice of the award of the contract, the successful Bidder does not do the following:
1. Return required forms or supply other Department-requested information.
 2. Execute a contract and contract bond, as provided in [30.6](#).
- (2) If the Department cancels the award, the Department may retain the proposal guaranty, not as a penalty, but in payment of liquidated damages the department sustains due to the Bidder's failure to

execute. If the retained proposal guaranty is a bid bond, pay the Department the proposal guaranty amount within 10 business days of demand.

- (3) If the Department cancels the award, a replacement award may then be made to the next qualified Bidder, or the project will be readvertised, or handled as the Department may elect.

30.8 Nullifying the Award

- (1) The Department will accept the Bidder's request to nullify and will nullify the Bidder's acceptance of the contract if the following conditions are met:
1. The Bidder files the required contract documents in proper form and order.
 2. The Department does not execute the contract within 30 calendar days after the Bidder files the required contract documents.
 3. The Bidder files a written request to nullify with the Department. Wait the 30 days specified in item 2 of 30.8(1) before filing that request. Stipulate in the request a deadline for the Department to execute the contract. This deadline must be 10 business days or more after the filing date of the request.
 4. The Department does not execute the contract within the stipulated deadline.
- (2) The Department will notify the Bidder, in writing, if the Department agrees to nullify the award. The Department's failure to act within the stipulated deadline also constitutes nullification.
- (3) The request to nullify is a voluntary act of the Bidder. The Department's nullification relieves the Bidder, the Bidder's surety, and the Department of all obligations under the award.
- (4) Unless and until the Bidder files a request to nullify, and until the Department nullifies, the Department may execute the contract without prejudice to any contract terms and conditions.

30.9 Expiration of Bid

- (1) No award can be made after one year from the date the bids were opened if no decision is made by the Department to award, nullify, or reject bids, unless mutually agreed upon by the Department and the Bidder.

END OF SECTION 30

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Section 40 Scope of Work

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

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

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

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

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

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

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

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

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

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

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

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

a. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in Section 80, paragraph 80-04, *Limitation of Operations*. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in Section 70, paragraph 70-15, *Contractor's Responsibility for Utility Service and Facilities of Others*.

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

c. When the contract requires the maintenance of an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep the road, street, or highway open to all traffic and shall provide maintenance as may be required to accommodate traffic. The Contractor, at their expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel. The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (<http://mutcd.fhwa.dot.gov/>), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways. Unless otherwise specified herein, the Contractor will not be required to furnish snow removal for such existing road, street, or highway.

40-06 Removal of existing structures. All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

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

Except as provided in Section 40, paragraph 40-07, *Rights in and Use of Materials Found in the Work*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

40-07 Rights in and use of materials found in the work. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

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

d. Use such material as intended by the terms of the contract.

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

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

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

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

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

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

END OF SECTION 40

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Section 50 Control of Work

50-01 Authority of the Resident Project Representative (RPR). The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements.

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

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

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

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

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

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

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

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

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

50-04 List of Special Provisions. Special Provisions are found in Segment II of this proposal for airport work.

50-05 Cooperation of Contractor. The Contractor shall be supplied with electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

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

50-06 Cooperation between Contractors. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

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

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

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

50-07 Construction layout and stakes.

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

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

The Contractor is responsible to establish all layout required for the construction of the project.

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. Survey(s) and notes shall be provided in the following format(s): PDF, AutoCAD (.dwg).

Laser, GPS, String line, or other automatic control shall be checked with temporary control as necessary. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on

the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

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

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

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

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

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

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

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

50-10 Removal of unacceptable and unauthorized work. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the RPR as provided in paragraph 50-02, *Conformity with Plans and Specifications*.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of Section 70, paragraph 70-14, *Contractor's Responsibility for Work*.

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

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

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

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

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

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

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

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

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

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

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

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

50-16 Claims for adjustment and disputes. If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the RPR in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the RPR is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the RPR has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity

of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the RPR who will present it to the Owner for consideration in accordance with local laws or ordinances.

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

END OF SECTION 50

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Section 60 Control of Materials

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

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

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

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

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

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

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

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

If item C-100 is included in the specifications, the Contractor shall employ a Quality Control (QC) testing organization to perform all Contractor required QC tests in accordance with Item C-100 Contractor Quality Control Program (CQCP).

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

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

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

When a material or assembly is specified by "brand name or equal" and the Contractor elects to furnish the specified "or equal," the Contractor shall be required to furnish the manufacturer's certificate of

compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

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

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

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

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

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

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

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

60-05 Engineer/ Resident Project Representative (RPR) field office. An Engineer/RPR field office is not required.

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

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

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

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

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

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

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

END OF SECTION 60

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Section 70 Legal Regulations and Responsibility to Public

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

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

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

70-04 Restoration of surfaces disturbed by others. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner, such authorized work (by others) must be shown on the plans and is indicated as follows: none.

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

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

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

70-06 Sanitary, health, and safety provisions. The Contractor's worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

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

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to their own operations and those of their own subcontractors and all suppliers in accordance with

Section 40, paragraph 40-05, *Maintenance of Traffic*, and shall limit such operations for the convenience and safety of the traveling public as specified in Section 80, paragraph 80-04, *Limitation of Operations*.

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

70-08 Construction Safety and Phasing Plan (CSPP). The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. See plan sheets containing the title "Construction Safety Phasing Plan."

70-09 Use of explosives. The use of explosives is not permitted on this project.

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

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

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

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

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

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

See plan sheets containing the title "Construction Operations and Safety Phasing Plan" and the special provisions for construction operations and the phasing requirements for this project.

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

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

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

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

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

70-14 Contractor's responsibility for work. Until the RPR's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with Section 50, paragraph 50-14, *Partial Acceptance*, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

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

70-15 Contractor's responsibility for utility service and facilities of others. As provided in paragraph 70-04, *Restoration of Surfaces Disturbed by Others*, the Contractor shall cooperate with the owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

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

See the plans for existing utility information.

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

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the Owners of all utility services or other facilities of their plan of operations. Such notification shall be in

writing addressed to "The Person to Contact" as provided in this paragraph and paragraph 70-04, *Restoration of Surfaces Disturbed By Others*. A copy of each notification shall be given to the RPR.

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

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

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

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

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

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

70-15.1 FAA facilities and cable runs. The Contractor is hereby advised that the construction limits of the project may include existing facilities and buried cable runs that are owned, operated and maintained by the FAA. The Contractor, during the execution of the project work, shall comply with the following:

a. The Contractor shall permit FAA maintenance personnel the right of access to the project work site for purposes of inspecting and maintaining all existing FAA owned facilities.

b. The Contractor shall provide notice to the FAA Air Traffic Organization (ATO)/Technical Operations/System Support Center (SSC) Point-of-Contact through the airport a minimum of seven (7) calendar days prior to commencement of construction activities in order to permit sufficient time to locate and mark existing buried cables and to schedule any required facility outages.

c. If execution of the project work requires a facility outage, the Contractor shall contact the FAA Point-of-Contact a minimum of 72 hours prior to the time of the required outage.

d. Any damage to FAA cables, access roads, or FAA facilities during construction caused by the Contractor's equipment or personnel whether by negligence or accident will require the Contractor to repair or replace the damaged cables, access road, or FAA facilities to FAA requirements. The Contractor shall not bear the cost to repair damage to underground facilities or utilities improperly located by the FAA.

e. If the project work requires the cutting or splicing of FAA owned cables, the FAA Point-of-Contact shall be contacted a minimum of 72 hours prior to the time the cable work commences. The FAA reserves the right to have a FAA representative on site to observe the splicing of the cables as a condition of acceptance. All cable splices are to be accomplished in accordance with FAA specifications and require approval by the FAA Point-of-Contact as a condition of acceptance by the Owner. The Contractor is hereby advised that FAA restricts the location of where splices may be installed. If a cable splice is required in a location that is not permitted by FAA, the Contractor shall furnish and install a sufficient length of new cable that eliminates the need for any splice.

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

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

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

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

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

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

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

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *Extra Work*, and Section 90, paragraph 90-05, *Payment for Extra Work*. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with Section 80, paragraph 80-07, *Determination and Extension of Contract Time*.

70-21 Insurance Requirements. See Special Provisions.

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Section 80 Execution and Progress

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

The Contractor shall perform, with his organization, an amount of work equal to at least **30** percent of the total contract cost.

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

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

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

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

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

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

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

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), or other format, or as otherwise specified.

It shall include information on the sequence of work activities, milestone dates, and activity duration. The schedule shall show all work items identified in the project proposal for each work area and shall include the project start date and end date.

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

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

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

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

The Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction and the approved CSPP.

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

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

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

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

80-05 Character of workers, methods, and equipment. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

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

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

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

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

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

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

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

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the

effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

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

80-07 Determination and extension of contract time. The number of calendar days or the number of working days or the completion date shall be stated in the proposal and contract and shall be known as the Contract Time.

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

80-07.1 Contract time based on working days. Contract time based on working days shall be calculated weekly by the Resident Project Representative (RPR). The RPR will furnish the Contractor a copy of their weekly statement of the number of working days charged against the contract time during the week and the number of working days currently specified for completion of the contract (the original contract time plus the number of working days, if any, that have been included in approved Change Orders or Supplemental Agreements covering Extra Work).

The weekly statement of contract time charged is based on the following considerations:

(1) Time will be charged for days on which the Contractor could proceed with scheduled work under construction at the time for at least six (6) hours with the normal work force employed on such items. When normal work force is a double-shift, use 12 hours; and when the normal work force is on a triple-shift, use 18 hours. Conditions beyond the Contractor's control such as strikes, lockouts, unusual delays in transportation, temporary suspension of the scheduled work items under construction or temporary suspension of the entire work which have been ordered by the Owner for reasons not the fault of the Contractor, shall not be charged against the contract time.

(2) The RPR will not make charges against the contract time prior to the effective date of the notice to proceed.

(3) The RPR will begin charges against the contract time on the first working day after the effective date of the notice to proceed.

(4) The RPR will not make charges against the contract time after the date of final acceptance as defined in Section 50, paragraph 50-14, *Final Acceptance*.

(5) The Contractor will be allowed one (1) week in which to file a written protest setting forth their own objections to the RPR's weekly statement. If no objection is filed within such specified time, the weekly statement shall be considered as acceptable to the Contractor.

The contract time (stated in the proposal) is based on the originally estimated quantities as described in the Section 20, paragraph 20-05, *Interpretation of Estimated Proposal Quantities*. Should the satisfactory completion of the contract require performance of work in greater quantities than those estimated in the proposal, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally

estimated quantities in the proposal. Such increase in contract time shall not consider either the cost of work or the extension of contract time that has been covered by change order or supplemental agreement and shall be made at the time of final payment.

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

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

Contract time based on specific completion date. When the contract time is a specified completion date, it shall be the date on which all contract work shall be substantially complete.

If the Contractor finds it impossible for reasons beyond their own control to complete the work within the contract time as specified, or as extended in accordance with the provisions of this paragraph, the Contractor may, at any time prior to the expiration of the contract time as extended, make a written request to the Owner for an extension of time setting forth the reasons which the Contractor believes will justify the granting of their own request. Requests for extension of time, caused by inclement weather, shall be supported with National Weather Bureau data showing the actual amount of inclement weather exceeded what could normally be expected during the contract period. The Contractor’s plea that insufficient time was specified is not a valid reason for extension of time. If the supporting documentation justify the work was delayed because of conditions beyond the control and without the fault of the Contractor, the Owner may extend the time for completion by a change order that adjusts the contract time or completion date. The extended time for completion shall then be in full force and effect, the same as though it were the original time for completion.

80-08 Failure to complete on time. For each calendar day or working day, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in paragraph 80-07, *Determination and Extension of Contract Time*) the sum specified in the contract and proposal as liquidated damages (LD) will be deducted from any money due or to become due the Contractor or their own surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract.

LIQUIDATED DAMAGES

| Original Contract Amount | | Daily Charge | |
|--------------------------|------------------|---------------------------------|-------------|
| From More Than | To and Including | Calendar day or Completion Date | Working Day |
| \$0 | \$250,000 | \$945 | \$1,890 |
| \$250,000 | \$500,000 | \$835 | \$1,670 |

| | | | |
|-------------|------------------|---------|---------|
| \$500,000 | \$1,000,000 | \$1,045 | \$2,090 |
| \$1,000,000 | \$2,000,000 | \$1,570 | \$3,140 |
| \$2,000,000 | Over \$2,000,000 | \$2,185 | \$4,370 |

See special provisions for additional information regarding contract time and liquidated damages.

The maximum construction time allowed for the project will be the sum of the time allowed for individual phases and/or alternates awarded by the Owner as specified in the contract documents and as added by change order or supplemental agreement. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the contract.

80-09 Default and termination of contract. The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

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

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

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

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

80-10 Termination for national emergencies. The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a

direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

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

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

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

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

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

END OF SECTION 80

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Section 90 Measurement and Payment

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

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

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

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

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

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

Measurement and Payment Terms

| Term | Description |
|---|---|
| Excavation and Embankment Volume | In computing volumes of excavation, the average end area method will be used unless otherwise specified. |
| Measurement and Proportion by Weight | The term "ton" will mean the short ton consisting of 2,000 pounds (907 kg) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the RPR. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the RPR directs, and each truck shall bear a plainly legible identification mark. |
| Measurement by Volume | Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable for the materials hauled, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery. |
| Asphalt Material | Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net |

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

| Term | Description |
|-------------------------|--|
| | <p>Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment.</p> <p>All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.</p> |
| Rental Equipment | <p>Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 <i>Payment for Extra Work</i>.</p> |
| Pay Quantities | <p>When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.</p> |

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

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

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

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

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

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

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the RPR's order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

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

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

Retainage and withheld payments are specified in the Special Provisions of this proposal.

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

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

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

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

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

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

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

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

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

90-08 Payment of withheld funds. At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

a. The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.

b. The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.

c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.

d. The Contractor shall obtain the written consent of the surety to such agreement.

90-09 Acceptance and final payment. When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

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

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

90-10 Construction warranty.

a. In addition to any other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.

b. This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the project work. Light Emitting Diode emitting diode (LED) light fixtures with the exception of obstruction lighting, must be warranted by the manufacturer for a minimum of four (4) years after date of installation inclusive of all electronics.

c. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Owner real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.

d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.

e. The Owner will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage.

f. If the Contractor fails to remedy any failure, defect, or damage within 14 days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

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

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

90-11 Contractor Final Project Documentation. Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor's final submittal. The Contractor shall:

a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations.

b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.

c. Complete final cleanup in accordance with Section 40, paragraph 40-08, *Final Cleanup*.

d. Complete all punch list items identified during the Final Inspection.

e. Provide complete release of all claims for labor and material arising out of the Contract.

f. Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the project.

g. When applicable per state requirements, return copies of sales tax completion forms.

h. Manufacturer's certifications for all items incorporated in the work.

i. All required record drawings, as-built drawings or as-constructed drawings.

j. Project Operation and Maintenance (O&M) Manual(s).

k. Security for Construction Warranty.

l. Equipment commissioning documentation submitted, if required.

END OF SECTION 90

SEGMENT II

SPECIAL PROVISIONS

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SPECIAL PROVISIONS (E-Bidding)

1. **General.** The work under this contract for the construction of Project AIP 3-55-0030-##, LSE1019, La Crosse Regional Airport, La Crosse, Wisconsin, in La Crosse County, Wisconsin, shall be in accordance with the plans therefore and shall be executed under the attached General Provisions, requirements of the technical specifications of FAA Advisory Circular AC 150/5370-10H as included within, and these Special Provisions.

Pay Items having numbers beginning with "NS" shall be executed under the requirements of the non-standard specifications include in Segment III.

2. **Scope of Work.** The Work under this contract consists of the construction of LSE Terminal Generator Replacement and related work, and all incidental items necessary to complete the Work as shown on the plans and included in the Proposal and Contract.
3. **Prosecution and Progress.** The Work shall begin within 10 calendar days after a written notice to do so has been issued by the Engineer.

The contract is expected to begin Fall of 2026 with ordering of equipment and materials. Contract time will not be charged during the procurement period. Site and building work to start in the Spring of 2027 after equipment has been procured and a notice to proceed has been issued.

4. **Notice of Other Contracts.** Project No. LSE1023 for the construction of LSE ARFF Building Rehabilitation will be in effect during the life of this contract.
5. **Schedule of Operations.** The Contractor shall submit a tentative schedule of operations in writing to the Department one week in advance of the pre-construction conference.
6. **Pre-construction Conference.** A pre-construction conference will be held prior to the start of any work, for the purpose of coordinating the Contractor's operations on the airport. The Contractor and subcontractors shall attend or send an authorized representative. Other parties, as necessary will be invited by the Department. Typically the following are represented:

Bureau of Aeronautics
Federal Aviation Administration
Airport Director and Operations

Resident and Project Engineer
Airline Representatives
Department of Natural Resources.

7. **Payment to all Subcontractors.** Within 10 calendar days of receipt by a contractor of a progress payment for work performed, materials furnished, or materials stockpiled by a subcontractor, the contractor shall pay that subcontractor for all work satisfactorily performed and for all materials furnished or stockpiled.

The contractor agrees further to release retainage amounts to each subcontractor within 10 calendar days after the subcontractor's work is satisfactorily completed. In addition, whenever the Department reduces the contract retainage amount, within 10 calendar days of receipt by a contractor of a retainage payment, the contractor must reduce the total amount retained from subcontractors to no more than remains retained by the Department.

The contractor shall pay the subcontractor within the time frames described above unless the contractor complies with both of the following within 10 calendar days of receiving the Department's progress payment:

- 1) The contractor notifies the subcontractor in writing that the work is not satisfactorily completed.
- 2) The contractor requests approval from the Department to delay payment because the subcontractor has not satisfactorily completed the work.

The contractor's request for approval should include the written notification to the subcontractor and shall provide sufficient documentation of good cause to assist the engineer in making a timely decision. If the engineer does not grant approval, the contractor shall pay the subcontractor within 10 calendar days of the Department's decision.

All subcontracting agreements made by a contractor shall include the above provisions and shall be binding on all contractors and subcontractors.

The contractor certifies compliance with the requirements of this Additional Special Provision by signing the contract. This clause applies to both DBE and non-DBE subcontractors.

8. **Electronic Certified Payrolls Submittal**

- a. Use the department's Civil Rights Compliance System (CRCS) to submit certified payrolls electronically. Details are available online through the department's highway construction contractor information (HCCI) site on the Labor, Wages, and EEO Information page at:

<https://wisconsindot.gov/Pages/doing-bus/civil-rights/labornwage/default.aspx>

- b. Ensure that all tiers of subcontractors, as well as all trucking firms, submit their weekly certified payrolls electronically through CRCS. These payrolls are due within seven days following the close of the payroll period. Every firm providing on-site physical labor towards completing the project is a subcontractor under this special provision.
- c. Upon receipt of contract execution, promptly make all affected firms aware of the requirements under this special provision and arrange for them to receive CRCS training as they are about to begin payrolls. The department will provide training either in a classroom setting at one of our regional offices or by telephone. Contact Paul Ndon at 414-438-4584 or via email at: paul.ndon@dot.wi.gov to schedule the training.
- d. Written permission from the engineer must be obtained in order for the department to accept paper submittals of certified payrolls using forms DT-1816 and DT-1929 for information required under this special provision. Use of paper submittals will be reserved for individual special cases and acceptance will be the exception, not the rule.

- e. Only firms who have been previously approved for exporting payroll data from their computer into the CRCS can initially submit their payroll data this way. Firms not previously approved that desire to export payroll data will have to obtain permission from the Department. Approval will require the contractors' payroll coordinator to send several sample electronic files to Paul Ndon for evaluation and approval (Paul Ndon at 414-438-4584 or via email at: paul.ndon@dot.wi.gov) Not every contractor's payroll system is capable of producing acceptable export files for CRCS use.
- f. All costs for conforming to this special provision are incidental to the contract.

9. **Disadvantaged Business Enterprise Development.**

Requirements

Pursuant to the federal Disadvantaged Business Enterprise (DBE) program regulation at 49 CFR Part 26, a contractor's failure to comply with any provision of the DBE program regulatory provisions will be considered a material breach of contract. This is nonnegotiable. The required DBE Forms referenced in this provision must be included in the bid submittal (as specified below).

If a contractor fails to carry out the DBE program requirements and/or the required Contract Provisions for Federal Aid Contracts (the Federal Requirements document referenced is located in the bid proposal), sanctions will be assessed depending upon the facts, reasoning, severity, and remedial efforts of the contractor that may include: termination of contract, withholding payment, assessment of monetary sanctions, and/or suspension/debarment proceedings that could result in the disqualification of the contractor from bidding for a designated period of time.

Please Note:

The following represents only an abbreviated summary of DBE requirement and overview for preparing the bid submittal. The full Bureau of Aeronautics (BOA) DBE contract provision is made part of this contract by reference and can be found here:

<https://wisconsin.gov/Documents/doing-bus/aeronautics/airports/dbe-pr-6121.pdf>

The WisDOT DBE program can be found here: <https://wisconsin.gov/Documents/doing-bus/civil-rights/dbe/2021prgmplan.pdf>

Directory of DBE firms

The only resource for DBE firms certified in the State of Wisconsin is the Wisconsin Unified Certification Program (UCP) DBE Directory. DBE firms are certified based on various factors including the federal standards from the Small Business Administration that assigns a North American Industrial Classification (NAICS) Codes. DBE firms are only eligible for credit when performing work in their assigned NAICS code(s). Wisconsin Department of Transportation (WisDOT) maintains a current list of certified DBE firms at: <http://wisconsin.gov/Documents/doing-bus/civil-rights/dbe/dbe-ucp-directory.xlsx>

DBE Documentation Bid Submittal Requirements

The Bureau of Aeronautics (BOA) will consider the bid nonresponsive and will reject the bid if the bidder fails to furnish the DBE Forms, as required.

1. Included in the bid submittal

- a. The Commitment to Subcontract to DBE (**Form 550bdev**) must be completed including all arithmetic, and supplemental documentation, and submitted by **ALL** bidders.
- b. Fully completed and signed Attachment A's are required to be included in the bid submittal.
- c. If the assigned DBE contract goal is not met, Documentation of Good Faith Effort (**Form DT1202**) is due **in addition to Form 550bdev** at time of bid, and must include all supporting/supplemental documentation.
- d. Submittal instructions: Include with bid submittal through Bid Express.

2. Verification of DBE Commitment

The documentation related to DBE subcontract commitment submitted prior to contract award is evaluated as follows:

a. DBE Goal Met

If the bidder indicates that the contract DBE goal is met, the Department will evaluate Form 550bdev and Attachments A to verify the actual DBE percentage calculation. If the DBE commitment is verified, the contract is eligible for award with respect to the DBE commitment.

b. DBE Goal Not Met

If the bidder indicates a bid percentage on Form 550bdev that does not meet the assigned DBE contract goal, the bidder must request alternative evaluation of good faith effort through submission of Form DT1202 (Documentation of Good Faith Effort) at the time of bid including narrative description and supplementary documentation. The Department will review the bidder's DBE commitment and evaluate the bidder's good faith effort submission. Following evaluation of the bidder's Good Faith Effort documentation, the bidder will be notified that the Department intends to:

- 1. *Approve* the request (adequate documentation of GFE has been submitted)- no conditions placed on the contract with respect to the DBE commitment;
- 2. *Deny* the request (inadequate documentation of GFE has been submitted)- the contract is viewed as non-responsive per **Wisconsin DOT federally approved DBE Program plan** (see link below) and will not be executed. If the Department denies the bidder's request, the contract is ineligible for award. The Department will provide a written explanation for denying the request to the bidder. The bidder may appeal the Department's denial.

The Good Faith Effort information will be forwarded by the Bureau of Aeronautics (BOA) to the DBE Office (OBOEC) for evaluation. Additional information may be requested by the DBE Office upon review. Utilization of the GFE toolkit linked below is preferred and makes review of GFE requests standardized.

Good Faith Efforts (GFE) Tool Kit

wisconsindot.gov/Documents/doing-bus/civil-rights/dbe/gfe-tool-kit.pdf

DBE Commitment and Program Compliance

If the contract is awarded, the Prime Contractor must obtain written consent from the Bureau of Aeronautics (BOA) to change or replace any DBE firm listed on the approved Form 550bdev, unless BOA has granted permission for the reduction, replacement, or termination of the assigned DBE in writing. If a prime contractor or a subcontractor on of any tier uses its own forces to perform work assigned to a DBE on an approved DBE commitment, **penalties and sanctions will apply up to (and include) non-payment for the work.** Any changes to DBE commitment after the approval of Form 550bdev must be reviewed and approved by BOA prior to the change.

For additional information on processes, reference the **WisDOT DBE Program Plan**, located at link: <https://wisconsindot.gov/Pages/doing-bus/civil-rights/dbe/default.aspx>.

10. Bidding Requirements and Conditions

Section 20 of the contract general provisions have the following modifications:

- a) Section 20.1 Prequalification of Bidders. Clarification: It is important to note that while this contract will be electronically bid, the prequalification process is a SEPARATE paper process and must be completed prior to the deadline established in the bid advertisement. A signed original hard copy of the prequalification must be sent to the department to complete the processing. The Bureau of Aeronautics prequalification may be sent via email to meet the submission deadline to help expedite processing and may be sent to: dotboabidding@dot.wi.gov
- b) Section 20.1(7) is removed and replaced with the following: The electronic bid template includes a section to provide outstanding workload information which will be included with the overall electronic bid submittal. The template allows two options to provide outstanding workload information 1) by direct entry of each project and the workload remaining or 2) by uploading a scan of the completed outstanding workload form and any attachments. One of these methods must be used. The Bidder will have to select an omission box for the NOT used.

Section 20.3(3) is removed and replaced with the following. Plans and specifications are available electronically at <https://bidexpress.com/businesses/51671/home>. Plans, specifications and contract documents are available free of charge. A free registration is required so that plan holders are known, and notifications can be sent to all plan holders for addendums or other information offered to plan holders that may affect the bid.

- c) 20.6 Preparing the Proposal is removed and replaced with the following.
 - (1) All necessary components required for properly furnishing a completed bid are included in the Electronic Bidding template.
 - (2) Ensure all information is completed and blanks are completely filled out
 - (3) Several areas within the template provide multiple ways to comply with the element. It is only necessary to complete one of the methods, and then indicating by check box omitting the other methods not used. For example, the outstanding workload may either be directly entered and built within the template, or an upload of the completed form can be provided. If the Bidder

chooses to build the list, the Bidder must indicate in the location to upload the form, that they are omitting the upload since they have directly entered the information. The opposite is true if the bidder chooses to upload the form, in that case, the Bidder will check the omission box for the direct entry because you are uploading the information. Similar omission check boxes are provided in other areas on the template. Such as the Bid security area which allows 4 options. The Bidder is required to chose only one option, while all the other options not used, the omission boxes are checked.

- (4) Upon selecting to check completeness of the bid, or upon attempting submitting the bid, the E-bidding software system will automatically perform a completion check. Any areas within the bid template that are required and incomplete will be highlighted and identified calling attention to required information.
- (5) **IMPORTANT NOTE:** When attempting to submit a bid that is noted as incomplete, the system will warn the Bidder. The system WILL allow if the Bidder override the incomplete notice and submit an incomplete bid! This allows a bidder to submit drafts so that the entire template does not have to be completed in a single sitting. Each time the bid is submitted, only the latest version is saved/submitted. All previous submissions will be superseded thus allowing updates. Please ensure the final submitted bid has been identified as complete. **ANY BID SUBMITTED AT THE TIME OF CLOSE OF BIDS THAT IS RECORDED AS INCOMPLETE, WILL NOT BE UNSEALED (OPENED) OR WILL BE REJECTED AS NONRESPONSIVE.**

d) 20.8 Proposal Guaranty shall have the following addition.

- 1) The E-Bidding template provides multiple ways to provide bid security. One additional feature is the electronic verification of bid bond via Surety 2000 or SurePath. Providing the Bond ID number will automatically be checked by the E-Bidding Software to verify the bond. No additional upload or mailing of the bond will be necessary.
- 2) There are FOUR (4) methods in the E-Bidding template to provide for the bid security. The Bidder is required provide only one of the options. The other options NOT used; the Bidder must check the omission box indicating that they are not choosing each of the options as they are meeting the requirement with one of the other methods.
- 3) **Please be aware:** If choosing any option other than Electronic Bond verification or the WisDOT certificate of annual bid bond, the bidder is required to upload a copy of the bond, check AND are **the Bureau of Aeronautics must receive the original bond, or check etc by the close of business two (2) business days after the close of bids. Failure to provide the original document may result in bid rejection.**

e) Section 20.9 Proposal Delivery.

- 1) This contract is electronically bid and therefore section 20.9(4) applies. The delivery shall be via Bidexpress.com. The provided template for the specific project must be completed. All components necessary except for bidder uploads are provided in the template for the contract. The Software automatic checking feature will check to see that components are completed, or files uploaded, but it is not capable to make determinations as the sufficiency of the information or documents to meet the contract

requirement(s). The Department reserves the right and authority to approve or reject the bid based upon the technical or other information provided.

- 2) **Bids received and indicated as incomplete after the close of bids will be not be opened or rejected as nonresponsive.**
- 3) Bids submitted by firms who have not obtained approved, current and valid prequalification in accordance with the bid advertisement **will not be opened or rejected as nonresponsive.**
- 4) E-Bidding will not allow any bid to be submitted after the time of close of bids
- 5) **Firms who intend to submit a bid proposal must register and obtain a digital ID.**
 - a. This registration is free of charge and may take several days to fully process and complete. Therefore, potential bidders are encouraged to obtain their digital ID registration as soon as possible to ensure the digital ID is obtained to allow sufficient time to complete the bid prior to the deadline of close of bids.
 - b. **Only the Prime or General contractor actually submitting a bid proposal is required to obtain a digital ID.** No bid can be submitted without the Digital ID. Subcontractors or suppliers are NOT required to obtain digital ID registration.
 - c. **ATTENTION:** Despite the similar name, this project is bid under BidExpress.com. Which is unique, distinct and completely separate from AASHTOware (BidX.com). Separate registration and digital ID credentials are required to bid this contract under BidExpress.com
- 6) **Cost for Electronically Submitting a Bid:** There is a fee that the bidder will be charged for submitting the bid. These fees are subject to change from time to time. Only Prime or General Contractors who select and choose to submit a bid proposal on the contract will be charged a single fee. There are two fee options.

11. **Section 70-11 of the Federal General Provisions - Responsibility of Damage and Tort Claims** shall be supplemented with the following section 70-11(a) as follows:

70-11(a) Local Insurance Requirements

A. Standard Commercial Insurance

Maintain not less than, the following standard insurance types and limits of commercial insurance in force until completing and obtaining the department's acceptance of all work as specified in 50-15 "Final Acceptance".

| Type of Insurance | Minimum Limits Required [Note 1] |
|---------------------------------|--|
| 1. Commercial general liability | \$2 million combined single limits per |

| | |
|--|--|
| insurance; shall be endorsed to include blanket contractual liability coverage. | occurrence with an annual aggregate limit of not less than \$4 million. |
| 2. Workers' compensation and employers' liability Insurance. | Workers' compensation limits: statutory Limits Employers' liability limits: Bodily injury by accident: \$100,000 each accident Bodily injury by disease: \$500,000 each accident \$100,000 each employee |
| 3. Commercial automobile liability insurance: shall cover all contractor-owned, non-owned, and hired vehicles used in carrying out the contract. | \$1 million-combined single limits per occurrence. |

[Note 1] The contractor may satisfy these requirements through primary insurance coverage or through excess/umbrella policies.

B. Builders Risk Insurance

It is the responsibility of the Contractor to provide Builder's Risk Insurance according to the stated specifications when the building is new construction of a freestanding structure or if the Contractor has complete control of the building or during these type of operations including but not limited to: new terminal buildings, renovating, expanding existing terminal buildings, hangars, equipment storage buildings etc.

The Contractor will provide and maintain "All Risks" Builders Risk insurance insuring 100% of full replacement value of the work including change orders for incorporation into work. The insurance shall be purchased by the Contractor, and name all Sub-Contractors of all tiers, Wisconsin Department of Transportation and the airport owner or owners as insured's, and all others having an insurable interest in the Work (if any).

Insurance provided is to insure against "All Risks" of physical loss or Damage and be issued on an "All Risks" builders risk policy to apply to:

- a) The "All risk" Builders Risk policy shall include coverage for all fixtures, materials, machinery, and equipment that constitute a permanent part of the structure. This coverage shall also include coverage for damage to foundations, including pilings, equipment, machinery and materials that have not been installed but which are destined to become a permanent part of the structure including property in transit.

Each bidder shall provide the department with certificates of insurance as evidence that required coverage's for insurance types 1, 2, and 3 are in force. The bidder shall provide certificates of insurance with their prequalification or accompanied with the contract prior to the department fully executing the contract.

Notify the department at least 60 calendar days before a cancellation or material change

in coverage. Only obtain coverage from insurance companies licensed to do business in the state that have an A.M. Best rating of A- or better. The cost of providing the required insurance coverage and limits is incidental to the contract. The department will make no additional or special payment for providing insurance.

The above insurance requirements shall apply with equal force whether the contractor or a subcontractor, or anyone directly or indirectly employed by either, performs the work under the project.

12. **Section 90-06 of the federal General Provisions - Partial Payments** shall be supplemented with the additional section 90-06(a) as follows:

90-06(a) Payment Withholdings

Liquidated Damages and Claims

(1) The department will withhold a portion of the payment from progress payment estimates for liquidated damages and claims including the following:

1. To provide for recovery of liquidated damages assessable against the contract as specified in Section 80-08
2. To cover claims against the contract filed with the department under chapter 779 of the Wisconsin statutes.

<http://docs.legis.wi.gov/statutes/statutes/779>

3. To provide for recovery of damage and tort claims assessable against the contract as specified in the project special provisions.

(2) Liquidated Damages as assessed and finally determined will be permanently withheld.

(3) The amount withheld for claims or recovery of damage for tort claims will be released in accordance with the resolution of the claim.

Retainage

(1) In addition to liquidated damage withholding, the Department will withhold retainage in accordance with State Statute 66.0901 as follows:

1. An amount equal to 5 percent of each estimate until 50% of the work has been completed. Thereafter the total amount of retainage will remain equal to 5 percent of the estimated completed cost shall continue to be retained while the project is progressing satisfactorily.
2. At 50% completion or any time thereafter when the work is not satisfactory, additional amounts may be retained, but the total retainage may not exceed 10% of the estimated completed contract value.

(2) Retainage may be released upon substantial completion as specified in 50-15, except an amount equal to the estimated value of remaining work to be completed

which shall be retained until final acceptance. After final acceptance has been granted as specified in 50-15, any remaining retainage shall be released.

13. **Award of Contract.** Award of Contract will be in accordance with Section 30.2 of Part 1 – Federal General Provisions. Section (3) from the Federal General Provisions reads as follows:

If the Department does not make an award by September 30, 2026, after opening the proposals, the lowest responsible Bidder, after September 30, 2026, may request, in writing, that the Department make the award. Stipulate a deadline of 10 business days or more, after the date of the request, for the department to make the award. If the Department does not make the award within the stipulated time, the Bidder is relieved of its obligation to execute a contract and contract bond.

14. **Construction Layout and Staking**

Construction Layout and Staking shall be according to Section 50-07 of the General Provisions.

Engineer will set necessary horizontal and vertical control for the project. The Contractor is responsible for preserving the Control, and for all construction staking required to construct the project in accordance with the lines and grades shown on the Plans.

No payment will be made separately or directly for Construction Layout and Staking. Construction Layout and Staking shall be considered necessary and incidental to the work of this Contract.

15. **Construction Superintendent**

The following supplements Section 50-05 of the General Provisions.

- A. The Contractor shall furnish a competent Construction Superintendent for the duration of the project to provide construction management.
- B. The responsibilities of the Construction Superintendent include but are not limited to: coordination with the Engineer, the Airport, WisDOT-Bureau of Aeronautics, and all subcontractors; scheduling of subcontractors; supervision of all construction; supervision of all signing, barricades, and lighting; quality control, change order approval; coordination with all utilities involved and attend all construction meetings.
- C. The Construction Superintendent shall be employed by the prime contractor and shall be named at the preconstruction conference, subject to the approval of the Engineer. The Superintendent responsibilities shall not be delegated to a subcontractor or other individual unless approved by the Engineer. The Superintendent shall be available 24 hours a day and shall be on the construction site when there is construction activity on the project, unless otherwise approved by the engineer. During times of shift work, or day and night work schedules, the Superintendent may appoint an additional Superintendent, as approved by the Engineer. At all times during construction, one of these approved Superintendents must be on the construction site, unless otherwise

approved by the Engineer.

- D. The Superintendent shall attend all periodic construction meetings unless otherwise authorized by the Engineer. Bi-weekly construction meetings are anticipated however, the Engineer may schedule more or less frequent meetings depending upon the nature of the anticipated construction activities.
- E. No separate measurement or payment will be made for a construction trailer, phone services, or utility services to be used by the Construction Superintendent if contractor deems those necessary.
- F. Liquidated damages in the amount of five hundred (\$500) per day will be assessed for each day there is construction activity on the project site without an approved Construction Superintendent being available on-site. Any liquidated damages will be accounted for and assessed by the engineer separate from any other liquidated damages that may apply to the contract and will be administered by the department.

16. Requirements for Airport Identification Badges

The following supplements Section 50 of the General Provisions. The requirement for ID badges is as on the LSE Regional Airport badging information page which can be found at <https://support.lseairport.com/help/badging>

A. Purpose

To establish the procedures and guidelines for use in the identification of the contractor personnel during the construction of this project.

B. Scope

Review the La Crosse Airport badging website for guidance on obtaining an airport badge: <https://business.lseairport.com/general-aviation-resources/#badging>,

Contractors working in airport buildings that have access to the airfield such as the terminal will be required to obtain an airport badge. Contractors working inside the airfield fence will be required to obtain an airport badge. Terminal area access requires a SIDA badge while all other access requires an AOA badge.

If a contractor needs infrequent access to airport buildings or the airfield (less than 3 days) for work, they may be escorted by a badged person. A badged person can only escort one vehicle at a time. A badged person can be responsible and escort up to 3 unbadged workers at a time and must be able to maintain line of site, talk to the unbadged personnel and actively supervise them at all times. Unbadged personnel cannot leave a badged persons line of site for any length of time while the unbadged personnel are in the nonpublic areas of the building. The badged person is responsible for maintaining security of the building or airfield and for ensuring that contractor personnel always stay within designated areas. Only badged personnel may open an access-controlled door, locked door, security gate, fence gate or allow personnel inside the building or

inside the airfield fence.

To have personnel badged, the prime contractor will be required to complete a Contractor Authorization Form listing the names of all prime contractor and subcontractor employees that will need to be badged for the project. Additionally, the prime contractor will be required to designate a person who will act as a signatory authority. The signatory authority will be required to personally authorize each badge application by signing the application and will be responsible for the return of all badges at the end of the project or ineligibility of applicant.

All badge request forms must be completed by an individual applicant and be signed by the signatory authority. Once the form is completed and signed, the personnel must come to the airport and present the signed form along with two forms of government issued identification to initiate a threat assessment and background check. A passport will count as two forms of government issued identification. If the proposed badge recipient passes a threat assessment check, the recipient will then be required to attend training classes and pass the training test before their badge is issued.

If the person proposed to be badged will be driving on the Air Operations Area (AOA), they must also pass an airfield driving test.

Processing time to get a badge is approximately 10 days after presenting the required identification and forms in person at the La Crosse Regional Airport. Badges are \$75 each and will expire on June 30th. There is a \$30 renewal fee upon expiration. All expired and unexpired badges must be turned in at the end of the project or a fine per Airport policy will be imposed.

Failure to follow the requirements of the badging guide may result in fines from the Transportation Safety Administration (TSA), the Airport, or both.

C. Payment

No direct payment will be made for ID badges; the costs of all badge requirements outlined in the guide shall be included as incidental to the construction costs of this project.

17. Airport Security

- A. In the interest of airport security, Contractor's forces shall be readily identifiable. Contractor will be required to certify at the Pre-construction Conference that contractor will observe and respond to Airport Director's requirements for complying with the Airport Operations training. Security Badges issued by the Airport will be required for the Contractor's forces, which will be discussed at the Pre-construction Conference.
- B. The Contractor shall have a designated person on call 24 hours per day for security or utility issues that arise because of the project construction.

- C. No motor vehicles of any type shall be allowed to park overnight or unattended without prior authorization from Airport Operations through the Engineer.

In the event that security is breached through the Contractor's neglect, Contractor shall pay La Crosse Regional Airport all costs associated with the security breach, including, but not limited to, fines, legal costs, equipment replacement, and repair of damage.

18. City of La Crosse Insurance Requirements

The following insurance requirements must be met to meet the City of La Crosse requirements. If other insurance requirements are listed within the project documents, the higher of the two will prevail.

Worker's Compensation and Employers Liability Insurance – The Contractor shall cover or insurance, under the applicable labor laws relating to worker's compensation insurance, all of their employees in accordance with the law in the State of Wisconsin. The Contractor shall provide statutory coverage for work related injuries and employer's liability insurance with limits of \$1,000,000 each accident, \$1,000,000 disease policy limit, and \$1,000,000 disease each employee.

19. Typical Airline Flight Schedule

Contractor to cooperate with terminal operations to avoid impacts to terminal facilities during scheduled commercial service flights. LSE is served by approximately 7 regularly scheduled daily arrivals and 7 regularly scheduled daily departures per 24-hour period. In addition, Allegiant Airlines flights are scheduled several times a week. See the flight schedule for more information on typical numbers and times of incoming flights. Flight schedule is subject to change at any time and can be found at:

<https://lseairport.com/flight-status/> and <https://www.flight.info/LSE/departures> and <https://www.flight.info/LSE/arrivals>.

See plans for additional information on work restrictions related to arrival and departure of scheduled aircraft.

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SEGMENT III

NON-STANDARD SPECIFICATIONS: GENERATOR SPECIFICATIONS

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**Project Title Page
for
Non-Standard Specifications**

**Generator
La Crosse Regional Airport
La Crosse, Wisconsin
Project No. LSE 1019, Contract 1**

Mead & Hunt, Inc.
R2309930-180838.01

Prepared for:

La Crosse Regional Airport
La Crosse, Wisconsin

Prepared by:



February 26, 2026

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**Certifications and Seals
for
Generator
La Crosse Regional Airport
La Crosse, Wisconsin
Project No. LSE 1019, Contract 1**

Mead & Hunt, Inc.
R2309930-180838.01

Prepared for:

La Crosse Regional Airport
La Crosse, Wisconsin

Prepared by:

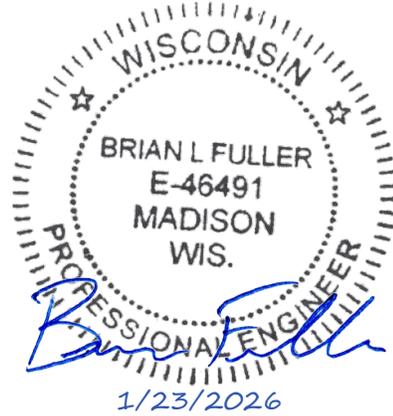


January 23, 2026

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ELECTRICAL ENGINEER – Brian Fuller, PE

Mead & Hunt
2440 Deming Way
Middleton, WI 53562
608.273.6380



END OF SECTION 000107

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Technical Specifications for Bid Item NS-90001 – Generator, per LS.

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END OF SECTION 000110

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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work by Owner.
5. Work under separate contracts.
6. Future work.
7. Purchase contracts.
8. Owner-furnished products.
9. Contractor-furnished, Owner-installed products.
10. Access to site.
11. Coordination with occupants.
12. Work restrictions.
13. Specification and Drawing conventions.
14. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification:

1. Project Name: Terminal Generator Replacement
2. Project Number: LSE 1019
3. Project Location: La Crosse Airport ARFF, 2841 Fanta Reed Rd, La Crosse, WI 54603

B. Owner: La Crosse Regional Airport, City of La Crosse, WI

1. Owner's Representative: Lauren Koss, Interim Airport Director

C. Project Management: Mead & Hunt

D. Airport Engineer: Mead & Hunt

E. Mead & Hunt Consultants: Mead & Hunt has retained the following design professionals who have prepared designated portions of the Contract Documents: N/A

F. Owner Consultants: Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Mead & Hunt has prepared the following portions of the Contract Documents:
 - a. Electrical

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The Terminal Generator Replacement project consists of the following:
 - a. New bi-fuel (natural gas and LPG) generator in winterized, outdoor enclosure on new concrete foundation to serve Terminal; two new automatic transfer switches (ATSS); add positioning functions for PBB's to new generator system; new feeders from generator to ATSS, branch circuits to generator set ancillaries (coolant heater, oil heater, battery heater, lights, GFCI receptacle); trenching, new remote annunciator panel, new natural gas piping

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.4 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract

1. None Anticipated.

C. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory Work under this Contract.

1. None Anticipated.

D. Building Permit: Submission & Fee payments to obtain a building permit will be by Contractor.

E. Concurrent Work: Owner will award separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1. None Anticipated.

1.5 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.
- B. Owner-Furnished Products:
 - 1. None Anticipated.

1.6 ACCESS TO SITE

- A. General: Each 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.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits: Confine construction operations to the scope of work associated with the building and renovated areas.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.7 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during the construction period, except for areas under immediate construction. Project will be completed in phases to allow occupancy of building. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having authority.
 - 2. Maintain owner access to utilities including power, heat, water and network connection throughout construction. Utilities are required for owner's operations.
 - 3. Provide not less than 72-hour notice to Owner of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having authority.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7 a.m. to 7 p.m., Monday through Friday, unless otherwise indicated.
 - 1. Weekend Hours: Shall be coordinated with the Owner.
 - 2. Hours for Utility Shutdowns: Shall be coordinated with the Owner.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services per requirements indicated:
 - 1. Notify the Airport Engineer not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Restricted Substances: Use of tobacco products and other controlled substances within the existing building is not permitted.
- F. Employee Identification: Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- G. Employee Screening: Comply with Owner's requirements for background screening of Contractor personnel working on Project site.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.10 MISCELLANEOUS PROVISIONS

- A. Refer to front end documents for additional information and restrictions for construction occurring at Airports.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

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Section 012500 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 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 or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 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.
 - 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.
 - 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 names and addresses and names and addresses of architects and owners.

- h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - 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. Cost information, 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 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 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 15 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. Substitution request is fully documented and properly submitted.
- c. Requested substitution will not adversely affect Contractor's construction schedule.
- d. Requested substitution has received necessary approvals of authorities having jurisdiction.
- e. Requested substitution is compatible with other portions of the Work.
- f. Requested substitution has been coordinated with other portions of the Work.
- g. Requested substitution provides specified warranty.
- h. 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.

B. Substitutions for Convenience: Not allowed unless otherwise indicated.

PART 3 EXECUTION (NOT USED)

END OF SECTION 012500

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Section 012900 - PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 RELATED WORK

- A. Review all Division 01 Sections.
- B. Divisions 02 through 49 Sections for specific requirements. Equally Note:
1. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 2. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.
 3. Division 01 Section "Submittal Procedures" for administrative requirements governing the preparation and submittal of the submittal schedule.
 4. Section 90 "Measurement and Payment", and other related portions of General Provisions and Special Provisions.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the contract amount to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's construction schedule.
1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the Schedule of Values to the Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual Table of Contents as a guide to establish line items for the Schedule of Value. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the Schedule of Values:

- a. Project name and location.
 - b. Name of Architect.
 - c. Owner's project and contract number
 - d. Architect's project number.
 - e. Contractor's name and address.
 - f. Date of submittal.
2. Arrange Schedule of Values consistent with format of AIA Document G703.
 3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Change Orders (numbers) that affect value.
 - d. Dollar value as a percentage of the Bid to nearest one-hundredth percent, adjusted to total 100 percent.
 4. Provide a breakdown in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts where appropriate.
 5. Round amounts to nearest whole dollar; total shall equal contract sum.
 6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Payment for materials on hand shall be in accordance With Standard Specification Section 90-07.
 7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
 9. Provide a separate line item for the following portions of the work:
 - a. Close-out documentation required in appropriate sections of Division 1 General Requirements and Technical Specifications sections. Value established for this item shall be subject to approval by Architect.
 - b. Engineer's Field Office as specified (GP 60-05, Seg IV Sections 015000, 015100, 015213 as applicable)
 10. Schedule of Values Updates: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

- B. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as forms for Applications for Payment.
- C. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the Schedule of Values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- D. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Payment for materials on hand shall be in accordance With Standard Specification Section 90-07.
 2. Provide summary documentation for stored materials indicating the following:
 - a. Materials previously stored and included in previous Applications for Payment.
 - b. Work completed for this Application utilizing previously stored materials.
 - c. Additional materials stored with this Application.
 - d. Total materials remaining stored, including materials with this Application.
- E. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.

- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Schedule of unit prices (if applicable).
 6. Submittal schedule (preliminary if not final).
 7. Copies of building permits.
- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 5. AIA Document G707, "Consent of Surety to Final Payment."
 6. Evidence that claims have been settled.
 7. Final liquidated damages settlement statement.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 2900

Section 013300 - SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and the complete Proposal Book, including General Contract Provisions, Special Provisions, and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for submitting substitutions for material and product requirements specified.
 - 2. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values
 - 3. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
 - 4. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 5. Section 017810 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 6. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect/Engineer's or Owner's Authorized Representative'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/Engineer's or Owner's Authorized Representative'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. Closeout Submittals: Written and graphic information and physical samples that do not require Architect/Engineer's or Owner's Authorized Representative's responsive action that are submitted at project closeout, refer to Section 017700 – Closeout Procedures. Submittals may be rejected for not complying with requirements. Closeout submittals are those submittals indicated in individual Specification Sections as "closeout submittals."

- D. Portable Document Format (PDF): 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.
- E. Wherever in the specifications or upon the drawings 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 Contracting Officer 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 Contracting Officer, unless otherwise expressly stated.
- F. 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 drawings 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.”
- G. Substitutions: For Contractor-proposed substitution requests, refer to Section 012500 – Substitution Procedures.

1.4 SUBMITTAL LOG

- A. Submittal Log: Contractor shall use the submittal log attached to this Section that includes a list of submittals, arranged by in chronological order Division and Section. The log includes time required for review by the Architect/Engineer or Owner’s Authorized Representative for each submittal listed. MS Excel format of the document will be provided to the Contractor at the preconstruction meeting for use in developing submittals.
 - 1. Each Section in the Submittal Log includes the submittals required in the specification manual(s). There are three types of submittals that may be included in each Section. The submittal types are action submittals (A), informational submittals (I), and closeout submittals (C). Refer to “Definitions” Article for descriptions of each submittal type.

1.5 SUBMITTAL PROCEDURES

- 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 submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect/Engineer or Owner’s Authorized Representative reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- B. Review submittals prior to transmittal; determine and verify field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal with requirements of contract documents.
- C. Contractor shall be responsible for quantities and dimensions shown on submittals taken from Contract Drawings.
- D. Make submittals promptly in such sequence as to cause no delay in Work. Only the Contractor shall submit submittals to Architect/Engineer's or Owner's Authorized Representative's. Contractor shall number transmittals consecutively and shall indicate the submittal procedure number being followed.
- E. All submittals shall include the Contractor's Material Submittal Cover form. Reference the attached sample copy for completion of the document. Complete all fields in the Contractor's Material Submittal Cover form that are highlighted with RED text in the sample copy. MSWord format of the document will be provided to the Contractor at the preconstruction meeting for use in developing submittals.
 - 1. Each submittal item shall be listed individually on the Material Submittal Cover.
 - 2. Provide one submittal for each Section. Do not combine Sections unless material for the Sections are dependent on each other.
 - 3. Include list of drawings with shop drawing submittals.
 - 4. Provide field dimensions, clearly identified as such, as applicable where requested by subcontractor or fabricator.
 - 5. Relation to adjacent or critical features of Work or materials, as applicable.
 - 6. Applicable standards, such as ASTM or Federal Specification numbers.
 - 7. Identification of deviations from Contract Drawings.
 - 8. Identification of revisions on the resubmitted.
 - 9. Additional information as required by Contract Documents.
 - 10. 8" x 3" blank space for Contractor's approval stamp and Architect/Engineer stamps.
 - 11. Contractor's approval stamp.
- F. Options: Identify options requiring selection by Architect.
- G. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- H. Apply the Contractor's approval stamp, signed may be provided on a transmittal cover sheet for the entire submittal or on each sheets of shop drawings, on cover sheet of each product data item, and on stamp sheet of each sample certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of information within submittal with requirements of Work and of Contract Documents. Use of electronic stamps and signatures are permitted.
 - 1. Contractor's stamp shall only note that the submittal has been approved. The use of words or phrases such as "reviewed" or "reviewed as noted" is not acceptable.

- I. Submittals without Contractor's approval stamp and submittals which, in Architect/Engineer's or Owner's Authorized Representative's opinion are incomplete, contain numerous errors, or have not been checked or have only been checked superficially, will be returned without comments. Any resulting delays shall be Contractor's responsibility.
- J. Action Submittal Requirements: All action submittals required for each Section must be provided in a single submission for review. Partial submittals are not permitted and will be returned without comment. Where partial submittals are necessary the Contractor shall coordinate with Architect/Engineer or Owner's Authorized Representative.
- K. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in the Submittal Log and the individual Specification Sections.
 - 1. Email: Prepare submittals as PDF package, and transmit to Architect/Engineer or Owner's Authorized Representative by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
 - a. Architect/Engineer or Owner's Authorized Representative will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
- L. 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/Engineer or Owner's Authorized Representative action stamp.
- M. Fabrication of products or beginning work prior to the return of approved submittals is at the risk of the Contractor.
- N. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- O. 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.

1.6 SUBMITTAL REQUIREMENTS

- A. 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 unsuitable 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. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. 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 unless submittal based on Architect's digital data drawing files is otherwise permitted.
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. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 3. Email Transmittal: Provide PDF transmittal. Include 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 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; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit sets of Samples. Architect will retain one Sample set; remainder will be returned.
 - 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 sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 - 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 - 2. Manufacturer and product name, and model number if applicable.
 - 3. Number and name of room or space.
 - 4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit 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. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.

- e. Description of product.
- f. Test procedures and results.
- g. Limitations of use.

1.7 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 insufficient 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 file 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, loads, and other factors used in performing these services.

1.8 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
 - 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
- B. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- C. Architect will return without review submittals received from sources other than Contractor.
- D. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 3300

Section 013523 - OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
1. Guidelines for operational safety on and at airports during construction.

1.2 SUBMITTALS

- A. Safety Plan Compliance Document (SPCD):
1. Following Federal Aviation Administration (FAA) Advisory Circular 150/5370-2G, a SPCD for a project shall be submitted to the WisDOT Bureau of Aeronautics and to the airport operator for review and approval. This should be submitted 14 days prior to the preconstruction conference. The notice-to-proceed cannot be issued without approval of this document.
 2. The SPCD shall be prepared in a detailed, written and pictorial format that identifies the timing and methodology for the contractor's compliance with the project's Construction Safety and Phasing Plan (CSPP) located in the construction plans & specifications. Any proposed alteration by the contractor from the CSPP shall be fully explained so a thorough analysis and determination can be made of the proposed modification.
 3. See the Safety Plan Compliance Worksheet found in the Specifications and Section 80.04.1 for more information on the SPCD. for additional detail.

1.3 CONTRACTOR ACCESS

- A. Vehicle and Pedestrian Operations.
1. Contractor's Employee Parking.
 - a. No parking of contractor personal vehicles (POV) within the Secure Area/ Air Operations Area (airside).
 - b. Personal vehicles to be parked at locations indicated in the plans.
 2. Contractor construction vehicle parking.
 - a. Contractor construction vehicles to be parked in the staging area at locations shown on the plans.
- B. Construction Site Entrance Locations.
1. See construction plans for gate and fence access locations.
- C. Lighting of Contractor Construction Vehicles
1. Contractor vehicles, that need access to the secure area, shall be equipped with a flashing light that is mounted on the uppermost part of the vehicle.
 2. Lights shall be flashing yellow and visible from any direction, day and night, including from the air. Lights must have a peak intensity within the range of 40-400 candelas (effective) from 0 degrees horizontal up to 10 degrees above horizontal and for 360 degrees horizontal. The upper limit of 400 candelas (effective) is necessary to avoid damage to night vision.

3. From 10 degrees to 15 degrees above the horizontal plane, the light output must be 1/10th of peak intensity or between 4 and 40 candelas (effective).
 4. Lights must flash at 75 +/- 15 flashes per minute.
- D. Vehicle Speed
1. Motor vehicles shall not operate at a speed that endangers property or persons in the area.
 2. Motor vehicles shall not exceed 10 mph on the aircraft parking ramps or 25 mph on the perimeter/service roads. All vehicles are restricted to 5 mph when in close proximity to aircraft.
- E. Involvement in Vehicle Accidents.
1. Any persons damaging any airfield light fixture or other airport facility shall report such damage to the Airport Manager's office immediately and shall be responsible for his or her share of any costs required to repair or replace damaged fixtures or facility.
- F. Description of proper vehicle operations
1. Proper vehicle operations shall be adhered to at all times and consistent with instruction provided by owner during an on-site Driver's Training briefing. See "Training Requirements for Vehicle Drivers" Article below.
 2. Vehicles within the secure area may only be operated by persons having successfully completed Non-Movement Area Driver Training or be escorted by a person having successfully completed Non-Movement Area Driver Training. The operator must provide proof of insurance, vehicle registration and operator drivers' license.
- G. Required escorts.
1. All drivers requiring access to the secure area, that do not have driver training, shall be escorted by a person that have successfully completed Non-Movement Area Driver Training, that are currently badged and permitted accordingly.
 2. All drivers requiring access to Movement Areas that do not have Movement Area training shall be escorted by a person that has successfully completed Movement Area Driver Training and are currently badged and permitted accordingly.
- H. Situational awareness.
1. Contractor's personnel shall constantly monitor their surroundings. Contractor must confirm by personal observation that no aircraft is approaching their position even when the airfield is closed.
 2. Vehicle drivers must confirm by personal observation that no aircraft is approaching their position during operation in the Non-Movement Area. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time.
- I. Two-way radio communication procedures.
1. General: Contractors will not access areas outside the terminal apron and therefore two-way radio communication with the air traffic control tower (ATCT) will not be required.

1.4 FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

- A. Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near aircraft movement areas. Materials capable of creating FOD must be continuously removed during the construction project.
1. Vehicle Cleanliness & Security: All contractors shall keep vehicle contents and payload secure at all times to prevent migration of materials onto airfield pavements.
 2. Pavement Sweeping/Vacuuming: Pavements shall be kept free of construction materials, dirt, rocks and other debris at all times for the life of the project .
 3. FOD Fence: Not applicable.
 4. Inspections: Not applicable.
 5. Inspection of FOD procedures and effectiveness shall be part of all inspections.

1.5 CONSTRUCTION SAFETY AND PHASING PLAN

- A. The initial Construction Safety and Phasing Plan developed for this project is provided as on drawing G-081. This document is to be used as a start for a contractor's CSPP.

END OF SECTION 013523

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SECTION 013553 - SECURITY PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Guidelines for the Contractor to obtain badges
- B. Airport Badging Forms are on-line at:
 - 1. <https://business.lseairport.com/general-aviation-resources/#badging>.

1.2 SIDA BADGE INSTRUCTIONS

- A. TSR Part 1542.209 requires a fingerprint-based Criminal History Records Check (CHRC) for all persons seeking unescorted access to airport SIDA/Secure Areas and "each individual authority to authorize others to have unescorted access to a SIDA" [this means Company Certification Officials who are authorized to sign ID application requests]. The results of the CHRC must "not disclose he or she has a disqualifying criminal offense as described in paragraph (d) of this section [of Part 1542]".
- B. Procedures:
 - 1. All contractors working on the project will be required to obtain an airport SIDA badge.
 - 2. Badged personnel are responsible for maintaining security and for staying within designated areas at all times.
 - 3. In order to have personnel badged, the prime contractor will be required to complete a Contractor Authorization Form listing the names of all prime contractor and subcontractor employees that will need to be badged for the project. Additionally, the prime contractor will be required to designate a person who will act as a signatory authority. The signatory authority will be required to personally authorize each badge application by signing the application and will be responsible for the return of all badges at the end of the project or ineligibility of applicant.
 - 4. All badge request forms must be completed by an individual applicant and be signed by the signatory authority. Once the form is completed and signed, the personnel must come to the airport and present the signed form along with two forms of government issued identification to initiate a threat assessment and background check. A passport will count as two forms of government issued identification. If the proposed badge recipient passes a threat assessment check, the recipient will then be required to attend training classes and pass the training test before their badge is issued.
 - 5. Processing time to get a badge is approximate 10 days after presenting the required identification and forms in person at the La Crosse Regional Airport.
- C. Charges:
 - 1. Badges are \$75 each. There is a \$30 renewal fee upon expiration.

1.3 SIDA BADGE RETURN

- A. All badges issued under this project be returned to Airport Operations prior to final payment being made to the contractor.
- B. Lost badges will be assessed as an administrative fee.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 013553

SECTION 013553.13 - GATE AND FENCE SECURITY AND BADGING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Badging requirements related to gate security, fence security, and badging incidental to the project.

1.2 BADGING

- A. Review the La Crosse Airport badging website for guidance on obtaining an airport badge: <https://business.lseairprt.com/general-aviation-resources/#badging>. Contractors working inside airport buildings that have access to the airfield such the terminal or ARFF will be required to obtain an airport badge. Contractors working inside the airfield fence will be required to obtain an airport badge. Terminal area access requires a SIDA badge while all other access requires an AOA badge.
- B. If a contractor needs infrequent access to airport buildings or the airfield (less than 3 days) for work, they may be escorted by a badged person. A badged person can only escort one vehicle at a time. A badged person be responsible and escort up to 3 unbadged workers at a time and must be able to maintain line of site, talk to the unbadged personnel and actively supervises them at all times. Unbadged personnel cannot leave a badged persons line of site for any length of time. The badged person is responsible for maintaining security of the building or airfield and for ensuring that contractor personnel always stay within designated areas. Only badged personnel may open an access-controlled door, locked door, security gate, fence gate or allow personnel inside the building or inside the airfield fence.
- C. To have personnel badged, the prime contractor will be required to complete a Contractor Authorization Form listing names of all prime contractor and subcontractor employees that will need to be badged for the project. Additionally, the prime contractor will be required to designate a person who will act as a signatory authority. The signatory authority will be required to personally authorize each badge application by signing the application and will be responsible for the return of all badges at the end of the project or ineligibility of applicant.
- D. All badge request forms must be completed by an individual applicant and be signed by the signatory authority. Once the form is completed and signed, the personnel must come to the airport and present the signed form along with two forms of government issued identification to initiate a threat assessment and background check. A passport will count as two forms of government issued identification. If the proposed badge recipient passes a threat assessment check, the recipient will then be required to attend training classes and pass the training test before their badge is issued.
- E. If the person proposed to be badged will be driving on the Air Operations Area (AOA), they must also pass an airfield driving test.

- F. Processing time to get a badge is approximately 10 days after presenting the required identification and forms in person at the La Crosse Regional Airport. Badges are \$75 each will expire on June 30th. There is a \$30 renewal fee upon expiration. All expired and unexpired badges must be turned in at the end of the project or a fine per Airport policy will be imposed.
- G. Failure to follow the requirements of the badging guide may result in fines from the Transportation Safety Administration (TSA), the Airport, or both.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 013553.13

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary facilities, Interim Life Safety, Security, and Protection of all temporary facilities and controls.
- B. Coordinate and refer to the Temporary Utilities section 015100 and the project requirements for the Field Offices and Sheds in section 015213.

1.2 RELATED WORK

- A. Review all Division 01 Sections.
- B. Divisions 02 through 49 Sections for specific requirements.

1.3 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.
- B. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2024c.
- C. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).
- E. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.

1.4 RELATED DOCUMENTS

- A. Align these requirements with the civil related documents, overlap exists with building related materials and civil related materials. Products specified in each section are requirements, product used can apply to multiple scopes of work if needed.

1.5 PROJECT CONDITIONS

- A. Temporary Construction Facilities are required to meet the International Building Code – 2015, this includes but not necessarily limited to the Egress and Life Safety provisions of the code.
- B. This project consists of phasing and sequencing. Temporary facilities and controls are required to be maintained, installed, or removed as it pertains to each phase and allow the airport to maintain its full operation. It is the responsibility of the contractor to plan and schedule for the phases.

- C. Temporary Use of Permanent Facilities and buildings under construction.
 - 1. This project is required to follow the NFPA 241- Standard for Safeguarding Construction, Alteration, and Demolition Operations.
 - 2. Interim Life Safety is required at all buildings under construction and must meet the applicable requirements in the International Building Code – 2015, and the means of egress provisions of 4.6.10 of the NFPA 101 – Life Safety Code.
 - 3. Service: The service requirements are found in the Temporary Utilities under the 01 51 00 section.

1.6 SUBMITTALS

- A. Site Plan
 - 1. Show temporary facilities, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Project Identification and Temporary Signs
 - 1. Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- C. Fire-Safety Program
 - 1. Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture- and Mold-Protection Plan
 - 1. Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 4. Indicate methods to be used to avoid trapping water in finished work.
- E. Dust- and HVAC-Control Plan
 - 1. Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - a. Locations of dust-control partitions at each phase of work.
 - b. HVAC system isolation schematic drawing.
 - c. Location of proposed air-filtration system discharge.
 - d. Waste-handling procedures.
 - e. Other dust-control measures.
- F. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, whether occupied by others, or occupied by the Owner. Include the following:

1. Methods used to meet the goals and requirements of the Owner.
 2. Concrete cutting method(s) to be used.
 3. Location of construction devices on the site.
 4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
 5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with the Owner.
 6. Indicate locations of sensitive research ???Insert item??? areas or other areas requiring special attention as identified by Owner. Indicate means for complying with Owner's requirements.
- G. Coordinate the requirements from this section with the 01 52 13 – Field offices and Sheds.
- H. Coordinate the requirements from this section with the phasing submittals required in other documents.

1.7 QUALITY ASSURANCE

- A. Construction site and areas to meet the requirements in the code and NFPA 241.
- B. Restrooms and Sanitation for the construction site will meet the OSHA's State-Specific Regulations and where applicable the Federal OSHA job safety and health.
- C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

PART 2 PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Field Offices
 1. Contractor related field offices: A site for office trailer(s) should the General Contractor or Prime-Sub-Contractors, wish to set one up, will be designated, if space is available, by the owner.
 2. Architect's Field Office: At a minimum, the General Contractor will provide an Architect's field office and it will meet the requirements in this section and consist of the items and requirements in Field Offices and Sheds under the 015213 section.
- B. Storage
 1. Sheds and Containers: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations. All Sheds and Containers will meet the requirements listed in this section and in Field Offices and Sheds under the 015213 section.
 2. Storage of Flammable/combustible liquids/gases:
 3. Are not allowed on site and need to be stored off-site at contractor's expense and properly secured and stored.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures within the code.
- B. Standpipes: If required, will meet the requirements in NFPA 241.
- C. Restrooms and Sanitation for the construction site will meet the OSHA's State-Specific Regulations and where applicable the Federal OSHA job safety and health program.
- D. HVAC Equipment
 - 1. Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 2. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 3. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
 - 4. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures."
- E. Air-Filtration Units
 - 1. Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.
- F. Chiller Equipment
 - 1. Provide self-contained temporary chiller equipment and associated piping and controls to ensure required cooling system capacity is provided throughout renovation of chiller plant and related systems.

2.3 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (182.88 cm) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.
- B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (182.88 cm) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete bases for supporting posts.
- C. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain-link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.

- D. Wood Enclosure Fence: Plywood, 6 feet (182.88 cm) high, framed with four 2-by-4-inch (50-by-100-mm) rails, with preservative-treated wood posts spaced not more than 8 feet (243.84 cm) apart.
- E. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less in accordance with ASTM E84 and passing NFPA 701 Test Method 2.
- F. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats, minimum 36 by 60 inches (914 by 1524 mm).
- G. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- H. Provide all barriers and temporary partition assemblies to meet the requirements as shown on the G-series sequencing sheets and related specification sections.

PART 3 EXECUTION

3.1 GENERAL

- A. Construction Personnel: Contractor's employees and personnel, project inspectors and regulatory representatives, owner and owners staff, and the design professionals shall all have access to using the temporary facilities including the temporary toilets per the local and state regulations and requirements and as defined in the documents.

3.2 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities 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.

3.3 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.4 SANITARY FACILITIES

- A. Provide temporary toilets, wash facilities, and drinking water for use by construction personnel. Comply with requirements of the local code and the authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
1. Use of Permanent Toilets: Use of Owner's existing or new toilet facilities is not permitted unless otherwise noted by Owner.

3.5 WORK AREAS

- A. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
 2. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - a. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 3. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 4. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- B. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- C. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.6 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
1. Provide construction for temporary field offices, shops, and sheds located within construction area as approved by Owner and within 30 feet (914.4 cm) of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
 2. Utilize designated area for temporary field offices.
 3. Maintain support facilities until Architect issues Substantial Completion. Remove after Substantial Completion. Personnel remaining after Substantial Completion.
- B. Temporary Roads and Paved Areas
1. Comply with the Civil portion of the documents. Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated in the documents.

2. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations. Return all temporary roads to condition existing before initial use or in a condition acceptable to Owner.
1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas in accordance with Civil documents.
 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course in accordance with Civil Documents.
- D. Traffic Controls
1. Comply with requirements of authorities having jurisdiction.
 2. Protect existing site improvements to remain, including curbs, pavement, and utilities.
 3. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking
1. Use designated areas for construction personnel.
- F. Storage and Staging
1. Use designated areas of Project site for storage and staging needs.
- G. Dewatering Facilities and Drains
1. Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 2. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 3. Remove snow and ice as required to minimize accumulations.
- H. Project Signs
1. Provide Project signs as indicated. Unauthorized signs are not permitted.
 2. Identification Signs: Provide Project identification signs as indicated on Drawings.
 3. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 4. Maintain and touch up signs, so they are legible at all times.
- I. Waste Disposal Facilities
1. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

2. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017000 "Execution Requirements."

J. Lifts and Hoists

1. Provide facilities necessary for hoisting materials and personnel.
2. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

K. Temporary Elevator Use:

1. Use of elevators is not permitted.
2. See Division 14 elevator Section for temporary use of new elevators.

L. Existing Elevator Use

1. Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
2. Do not load elevators beyond their rated weight capacity.
3. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work, so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

M. Temporary Stairs

1. Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

N. Existing Stair Usage

1. Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
2. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas, so no evidence remains of correction work.

O. Temporary Use of Permanent Stairs

1. Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.7 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. General:

1. Comply with drawings and Notes on drawings, and this section.

B. Protection of Existing Facilities

1. Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 2. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- C. Environmental Protection
1. Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 2. Comply with work restrictions specified in Section 011000 "Summary."
- D. Temporary Erosion and Sedimentation Control
1. Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent, and requirements specified in Section 312010 "Earth Moving for Building and Structures".
- E. Temporary Erosion and Sedimentation Control
1. Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.
 2. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
 3. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 4. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 5. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- F. Stormwater Control
1. Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- G. Tree and Plant Protection
1. Comply with requirements specified in Section 015600 "Temporary Barriers and Controls."
 2. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- H. Pest Control
1. Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals, so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- I. Site Enclosure Fence

1. Before construction operations begin and complying with the preparation phase requirements located on the G-series drawings, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
 2. Comply with Airport requirements for security into the Airport site as a whole all fencing scope needs to be approved by owner.
 3. Extent of Fence: As indicated on Drawings for each phase.
 4. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- J. Security Enclosure and Lockup
1. Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- K. Barricades, Warning Signs, and Lights
1. Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- L. Temporary Egress
1. Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- M. Covered Walkway
1. Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction and requirements indicated on Drawings.
 2. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 3. Paint and maintain appearance of walkway for duration of the Work.
- N. Temporary Enclosures
1. Comply with drawings and Notes on drawings, and this section
 2. Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior. Manage enclosures with the requirements as indicated on drawings.
 3. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- O. Temporary Partitions
1. Comply with drawings and Notes on drawings, and this section
 2. Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise. Comply with drawings.
 3. Construct dustproof partitions as indicated on drawings and use materials that are consistent within the respective specifications.

4. Comply with requirements and assemblies indicated on drawings, however where not indicated on drawings and needed, Construct:
 - a. Construct dustproof partitions with gypsum wallboard, with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side. or
 - b. A Dustproof partition with two layers of 6-mil (0.14-mm) polyethylene sheet on each side. Cover floor with two layers of 6-mil (0.14-mm) polyethylene sheet, extending sheets 18 inches (457.2 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - c. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219.2 mm) between doors. Maintain water-dampened foot mats in vestibule.
5. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
6. Insulate partitions to control noise transmission to occupied areas.
7. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
8. Protect air-handling equipment.
9. Protect all Gates, Aircraft, and Aircraft related equipment. Coordinate with Owner if Aircraft related equipment needs to be address or protected by contractor.
10. Provide walk-off mats at each entrance through temporary partition.

P. Temporary Fire Protection

1. Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
2. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
3. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction. Permits may be required, contractor is responsible to pay for obtain any welding-relating compliance.
4. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
5. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign, stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.8 MOISTURE AND MOLD CONTROL

A. Moisture and Mold Protection

1. Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.

B. Exposed Construction Period

1. Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

2. Protect porous materials from water damage.
3. Protect stored and installed material from flowing or standing water.
4. Keep porous and organic materials from coming into prolonged contact with concrete.
5. Remove standing water from decks.
6. Keep deck openings covered or dammed.
7. Comply with all Manufactures requirements for exposure to elements.

C. Partially Enclosed Construction Period

1. Before or After each construction phase or after installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 2. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 3. Keep interior spaces reasonably clean and protected from water damage.
 4. Periodically collect and remove waste containing cellulose or other organic matter.
 5. Discard or replace water-damaged material.
 6. Do not install material that is wet.
 7. Discard and replace stored or installed material that begins to grow mold.
 8. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period

1. After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 - a. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 - b. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials. Refer to product and manufactures requirements.
 - c. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - 1) Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
 - 2) Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - 3) Remove and replace materials:
 - a) That cannot be completely restored to their manufactured moisture level within 48 hours.
 - b) That become warped, distorted, damaged, or aesthetically look different to the native appearance. Architect's or Owner can have the discretion of the appearance.

3.9 OPERATION, TERMINATION, AND REMOVAL

A. Supervision

1. Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance

1. Maintain facilities in good operating condition until removal.
2. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover

1. Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal

1. Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
2. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
3. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
4. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

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SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 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.

1.2 RELATED WORK

- A. Review all Division 01 Sections.
- B. Divisions 02 through 49 Sections for specific requirements. Equally Note:
 - 1. Division 01 Section "Substitution Procedures" for requests for substitutions.
 - 2. Division 01 Section "Submittal Procedures" for submittal requirements.
 - 3. Related portions of General Provisions and Special Provisions.

1.3 DEFINITIONS

- A. Basis-of-Design (BOD) Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design" including make or model number or other designation. In addition to the basis-of-design, product description, product attributes, and characteristics may be listed to further establish the significant qualities related to type, function, in-service performance, physical properties, weight, dimension, durability, appearance, and other, special features, requirements, and characteristics for purposes of evaluating comparable products of additional manufacturers. Additional comparison manufacturers and or products may or may not be named in the specification. The absence of comparable manufacturers or comparable products is not to be take as a proprietary listing specification. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements and administration procedures of the Contract Documents as judged by the Architect.

- B. Or Equal: Unless specifically stated as “no substitutions allowed”, whenever an item is described by using a brand/trade name of a manufacturer and/or model number, or it is stated as the “Basis of Design” it is intended that the words, "or equal" apply. "Or equal" means another brand that is equal or equivalent to the named brand in meeting the specific physical, operational, design, performance, maintenance, quality, fit, appearance and reliability requirements of the project as determined at the Architect’s sole discretion. All proposals offering an equivalent product must include complete manufacturer’s descriptive literature for that product. The Owner reserves the right to test and evaluate the product. At the Contractor’s expense, the Contractor bears sole responsibility for providing any information, test data, or documents required by the Architect to fully evaluate the acceptability of the “or equal.” At the Contractor’s expense, this full evaluation may require independent testing, including destructive testing, at qualified test facilities. If the Contractor’s lists a brand/trade name and/or catalog number in the quote, substitution forms, or any other request, the Architect and Owner will assume the Contractor certifies that the item meets the specifications unless it is documented and clearly stated otherwise. All documentation and requests within the forms are required to state and describe specifically how it differs from the item specified. All products are to be of new, unused condition, unless otherwise requested in this project.
- C. 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.

1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify basis-of-design 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 "Comparable Products" Article.
 2. Architect's/Engineer’s Action: If necessary, Architect/Engineer will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect/Engineer will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - 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. Store 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.

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. Refer to Divisions 02 through 49. 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 or needed to comply with project requirements, 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:
1. Product: Where Specifications name 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. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
 4. Manufacturers:
 - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
 5. 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.
- C. Visual Matching Specification: Where Specifications require "match Architect's/Engineers's sample", provide a product that complies with requirements and matches Architect's/Engineer's sample. Architect's/Engineer's decision will be final on whether a proposed product matches.
1. 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.
- D. 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.

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, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, in-service performance, physical properties, weight, size, durability, visual characteristics, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

PART 3 EXECUTION (NOT USED)

END OF SECTION 016000

SECTION 017000 - EXECUTION REQUIREMENTS

PART 1 GENERAL

1.1 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. Progress cleaning.
 6. Starting and adjusting.
 7. Protection of installed construction.
 8. Correction of the Work.

1.2 RELATED WORK

- A. Review all Division 01 Sections.
- B. Divisions 02 through 49 Sections for specific requirements. Equally Note:
1. Division 01 Section "Submittal Procedures" for submitting surveys.
 2. 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.
 3. Related portions of General Provisions and Special Provisions.
 4. Division 02 Section "Selective Demolition."

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 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

1.6 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 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 the Architect before proceeding. Shore, brace, and support structural element 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 result 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. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.7 WARRANTY

- A. 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.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other 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 the 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. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 4. 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 local utility and 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. 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.
- 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 the 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 project horizontal control 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 dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. 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.
- E. 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 Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- 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.

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. Maintain minimum headroom clearance of 96 inches (2438.4 mm) in occupied spaces and 90 inches (2286 mm) in unoccupied spaces.
- 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. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels, excess vibration or RF interference.
- F. 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.
- G. 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.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. 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. Temporary Support: Provide temporary support of work to be cut.
- C. 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.
- D. 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 prevent interruption to occupied areas.

3.7 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 (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Utilize containers intended for holding waste materials of type to be stored.
- 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 and to maintain ongoing operations.
 - 1. Remove 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.
- 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.

3.8 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components.
- 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."

3.9 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.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017000

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Inspection procedures.
 2. Warranties.
 3. Final cleaning.
- B. Related Sections include the following:
1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 2. Division 1 Section "Execution Requirements" for progress cleaning of Project site.
 3. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 4. Divisions 2 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 3. Prepare and submit Project Record Documents, operation and maintenance manuals, and similar final record information.
 4. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 5. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 6. Complete startup testing of systems.
 7. Submit test/adjust/balance records.
 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.

- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer 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 Engineer, that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection 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.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
 2. Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer 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. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit copy 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 Contractor.

1.5 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

- B. 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.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
 - 2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

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.

PART 3 EXECUTION

3.1 FINAL CLEANING

- A. General: Provide 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 Remove tools, construction equipment, machinery, and surplus material from Project site.
 - a. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - b. Sweep concrete floors broom clean in unoccupied spaces.
 - c. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - d. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - e. Remove labels that are not permanent.

- f. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - g. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - h. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - i. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - j. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - k. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - l. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

SECTION 017810 - PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Sections include the following:
 - 1. Division 1 Section "Closeout Procedures" for general closeout procedures.
 - 2. Divisions 2 through 16 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.2 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set of marked-up Record Drawings.
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal.

PART 2 PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
 - 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 prepare the 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 understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - 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. Revisions to electrical circuitry.
 - d. Duct size and routing.
 - e. Changes made by Change Order or Change Directive.

- f. Changes made following Engineer's written orders.
 - g. Details not on the original Contract Drawings.
 - h. Field records for variable and concealed conditions.
3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 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.

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.

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.

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.

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 modifications to Project Record Documents as they occur; do not wait until the 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 Engineer's reference during normal working hours.

END OF SECTION 017810

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
1. Emergency manuals.
 2. Operation manuals for systems, subsystems, and equipment.
 3. Maintenance manuals for the care and maintenance of products, materials, systems and equipment.

1.2 RELATED WORK

- A. Review all Division 01 Sections.
- B. Divisions 02 through 49 Sections for specific requirements. Equally Note:
1. See Divisions 02 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Manual: Submit two (2) copies of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 30 days after final inspection.
1. Correct or modify each manual to comply with Architect's comments. Submit two (2) copies of each corrected manual within 15 days of receipt of Architect's comments.

PART 2 PRODUCTS

2.1 MANUALS, GENERAL

- 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 a title page, table of contents, and manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. 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, address, and telephone number of Contractor.
 6. 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.
- 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.
 - 1. Binders: Heavy-duty, 3-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. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. 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 diskettes for computerized electronic equipment.
 - 4. 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.

2.2 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and equipment descriptions, operating standards, operating procedures, operating logs, wiring and control diagrams, and license requirements.
- B. Descriptions: Include the following:
 - 1. Product name and model number.
 - 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 start-up, break-in, and control procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; and required sequences for electric or electronic systems.

- 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.

2.3 PRODUCT MAINTENANCE MANUAL

- 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.
- 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 inspection procedures, types of cleaning agents, methods of cleaning, schedule for cleaning and maintenance, and 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.

2.4 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- 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.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including maintenance instructions, drawings and diagrams for maintenance, nomenclature of parts and components, and recommended spare parts for each component part or piece of equipment:

- D. Maintenance Procedures: Include test and inspection instructions, troubleshooting guide, disassembly instructions, and adjusting instructions that detail essential maintenance procedures:
- 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.
- 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.

PART 3 EXECUTION

3.1 MANUAL PREPARATION

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. 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.
- C. 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.
- D. 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.
- E. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.

1.2 RELATED WORK

- A. Review all Division 01 Sections.
- B. Divisions 02 through 49 Sections for specific requirements. Equally Note:
 - 1. See Divisions 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Instruction Program: Submit two (2) copies of outline of instructional program for demonstration and training, including 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.

1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Pre-instruction Conference: Conduct conference at Project Site. Review methods and procedures related to demonstration and training.
- 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 has been reviewed and approved by Engineer.

PART 2 PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and 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:
1. Basis of System Design, Operational Requirements, and Criteria: Include system and equipment descriptions, operating standards, regulatory requirements, equipment function, operating characteristics, limiting conditions, and performance curves.
 2. Documentation: Review emergency, operations, and maintenance manuals; Project Record Documents; identification systems; warranties and bonds; and maintenance service agreements.
 3. Emergencies: Include instructions on stopping; shutdown instructions; operating instructions for conditions outside normal operating limits; instructions on meaning of warnings, trouble indications, and error messages; and required sequences for electric or electronic systems.
 4. Operations: Include startup, break-in, control, and safety procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; operating procedures for emergencies and equipment failure; and required sequences for electric or electronic systems.
 5. Adjustments: Include alignments and checking, noise, vibration, economy, and efficiency adjustments.
 6. Troubleshooting: Include diagnostic instructions and test and inspection procedures.
 7. Maintenance: Include inspection procedures, types of cleaning agents, methods of cleaning, procedures for preventive and routine maintenance, and instruction on use of special tools.
 8. Repairs: Include diagnosis, repair, and disassembly instructions; instructions for identifying parts; and review of spare parts needed for operation and maintenance.

PART 3 EXECUTION

3.1 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 an instructor to describe Owner's operational philosophy.
- 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 (7) days' advance notice.

END OF SECTION 017900

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Penetrations in fire-resistance-rated walls.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
1. E84 - Test Method for Surface Burning Characteristics of Building Materials.
 2. E814 - Test Method for Fire Tests of Through-Penetration Fire Stops.
- B. Underwriters Laboratories Inc. (UL):
1. Qualified Firestop Contractor Program Requirements.
 2. 1479 - Fire Tests of Through-Penetration Firestops (ANSI).
 3. Fire Resistance Directory.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. .
- B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.
1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire- resistance-rated assembly.
- C. Qualification Data: For qualified Installer.
- D. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

- B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
 - 1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
 - b. Classification markings on penetration firestopping correspond to designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."
- C. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project Site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.
- C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by Owner's inspecting agency and building inspector, if required by authorities having jurisdiction.
- D. Notify testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Manufacturers' names are given to clarify the designer's intent and are not intended to limit selection of similar manufacturer's with similar products.
1. Grace Construction Products.
 2. 3M Fire Protection Products.
 3. Tremco, Inc.; Tremco Fire Protection Systems Group.

2.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire- resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
1. Fire-resistance-rated walls include fire walls, fire-barrier walls, and fire partitions.
 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.
- D. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place and Precast Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

- A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (152.4 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building
2. Management of Any Damage."
3. Contractor's name, address, and phone number.
4. Designation of applicable testing and inspecting agency.
5. Date of installation.
6. Manufacturer's name.
7. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Installer will engage a qualified testing agency to perform tests and inspections.
- B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- C. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

SECTION 231123 - FACILITY NATURAL-GAS PIPING

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 DEFINITIONS

- A. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

1.3 PERFORMANCE REQUIREMENTS

- A. Minimum Operating-Pressure Ratings:
 - 1. Piping and Valves: 100 psig minimum unless otherwise indicated.
 - 2. Service Regulators: 100 psig minimum unless otherwise indicated.
- B. Natural-Gas System Pressure within Buildings: 0.5 psig or less.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of the following:
 - 1. Piping specialties.
 - 2. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
 - 3. Pressure regulators. Indicate pressure ratings and capacities.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For pressure regulators to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. 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.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.
- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.

1.8 PROJECT CONDITIONS

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.
- B. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide purging and startup of natural-gas supply according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of natural-gas service.
 - 2. Do not proceed with interruption of natural-gas service without Owner's written permission.

1.9 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.
- B. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces. Comply with requirements in Division 8.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

- A. Pipe and Fittings: See schedule for pipe and fitting material requirements

2.2 PIPING SPECIALTIES

A. Y-Pattern Strainers:

1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig.

2.3 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural gas.

B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 MANUAL GAS SHUTOFF VALVES

A. See "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.

B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.

1. CWP Rating: 125 psig.
2. Threaded Ends: Comply with ASME B1.20.1.
3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.

C. General Requirements for Metallic Valves, NPS 2-1/2 and Larger: Comply with ASME B16.38.

1. CWP Rating: 125 psig.
2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
3. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
4. Service Mark: Initials "WOG" shall be permanently marked on valve body.

D. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BrassCraft Manufacturing Company; a Masco company.
 - b. Conbraco Industries, Inc.; Apollo Div.
 - c. Lyall, R. W. & Company, Inc.
 - d. McDonald, A. Y. Mfg. Co.
 - e. Perfection Corporation; a subsidiary of American Meter Company.
2. Body: Bronze, complying with ASTM B 584.
3. Ball: Chrome-plated bronze.
4. Stem: Bronze; blowout proof.
5. Seats: Reinforced TFE; blowout proof.
6. Packing: Threaded-body packnut design with adjustable-stem packing.
7. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
8. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

E. Bronze Plug Valves: MSS SP-78.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Lee Brass Company.
 - b. McDonald, A. Y. Mfg. Co.
2. Body: Bronze, complying with ASTM B 584.
3. Plug: Bronze.
4. Operator: Square head or lug type with tamperproof feature where indicated.
5. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
6. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

2.5 PRESSURE REGULATORS

A. General Requirements:

1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators NPS 2 and smaller; flanged for regulators NPS 2-1/2 and larger.

B. Service Pressure Regulators: Comply with ANSI Z21.80.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Actaris.
 - b. American Meter Company.
 - c. Fisher Control Valves and Regulators; Division of Emerson Process Management.
 - d. Invensys.
 - e. Richards Industries; Jordan Valve Div.
2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
6. Orifice: Aluminum; interchangeable.
7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
10. Overpressure Protection Device: Factory mounted on pressure regulator.
11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Close equipment shutoff valves before turning off natural gas to premises or piping section.
- B. Inspect natural-gas piping according to the International Fuel Gas Code to determine that natural-gas utilization devices are turned off in piping section affected.
- C. Comply with the International Fuel Gas Code requirements for prevention of accidental ignition.

3.3 OUTDOOR PIPING INSTALLATION

- A. Comply with the International Fuel Gas Code for installation and purging of natural-gas piping.
- B. Steel Piping with Protective Coating:
 - 1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.
 - 2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.
 - 3. Replace pipe having damaged PE coating with new pipe.
- C. Install fittings for changes in direction and branch connections.
- D. Install pressure gage upstream and downstream from each service regulator.

3.4 VALVE INSTALLATION

- A. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

3.5 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
 - 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
 - 2. Cut threads full and clean using sharp dies.
 - 3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
 - 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
 - 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints:
 - 1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
 - 2. Bevel plain ends of steel pipe.
 - 3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
- B. Comply with requirements for pipe hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- C. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
 - 1. NPS 1 and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 - 2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 - 3. NPS 1-1/2 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 - 4. NPS 2-1/2 to NPS 3-1/2: Maximum span, 10 feet; minimum rod size, 1/2 inch.
- D. Install hangers for horizontal, corrugated stainless-steel tubing with the following maximum spacing and minimum rod sizes:
 - 1. NPS 3/8: Maximum span, 48 inches; minimum rod size, 3/8 inch.
 - 2. NPS 1/2: Maximum span, 72 inches; minimum rod size, 3/8 inch.
 - 3. NPS 3/4 and Larger: Maximum span, 96 inches; minimum rod size, 3/8 inch.
- E. Provide additional intermediate supports as required so deflection of piping does not exceed 1/240 of span.
- F. Support spacings listed above are minimum requirements. Contractor shall provide additional supports as required by codes or authority having jurisdiction at no additional cost to contract.

3.7 CONNECTIONS

- A. Connect to utility's gas main according to utility's procedures and requirements.
- B. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.
- C. Install piping adjacent to appliances to allow service and maintenance of appliances.
- D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.
- E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.8 LABELING AND IDENTIFYING

- A. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.9 PAINTING

- A. Paint exposed, exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.
 - 1. Alkyd System: MPI EXT 5.1D.
 - a. Prime Coat: Alkyd anticorrosive metal primer.
 - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
 - c. Topcoat: Exterior alkyd enamel (gloss).
 - d. Color: Gray.
- B. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.10 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Test, inspect, and purge natural gas according to the International Fuel Gas Code and authorities having jurisdiction.
- C. Natural-gas piping will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Prior to start-up, Contractor shall verify gas system pressure downstream of gas meter as indicated on plans. If meter pressure is not within $\pm 5\%$ of pressure indicated on plans, Contractor shall notify the Architect/Engineer and Owner immediately.
 - 1. If a pressure tap is not available for connectors of a gas pressure gauge, one shall be installed at no additional cost to the Contract.
- F. Downstream gas pressure measurement shall be taken within 15 feet of the gas meter discharge.

3.11 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain earthquake valves.

3.12 OUTDOOR PIPING SCHEDULE

A. Low-Pressure (2 psig or less):

1. Pipe 2" and smaller:

a. Schedule 40 black steel, ASME-A53, 150 pressure class, Malleable ASME B16.3

3.13 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

END OF SECTION 231123

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SECTION 260500 - COMMON WORK REQUIREMENTS FOR ELECTRICAL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. General Provisions of the Contract and Project Drawings apply to this Section.

1.2 DESCRIPTION

- A. Work to be performed under the sections of Division 26 includes all labor, materials, and equipment required to install complete electrical systems as described in these specifications and as shown on the drawings. This section includes information common to two or more technical specification sections or items that are of a general nature, not conveniently fitting into other technical sections.
- B. Before submitting a bid, the Contractor shall examine the drawings and specifications, visit the work site, and be informed of local conditions, all federal, state and local ordinances, regulations and all other pertinent items which may affect cost, schedule, and completion of this project.
- C. Drawings accompanying these specifications are a part of these specifications. Drawings are intended to show general arrangement, design, and extent of work and are diagrammatic. Drawings are not intended to show exact locations except where dimensions are shown. Any substantial differences existing between drawings and conditions in the field shall be submitted to the Engineer for consideration before proceeding with work. Electrical work is shown on plans using standard industry symbols.
- D. Before ordering materials or doing work, the Contractor shall verify all measurements pertaining to work scope and assume installation responsibility for complete and fully functional electrical systems.
- E. The electrical work included in all other divisions of this specification and related documents is the responsibility of the contractor performing the division 26 work unless specifically noted otherwise.

1.3 REFERENCED STANDARDS

- A. Abbreviations of standards organizations referenced in this, and other sections are as follows:
- B.
 - ANSI American National Standards Institute
 - ASTM American Society for Testing and Materials
 - EPA Environmental Protection Agency

- ETL Electrical Testing Laboratories, Inc.
- IBC International Building Code
- IEEE Institute of Electrical and Electronics Engineers
- IES Illuminating Engineering Society
- ISA Instrument Society of America
- NBS National Bureau of Standards
- NEC National Electric Code
- NECA National Electrical Contractors Association
- NEMA National Electrical Manufacturers Association
- NESC National Electrical Safety Code
- NFPA National Fire Protection Association
- UL Underwriters Laboratories Inc.

1.4 QUALITY ASSURANCE

- A. Manufacturer references used herein are intended to establish a level of quality and performance requirements unless more explicit restrictions are stated to apply.
- B. Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contract documents, the contractor is responsible for all costs involved in integrating the equipment or accessories into the system and the assigned space and for obtaining the performance from the system into which these items are placed.
- C. All materials shall be listed by and shall bear the label of an approved electrical testing laboratory. If none of the approved electrical testing laboratories has published standards for a particular item, then other national independent testing standards, subject to approval by the Engineer shall apply and such items shall bear those labels. Where one of the approved electrical testing laboratories has an applicable system listing and label, the entire system shall be so labeled. The Contractor shall not modify new equipment in such a way as to nullify the Testing Laboratories label. All equipment and materials shall be used or installed in accordance with any instruction included in the listing by the laboratory.

1.5 DEFINITIONS

| | |
|--------|--|
| ATS | Acceptance Testing Specifications. |
| BACnet | A networking communication protocol that complies with |

| | |
|-------------------------|---|
| | ASHRAE 135. |
| BAS | Building automation system. |
| CCT | Correlated color temperature. |
| CD | Candela, the SI fundamental unit of luminous intensity. |
| CPT | Control power transformer. |
| CRI | Color-rendering index. |
| DB | Decibel, a unitless logarithmic ratio of two electrical, acoustical, or optical power values. |
| dB(A-weighted) or dB(A) | Decibel acoustical sound pressure level with A-weighting applied in accordance with IEC 61672-1. |
| Direct Buried | Duct or a duct bank that is buried in the ground, without any additional casing materials such as concrete. |
| DC | Direct current. |
| DDC | Direct digital control (HVAC). |
| Duct | A single duct or multiple ducts. Duct may be either installed singly or as component of a duct bank. |
| Duct Bank | Two or more ducts installed in parallel, with or without additional casing materials and or multiple duct bank. |
| EMI | Electromagnetic interference. |
| EMT | Electrical metallic tubing. |
| EPS | Emergency power supply. |
| EPSS | Emergency power supply system. |
| Ethernet | Local area network based on IEEE 802.3 standards. |
| 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. |
| FC | Footcandle, an internationally recognized unit of illuminance equal to one lumen per square foot or 10.76 lx. The simplified conversion 1 fc = 10 lx in the Specifications is common practice and considered adequate precision for building construction activities. |
| FURNISH | Supply for Use |

| | |
|------------------------|---|
| GFCI | Ground-Fault Circuit Interrupter. |
| GND | Ground. |
| GRC | Galvanized rigid steel conduit. |
| HTML | Hypertext markup language. |
| IBC | International Building Code. |
| IGBT | Insulated-gate bipolar transistor. |
| Illuminance | The metric most commonly used to evaluate lighting systems. It is the density of luminous flux, or flow of light, reaching a surface divided by the area of that surface. |
| Horizontal Illuminance | Measurement in foot-candles (lux), on a horizontal surface 30 inches (762 mm) above ground unless otherwise indicated. |
| Target Illuminance | Average maintained illuminance level, calculated by multiplying initial illuminance by LLF. |
| Vertical Illuminance | Measurement in foot-candles (lux), in [two][four] directions on a vertical surface, at an elevation coinciding with plane height of horizontal measurements. |
| Hz | Hertz. |
| IMC | Intermediate metal conduit. |
| Inominal | Nominal discharge current. |
| Install | Connect complete and ready for operation |
| I/O | Input/output. |
| IP | Internet protocol. |
| Jacket | A continuous nonmetallic outer covering for conductors or cables. |
| kcmil | One thousand circular mils |
| kV | Kilovolt. |
| kVA | Kilovolt-ampere. |
| kvar | Kilovolt-ampere reactive. |

| | |
|------------------|---|
| kW | Kilowatt. |
| kWh | Kilowatt-hour. |
| LAN | Local area network. |
| LC | Lighting Certified. |
| LCD | Liquid crystal display. |
| LED | Light-emitting diode. |
| Legally Required | As used in this Section, it shall have the same meaning as used in NFPA 70. |
| LER | Luminaire efficacy rating. |
| LLD | Lamp lumen depreciation, which is the decrease in lamp output as the lamp ages. |
| LLF | Light loss factor, which is the product of all factors that contribute to light loss in the system. |
| LP-Gas | Liquefied petroleum gas. |
| Low Voltage | As defined in NFPA 70 for circuits and equipment operating at less than 50 V or remote-control, signaling and power-limited circuits. |
| LP | Liquid petroleum. |
| Lumen | Measured output of lamp and luminaire, or both. |
| Luminaire | Complete lighting fixture, including ballast housing if integral. |
| MCCB | Molded-case circuit breaker. |
| Monitoring | Acquisition, processing, communication, and display of equipment status data, metered electrical parameter values, power quality evaluation data, event and alarm signals, tabulated reports, and event logs. |
| MOV | Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic. |
| NC | Normally closed. |
| NETA ATS | Acceptance Testing Specification. |
| NO | Normally open. |

| | |
|-------------------|---|
| | |
| OCPD | Overcurrent protective device. |
| One-Line Diagram | A diagram which 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. |
| PC | Personal computer; sometimes plural as "PCs." |
| PF | Power factor. |
| Pigtail | Short lead used to connect a device to a branch-circuit conductor. |
| Protective Device | A device that senses when an abnormal current flow exists and then removes the affected portion from the system. |
| Provide | To supply for use and connect complete and ready for operation |
| PT | Potential transformer. |
| PWM | Pulse-width modulated. |
| RFI | Radio-frequency interference. |
| RMC | Rigid metal conduit. |
| RMS | Root-mean-square value of alternating voltage, which is the square root of the mean value of the square of the voltage values during a complete cycle. |
| SCCR | Short-circuit current rating. |
| Service | The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served. |
| Sheath | A continuous metallic covering for conductors or cables. |
| SPD | Surge protective device. |
| SPDT | Single pole, double throw. |
| STC | Standard Test Conditions defined in IEC 61215. |

| | |
|--------|---|
| SVR | Suppressed voltage rating. |
| TCP/IP | Transport control protocol/Internet protocol incorporated into Microsoft Windows. |
| TDD | Total demand (harmonic current) distortion (also listed as "THD") |

| | |
|-----------------|---|
| | in catalog data by manufacturers). |
| THD | Total harmonic distortion. |
| THD(V) | Total harmonic voltage demand. |
| Traffic Ways | Locations where vehicle or pedestrian traffic is a normal course of events. |
| TVSS | Transient voltage surge suppressor. |
| Uninterruptible | As used in the Section Text, an on-line, double-conversion (rectifier/inverter) unit, with no interruption of power to the load on interruption and restoration of the "normal" source. |
| UPS | Uninterrupted power supply. |
| UTP | Unshielded twisted pair. |
| VFD | Variable frequency drive or motor controller. |
| VPN | Virtual private network. |
| VPR | Voltage protection rating. |
| VRLA | Valve-regulated lead acid. |
| VA | Volt-ampere, unit of complex electrical power. |
| VAR | Volt-ampere reactive, unit of reactive electrical power. |
| W | Watt, unit of real electrical power. |
| WAN | Wide area network. |

1.6 REGULATORY REQUIREMENTS

- A. All work and materials are to conform in every detail to applicable rules and requirements of local codes and regulations, the National Electrical Code (NFPA 70), other applicable National Fire Protection Association codes, and current manufacturing standards (including NEMA) and any additional local modifications enacted by the Local Authority Having Jurisdiction. Contractor shall be responsible to verify what if any local modifications are in place or enacted by the Local Authority Having Jurisdiction.
- B. All work shall be installed in accordance with NECA standards of installation.
- C. All work shall conform where applicable to the Williams-Steiger Occupational Safety and Health Act of 1970 (OSHA), Part 1910, "Occupational Safety and Health Standards."

This shall include any local or state modifications enacted by the Authority having Jurisdiction.

- D. Provide temporary lighting and construction power for the project. Pay the usage charges to the serving utility for electric service associated with temporary lighting and power for construction.

1.7 CONTINUITY OF EXISTING SERVICES AND SYSTEMS

- A. No outages shall be permitted on existing systems except at the time and during the interval specified by the Owner. The Owner may require written approval. Any outage must be scheduled when the interruption causes the least interference with normal Owner schedules and business routines. No extra costs will be paid to the Contractor for such outages which must occur outside of regular weekly working hours.
- 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 at least **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.**
- C. This Contractor shall restore any circuit interrupted as a result of this work to proper operation as soon as possible. Note that facility operations are on a seven-day week schedule.

1.8 OMISSIONS

- A. The Contractor shall call to the attention of the Engineer any materials or apparatus the Contractor believes to be inadequate and to any necessary items of work omitted.

1.9 SUBMITTALS

- A. Refer to General Provisions of the Contract for Submittal requirements.
- B. Submit for all equipment and systems as indicated in the respective specification sections, marking each submittal with that specification section number. Mark general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name or number, as indicated in the contract documents. Failure to do this may result in the submittal(s) being returned to the Contractor for correction and resubmission. Failing to follow these instructions does not relieve the Contractor from the requirement of meeting the project schedule.
- C. On request, the Contractor shall furnish additional drawings, illustrations, catalog data, performance characteristics, etc. to clarify intent of construction or operations.

- D. Submittals shall be grouped to include complete submittals of related systems, products, and accessories in a single submittal. Mark dimensions and values in units to match those specified. Include wiring diagrams of electrically powered equipment.
- E. The submittals must be approved before fabrication.

1.10 PROJECT/SITE CONDITIONS

- A. Install Work in locations shown on Drawings, unless prevented by Project conditions.
- B. Prepare drawings showing proposed rearrangement of work to meet Project conditions, including changes to work specified in other Sections. Obtain written permission of Engineer before proceeding.
- C. Tools, materials, and equipment shall be confined to areas designated by the Owner.

1.11 WORK SEQUENCE AND SCHEDULING

- A. See the General Provisions of the Contract, Scheduling and Coordination of Work, Time for Completion of the Project, General Requirements, and Mutual Responsibility for additional requirements.

1.12 WORK BY OTHER TRADES

- A. Every attempt has been made to indicate in this trade's specifications and drawings all work required of this Contractor. However, there may be additional specific paragraphs in other trade specifications and addenda, and additional notes on drawings for other trades which pertain to this Trade's work, and thus those additional requirements are hereby made a part of these specifications and drawings.
- B. Electrical details on drawings for equipment to be provided by others is based on preliminary design data only. This Contractor shall lay out the electrical work and shall be responsible for its correctness to match equipment actually provided by others.

1.13 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Refer to General Provisions of the Contract for Operating and Maintenance Instruction requirements.
- B. Operation and Maintenance Data:
 - 1. Provide emergency operation, normal operation, and preventive maintenance manuals for each system, equipment, and device provided for the project.
 - 2. Include the following information:
 - a. Manufacturer's operating specifications.
 - b. User's guides for software and hardware.
 - c. Schedule of maintenance material items recommended to be stored at the Project site.
 - d. Detailed instructions covering operation under both normal and abnormal conditions.

- e. Time-current curves for overcurrent protective devices and manufacturer's written instructions for testing and adjusting their settings.
- f. Manufacturer's instructions for setting field-adjustable components.
- g. Manufacturer's instructions for testing, adjusting, and reprogramming microprocessor controls.
- h. EPSS: Manufacturer's system checklists, maintenance schedule, and maintenance log sheets in accordance with NFPA 110.

1.14 TRAINING

- A. Instruct Owner's personnel in the proper operation and maintenance of systems and equipment provided as part of this project; video record all training sessions. Use the Operating and Maintenance manuals during this instruction. Demonstrate startup and shutdown procedures for all equipment. All training shall be during normal working hours.
- B. The requirement for recording training sessions may be deleted on some projects but not the requirement for the training itself.
- C. Refer to other sections in Division 26 for specific section and equipment training requirements.

1.15 RECORD DRAWINGS

- A. A set of prints shall be kept at the job site upon which all changes and deviations from the original design are to be recorded daily. All changes shall be clearly marked. These drawings shall indicate as a minimum, all changes made to the drawings, changes in circuiting, equipment location, accurate locations of embedded conduit, and all other significant changes and deviations from the original design.
- B. The daily record of changes shall be the responsibility of the Contractor's field representative. No arbitrary mark-ups will be permitted.
- C. The record drawing set shall be made available and may be audited periodically by the Engineer to assure changes from contract documents are being recorded.
- D. At the completion of the project, the Contractor shall submit the marked-up record drawings to the Engineer prior to request for final payment.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Reference applicable sections within Division 26 specification sections.

PART 3 – EXECUTION

3.1 WORK INCLUDED

- A. The scope of work shall include all work, including all labor, materials and equipment, testing required to install a complete electrical system as indicated in the project Manual. The Project Manual consists of the bidding documents, the contract, specifications, contract drawings and all subsequent addenda and modifications. The contractor shall furnish and install all necessary materials, apparatus, and devices to complete the electrical equipment and systems installation herein specified, except such parts as are specifically exempted herein.
- B. All work items shown on the drawings is within the scope of work and shall be provided as indicated. Only items that are clearly indicated as being provided by others or under a separate contract shall be out of scope.
- C. In general, the specifications indicate the requirements and quality for products required and the executions for those products. Only items that are clearly indicated as being provided by others or under a separate contract shall be out of scope.
- D. If there is any discrepancy between the drawings and the specifications, it is the contractor's responsibility to notify the Engineer for resolution, prior to procuring equipment or starting work.
- E. Coordinate and verify all equipment being supplied by equipment supplier and other trades. Verify equipment size, motor HP, dimensions, locations, etc. as all are subject to change.
- F. Contractor shall verify all door swings and the location of all cabinets, diffusers, HVAC, plumping, process and building equipment before installing electrical equipment, fixtures, outlets, and conduit.
- G. The Contractor shall provide all plywood backboards and supports for all electrical equipment as indicated on the drawings and as required or specified.
- H. All permits and inspection fees required to complete the work shall be paid for by the Contractor unless noted otherwise.
- I. All electrical equipment and fixtures shall be installed in complete accordance with the manufacturers' recommendations.
- J. Contractor shall provide all motor connections as shown on the drawings and as specified herein.

3.2 CONCRETE

- A. All concrete work required for the proper installation of electrical equipment including generator foundation and other electrical equipment pads shall be provided by the Contractor and shall conform to specified requirements and drawing detail(s).

3.3 SITE WORK

- A. The Contractor shall provide excavation and backfill for all electrical underground work as indicated on the drawings and as required. The Contractor shall perform this work and provide compaction as specified in General Provisions of the Contract and other Divisions. Finish grading and final restoration shall be by the General Contractor.

3.4 CONFIRMATION OF NATURAL GAS SERVICE

- A. Consult with Natural Gas Utility, Xcel Energy, to verify service information specified herein and shown on drawings before submitting bid.
- B. The Electrical Contractor shall initiate the natural gas service application.

3.5 PERMITS, FEES, TAXES, INSPECTIONS

- A. Procure all applicable permits and licenses.
- B. Abide by all laws, regulations, ordinances, and other rules of the State or Political Subdivision where the work is done, or as required by any duly constituted public authority.
- C. ELECTRICAL CONTRACTOR to pay all charges for permits or licenses.
- D. Pay all fees and taxes imposed by State, Municipal, and other regulatory bodies.
- E. Pay all charges arising out of required inspections by an authorized body.
- F. Pay all charges arising out of required contract document reviews associated with the project and as initiated by the Owner or authorized agency/consultant.
- G. Where applicable, all fixtures, equipment and materials shall be listed by Underwriter's Laboratories, Inc. or a nationally recognized testing organization.

3.6 METERING

- A. Consult with Natural Gas Utility, Xcel Energy, regarding gas service and metering equipment requirements.
- B. Install metering equipment to meet installation standards and requirements of Xcel Energy.
- C. Refer to associated Division 23 specification sections and drawings for additional information.

3.7 SERVICE INSTALLATION

- A. The service installation shall comply with the latest applicable standards of the Utility. Refer to the current natural gas service installation manuals.

- B. The Contractor shall meet with the natural gas utility prior to rough-in to review and coordinate the installation of the natural gas service, to verify existing conditions, and to confirm project specific requirements.

3.8 BUILDING ACCESS

- A. Arrange for the necessary openings in the building to allow for admittance of all apparatus. When the building access was not previously arranged and must be provided by this contractor, restore any opening to its original condition after the apparatus has been brought into the building.

3.9 EQUIPMENT ACCESS

- A. Install all piping, conduit, ductwork, and accessories to permit access to equipment for maintenance. Coordinate the exact location of wall and ceiling access panels and doors with the General Contractor, making sure that access is available for all equipment and specialties. Where access is required in gypsum board walls or ceilings, furnish and install access doors as necessary, and as approved by Engineer.

B. COORDINATION

- C. The Contractor shall cooperate with other trades and the Owner's construction representative in locating work in a proper manner. Should it be necessary to raise or lower or move longitudinally any part of the electrical work to better fit the general installation, such work shall be done at no extra cost, provided such decision is reached prior to actual installation. The Contractor shall check location of electrical outlets with respect to other installations before installing.

- D. The Contractor shall verify that all devices are compatible for the surfaces on which they will be used. This includes, but is not limited to, light fixtures, panelboards, devices, etc. and recessed or semi-recessed heating units installed in/on architectural surfaces.

- E. Coordinate all work with other trades prior to installation. Any installed work that is not coordinated and that interferes with another trades work shall be removed or relocated at the installation contractor's expense.

3.10 HOUSEKEEPING AND CLEAN UP

- A. Refer to General Provisions of the Contract for additional requirements.
- B. The Contractor shall clean up and remove from the premises, on a daily basis, all debris and rubbish resulting from its work and shall repair all damage to new and existing equipment resulting from its work. When job is complete, the Contractor shall remove all tools, excess material and equipment, etc., from the site.

END OF SECTION 260500

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SECTION 260502 - ELECTRICAL DEMOLITION AND ALTERATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. General Provisions of the Contract, Drawings and Division 26 specifications apply to this section.
- B. Section 260500 “Common Work Requirements for Electrical.”
- C. NFPA 70 – National Electrical Code

1.2 COORDINATION

- A. Coordinate sequencing with Owner and other Contractors. Coordinate scope of work with all other Contractors and the Owner at the project site. Schedule removal of equipment and electrical service to avoid conflicts.

1.3 SUMMARY

- A. Electrical Demolition of existing electrical system components.
- B. The drawings are intended to indicate the scope of work required and do not indicate every box, conduit, or wire that must be removed. The Contractor shall visit the site prior to submitting a bid and verify existing conditions.

1.4 CONTINUITY OF EXISTING SERVICES AND SYSTEMS

- A. No outages shall be permitted on existing systems except at the time and during the interval specified by the Owner. The Owner requires written approval. Any outage must be scheduled when the interruption causes the least interference with normal Owner schedules and business routines. No extra costs will be paid to the Contractor for such outages which must occur outside of regular weekly working hours.
- B. This Contractor shall restore any circuit interrupted as a result of this work to proper operation as soon as possible. Note that facility operations are on a seven-day week schedule.
- C. Prior to demolition or alteration of structures, the following shall be accomplished:
 - 1. Disconnection of electrical power to utilization equipment and circuits removed or affected by demolition work.
 - 2. Electrical and natural gas services rerouted or shut off outside area of demolition.
 - 3. Survey and record condition of existing facilities to remain in place that may be affected by demolition operations. After demolition operations are completed, survey conditions again and restores existing facilities to their predemolition condition.
 - 4. Notify utility, Xcel Energy, prior to razing operations to permit them to disconnect and remove or relocate equipment that served existing facilities.
 - 5. Contractor shall notify Engineer of existing code violations observed during the course of performing his work. If corrective action needs to be taken that

changes the scope of the work, corrective action shall proceed only after approval by Engineer.

6. Provide temporary wiring and connections to maintain existing systems in service during construction. Assume all equipment and systems must remain operational unless specifically noted otherwise on drawings.
7. Existing Electrical and Natural Gas Service: Maintain existing systems in service until new system is completed and ready for service. Disable system only to make switchovers and connections. Obtain permission no fewer than **seven** days in advance of proposed interruption of electric and/or natural gas services before partially or completely disabling system. Minimize outage duration. If required, make temporary connections to maintain service in areas adjacent to work area. Do not proceed with interruption of electric and/or natural gas services without Owner's written permission.

PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work as specified in the individual Sections.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that abandoned wiring and equipment serve only abandoned equipment or facilities. Extend conduit and wire to facilities and equipment that will remain in operation following demolition. Extension of conduit and wire to equipment shall be compatible with the surrounding area.

3.2 PREPARATION

- A. Where ceilings are indicated as being removed on drawings, the Contractor shall be responsible for the removal of all electrical equipment, devices, fixtures, raceways, wiring, systems, etc., from the removed area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Disconnect abandoned outlets and junction boxes as applicable, and remove devices and conductors back to source panelboard as applicable for work scope. Remove abandoned outlets if conduit serving them is abandoned and removed. Provide blank cover for abandoned outlets and junction boxes which are not removed. Patch openings created from removal of devices to match surrounding finishes.
- B. Repair adjacent construction and finishes damaged during demolition and extension work. Patch openings to match existing surrounding finishes.
- C. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

- D. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified. This includes the extension of the circuit from the last active device to the next device in the system to be activated.
- E. Equipment removal in certain locations may require the installation of a junction box to reconnect circuits that remain in operation. Extend conduit and wiring as required to maintain power to remaining equipment.
- F. Contractor shall remove and install all ceiling tiles as required for the execution of electrical work that is outside the contract limits of construction. Contractor shall replace ceiling tiles with identical material where damaged by this Contractor.
- G. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- H. HID and fluorescent lamps, determined by the Toxicity Characteristic Leachate procedure (TCLP), to be hazardous waste shall be disposed of in a permitted hazardous waste disposal facility or by a permitted lamp recycler.
- I. Contractor is responsible for all costs incurred in repair, relocations, or replacement of any cables, conduits, or other services if damaged without proper investigation.

3.4 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections within the project scope. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide electronically typed/produced circuit directory showing revised circuiting arrangement.
- C. Electrical items (panelboard, disconnects, devices, conduit, wire, etc.) removed and not relocated remain the property of the owner. The contractor shall dispose of material the owner does not want.

3.5 ASBESTOS REMOVAL

- A. If this Contractor discovers the presence of asbestos material, he shall cease work immediately and notify Owner and Engineer of condition.

3.6 INSTALLATION

- A. Install relocated materials and equipment under the provisions of Division 26 Specifications.

END OF SECTION 260502

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SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire.
2. Armored cable, Type AC.
3. Connectors and splices.

B. Related Requirements:

1. General Provisions of the Contract and Project Drawings apply to this section.
2. Section 260500 "Common Work Requirements for Electrical" specifies additional abbreviations, definitions, submittals, qualifications, testing agencies, and other requirements applicable to the Work for electrical on Project, including wiring methods.
3. Section 260523 "Control-Voltage Electrical Power Cables" for control systems communications cables and Classes 1, 2, and 3 control cables.
4. Section 260533 "Raceway and Boxes for Electrical Systems".

1.2 ACTION SUBMITTALS

A. Product Data:

1. Copper building wire.
2. Armored cable, Type AC.
3. Connectors and splices.

PART 2 – PRODUCTS

2.1 COPPER BUILDING WIRE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cerrowire.
2. Prysmian Group.
3. Southwire Incorporated.

B. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

2. 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 ARMORED CABLE, TYPE AC

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AFC Cable Systems, a part of Atkore International.
 2. Cerrowire
 3. Prysmian Group
 4. Southwire.
- B. Description: A factory assembly of insulated current-carrying conductors with or without an equipment grounding conductor in an overall metallic sheath.
- C. Standards:
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 2. Comply with UL 4.
 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Circuits: Single circuit only.
- E. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- F. Ground Conductor: Insulated.
- G. Conductor Insulation: Type THHN/THWN-2. Comply with UL 83.
- H. Armor: Steel, interlocked.

2.3 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one the following:
1. AFC Cable Systems, a part of Atkore International.
 2. Gardner Bender.
 3. Hubbell Power Systems, Inc.
 4. Ideal Industries, Inc.

5. IIsco; a branch of Bardes Corporation.
 6. NSi Industries LLC.
 7. O-Z/Gedney; a brand of the EGS Electrical Group.
 8. Thomas and Betts Corp.
 9. 3M; Electrical Markets Division.
- B. 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.
- C. Jacketed Cable Connectors: For steel jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Split Bolt Connectors: Not acceptable.
- E. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
1. Material: Copper.
 2. Type: One or two hole with long barrels, dependent on installation location and application. **Generator bus bar terminations shall be two hole only.**
 3. Termination: Compression and/or crimp.

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. 12 AWG and smaller; stranded for No. 10 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.
- B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: 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 Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

- F. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.

3.3 INSTALLATION, GENERAL

- A. Route feeders and branch circuits as required to meet project conditions.
- B. All 120 and 277 volt branch circuits shall have a dedicated neutral conductor. The neutral conductor shall be considered current-carrying conductor for wire derating. The use of multi-wire branch circuits with a common neutral is **not** permitted.
- C. All power wiring shall be installed in conduit unless specifically indicated otherwise.
- D. Conceal feeders and branch circuits in finished walls and ceilings, as applicable to project scope and where noted on drawings.
- E. Complete raceway installation between conductor and cable termination points in accordance with Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- F. 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.
- G. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- H. Install exposed feeders and branch circuits parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- I. 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 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 wall assemblies to restore original fire-resistance rating of assembly. Refer to Division 07 specifications for additional details.

3.8 FIELD QUALITY CONTROL

- A. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test 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.

- B. Cables will be considered defective if they do not pass tests and inspections.

- C. 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

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SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. RS-485 cable.
2. Control and signaling cable.
3. Control-circuit conductors.

B. Related Requirements:

1. General Provisions of the Contract and Project Drawings apply to this section.
2. Section 260500 "Common Work Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
3. Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for copper current-carrying conductors with an overall insulation layer or jacket, or both, rated 600 V or less.
4. Section 260533 "Raceways and Boxes for Electrical Systems".
5. Section 260543 "Underground Ducts and Raceways for Electrical Systems".
6. Section 260553 "Identification for Electrical Systems".
7. NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines.

1.2 ACTION SUBMITTALS

A. Product Data:

1. RS-485 cable.
2. Control and signaling cable.
3. Control-circuit conductors.

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. All interconnect wiring and data cabling will be provided by this Contractor to comply with the generator system manufacturer's requirements.
- C. Belden products are the basis of design.

- D. All interconnect wiring and data cabling shall be stranded to comply with NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines.

2.2 RS-485 CABLE

- A. Standard Cable: Comply with NFPA 70 to meet installation conditions.
 - 1. One pair, 24 AWG (minimum), stranded (7x32) tinned-copper conductors.
 - 2. Insulation: Polyethylene (PE)
 - 3. Outer shield
 - a. Tape: Bi-laminate (aluminum and polyethylene)
 - b. Braid: Tinned copper (TC)
 - 4. Outer Jacket, polyvinyl chloride (PVC)
 - 5. Flame Resistance: Comply with UL 1685.

2.3 CONTROL AND SIGNALING CABLE

- A. Paired Cable: Comply with NFPA 70 to meet installation conditions.
 - 1. Multi-pair, 24 AWG (minimum), stranded (7x32) tinned-copper conductors.
 - 2. Insulation: Polyethylene (PE)
 - 3. Inner Shield: tape, bi-laminate (aluminum and polyethylene)
 - 4. Outer Jacket: Polyvinyl chloride (PVC)
 - 5. Flame Resistance: Comply with UL 1685.

2.4 CONTROL-CIRCUIT CONDUCTORS

- A. Cabling and conductors shall meet the requirements of NEC Article 725.
- B. Class 1 Remote-Control, Signaling and Power-Limited Circuits: 600 volt insulation, individual conductors twisted together, shielded, and covered with an overall PVC jacket. Cable shall be Listed, temperature rated, and suitable Type (general purpose or riser) for the application as required in the National Electrical Code.
- C. Cable for Class 2 or Class 3 Remote-Control, Signaling and Power-Limited Circuits shall be Listed, temperature rated, and suitable Type (general purpose or riser) for the application as required in the National Electrical Code.

2.5 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.
- B. Factory test twisted pair cables according to TIA-568-C.2.
- C. Cable will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

PART 3 – EXECUTION

3.1 INSTALLATION OF RACEWAYS AND BOXES

- A. Comply with requirements in Section 260533 "Raceway and Boxes for Electrical Systems" for raceway selection and installation requirements for conduits as supplemented or modified in this Section.
 - 1. Outlet boxes must be no smaller than 2 inch wide, 3 inch high, and 2-1/2 inch deep.
 - 2. Outlet boxes for cables must be no smaller than 4 inch square by 2-1/8 inch deep with extension ring sized to bring edge of ring to within 1/8 inch of the finished wall surface.
 - 3. Flexible metal conduit must not be used.
- B. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.
- C. Install manufactured conduit sweeps and long-radius elbows if possible.

3.2 INSTALLATION OF CONDUCTORS AND CABLES

- A. Comply with NECA 1.
- B. Control-voltage cables shall be installed in conduit.
- C. Do not use wire smaller than 14 AWG for control wiring greater than 60 volts, or 18 AWG for voltages less than 60 volts, all sizes subject to NEC 725 requirements.
- D. Splice only in junction boxes.
- E. Neatly train and lace wiring inside boxes, and equipment.
- F. General Requirements for Cabling:
 - 1. Comply with TIA-568-C Series of standards.
 - 2. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems."
 - 3. Terminate all conductors; cable must not contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
 - 4. Cables may not be spliced and must be continuous from terminal to terminal. Do not splice cable between termination, tap, or junction points.
 - 5. Cables serving a common system may be grouped in a common raceway. Install network cabling and control wiring and cable in separate raceway from power wiring. Do not group conductors from different systems or different voltages.
 - 6. Secure and support cables at intervals not exceeding 30 inch and not more than 6 inch from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - 7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Install lacing bars and distribution spools.
 - 8. Do not install bruised, kinked, scored, deformed, or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.

9. Cold-Weather Installation: Bring cable to room temperature before dereeling. Do not use heat lamps for heating.
10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Monitor cable pull tensions.
11. Support: Do not allow cables to lie on removable ceiling tiles.
12. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
13. Provide strain relief.
14. Keep runs short. Allow extra length for connecting to terminals. Do not bend cables in a radius less than 10 times the cable OD. Use sleeves or grommets to protect cables from vibration at points where they pass around sharp corners and through penetrations.
15. Ground wire must be copper, and grounding methods must comply with IEEE C2. Demonstrate ground resistance.

G. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-D recommendations for separating unshielded copper voice and data communications cable from potential EMI sources including electrical power lines and equipment.
2. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures must be as follows:
 - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 3 inch.
 - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 6 inch.

3.3 REMOVAL OF CONDUCTORS AND CABLES

- A. Remove abandoned conductors and cables. Abandoned conductors and cables are those installed that are not terminated at equipment and are not identified with a tag for future use.

3.4 FIRESTOPPING

- A. Comply with existing conditions and requirements for penetrations through fire-resistive construction.
- B. Comply with TIA-569-D, Annex A, "Firestopping."

3.5 GROUNDING

- A. For data communication wiring, comply with TIA-607-B and with BICSI TDMM, "Bonding and Grounding (Earthing)" Chapter.
- B. For control-voltage wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.6 IDENTIFICATION

- A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Identify data and communications system components, wiring, and cabling according to TIA-606-B; label printers must use label stocks, laminating adhesives, and inks complying with UL 969.
- C. Identify each wire on each end and at each terminal with a number-coded identification tag. Each wire must have a unique tag.

3.7 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Visually inspect cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
 - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
- B. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
- C. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 260523

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SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Grounding and bonding conductors.
2. Grounding and bonding clamps.
3. Grounding and bonding bushings.
4. Grounding and bonding connectors.
5. Grounding bus.
6. Grounding (earthing) electrodes.
7. Grounding electrode enclosures.

B. Related Requirements:

1. General Provisions of the Contract and Project Drawings apply to this section.
2. Section 260500 "Common Work Requirements for Electrical" specifies additional requirements applicable to coordinating, scheduling, and sequencing of the Work specified in this Section.
3. Section 260553 "Identification for Electrical Systems" specifies electrical equipment labels and warning signs installed by this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Product Listing: Include copy of unexpired approval letter, on letterhead of qualified electrical testing agency, certifying product's compliance with specified listing criteria.
 - a. If listed manufacturer differs from selling manufacturer, indicate relationship between entities on submittal. Clearly indicate which entity warrants product performance and fitness for purpose.
 - b. Listing criteria identified in approval letter must match specified listing criteria. UL label indicating approval of equipment's enclosure is not considered approval of equipment for intended application.
 - c. Product identification in approval letter must match product branding and model numbers in submittal. Approval letters for discontinued or superseded products are unacceptable for submitted product.

B. Shop Drawings: Prepare and submit the following:

1. Plans showing dimensioned locations of grounding features described in "Field Quality Control for Grounding and Bonding" Article, including the following:
 - a. Grounding electrode access enclosures.
 - b. Grounding electrodes.

- C. Field quality-control reports.
- D. Manufacturer's published instructions.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. In addition to items specified in Section 260050 "Common Work Requirements for Electrical," include the following:
 - a. Plans showing locations of grounding features described in "Field Quality Control for Grounding and Bonding" Article, including the following:
 - 1) Grounding electrode access enclosures.
 - 2) Grounding electrodes.
 - 3) Grounding arrangements and connections for separately derived systems.
 - b. Instructions for periodic testing and inspection of grounding features at test wells, grounding connections for generator system based on NETA MTS.
 - 1) Tests must determine if ground-resistance or impedance values remain within specified maximums, and instructions must recommend corrective action if values do not.
 - 2) Include recommended testing intervals.

1.4 SERVICE CONDITIONS FOR ELECTRICAL EQUIPMENT

- A. Soil Resistivity: Grounding (earthing) Work on the Project must account for soil resistivity conditions.
- B. Electrical Equipment Grounding (Earthing): Do not exceed 25 ohms resistance to ground (earth).
 1. Contact Engineer for resolution if 25 ohm specified resistance to ground (earth) is not attained after complying with prescriptive requirements in Article 250 of NFPA 70.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Products or components listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2.2 GROUNDING AND BONDING CONDUCTORS

- A. Equipment Grounding Conductor:
 - 1. Standard Features: 600 V, THHN/THWN-2 or THWN-2, copper wire or cable, green color, in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. ASTM - Bare Copper Grounding and Bonding Conductor:
 - 1. Standard Features: Complying with one or more of the following:
 - a. Soft or Annealed Copper Wire: ASTM B3.
 - b. Concentric-Lay Stranded Copper Conductor: ASTM B8.
 - c. Tin-Coated Soft or Annealed Copper Wire: ASTM B33.

2.3 GROUNDING AND BONDING CLAMPS

- A. Description: Clamps suitable for attachment of grounding and bonding conductors to grounding electrodes, pipes, tubing, and rebar. Grounding and bonding clamps specified in this article are also suitable for use with communications applications.
- B. UL KDER - Hex-Fitting-Type Pipe and Rod Grounding and Bonding Clamp:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ABB Electrification Installations Products.
 - b. Cooper B-line; brand of Eaton, Electrical Sector.
 - c. ERICO; brand of nVent Electrical plc.
 - d. Galvan Industries, Inc.; Electrical Products Division, LLC.
 - e. Harger Lightning & Grounding; business of Harger, Inc.
 - f. ILSCO; brand of ECM Industries LLC; division of nVent Electric plc.
 - g. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - 2. Source Limitations: Obtain products from single manufacturer.
 - 3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
 - 4. Standard Features:
 - a. Two pieces with zinc-plated bolts.
 - b. Clamp Material: Silicon bronze or die-cast zinc alloy.
 - c. Listed for outdoor use.

C. UL KDER - U-Bolt-Type Pipe and Rod Grounding and Bonding Clamp:

1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. ABB Electrification Installations Products.
 - b. Cooper B-line; brand of Eaton, Electrical Sector.
 - c. ERICO; brand of nVent Electrical plc.
 - d. Galvan Industries, Inc.; Electrical Products Division, LLC.
 - e. Harger Lightning & Grounding; business of Harger, Inc.
 - f. ILSCO; brand of ECM Industries LLC; division of nVent Electric plc.
 - g. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
2. Source Limitations: Obtain products from single manufacturer.
3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
4. Standard Features:
 - a. Clamp Material: Brass or Tinned brass.
 - b. Listed for outdoor use.

D. UL KDER - Strap-Type Pipe and Rod Grounding and Bonding Clamp:

1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. ABB Electrification Installations Products.
 - b. Cooper B-line; brand of Eaton, Electrical Sector.
 - c. ERICO; brand of nVent Electrical plc.
 - d. Galvan Industries, Inc.; Electrical Products Division, LLC.
 - e. Harger Lightning & Grounding; business of Harger, Inc.
 - f. ILSCO; brand of ECM Industries LLC; division of nVent Electric plc.
 - g. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
2. Source Limitations: Obtain products from single manufacturer.
3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
4. Standard Features:
 - a. Clamp Material: Copper, tinned copper, and/or galvanized steel.
 - b. Listed for outdoor use.

- E. UL KDER - Beam Grounding and Bonding Clamp:
1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. ABB Electrification Installations Products.
 - b. Panduit Corp.
 - c. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 2. Source Limitations: Obtain products from single manufacturer.
 3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
 4. Standard Features: Mechanical-type, terminal, ground wire access from four directions; with dual, tin-plated or silicon bronze bolts.

F. UL KDER - Exothermically Welded Connection:

1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. ABB Electrification Installations Products.
 - b. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - c. ERICO; brand of nVent Electrical plc.
 - d. Harger Lightning & Grounding; business of Harger, Inc.
 - e. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
2. Source Limitations: Obtain products from single manufacturer.
3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
4. Standard Features: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.4 GROUNDING AND BONDING BUSHINGS

- A. Description: Bonding bushings connect conduit fittings, tubing fittings, threaded metal conduit, and unthreaded metal conduit to metal boxes and equipment enclosures, and have one or more bonding screws intended to provide electrical continuity between bushing and enclosure. Grounding bushings have provision for connection of bonding or grounding conductor and may or may not also have bonding screws.

B. UL KDER - Bonding Bushing:

1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. ABB Electrification Installations Products.
 - b. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - c. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - d. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - e. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
2. Source Limitations: Obtain products from single manufacturer.
3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
4. Standard Features: Threaded bushing with insulated throat.

C. UL KDER - Grounding Bushing :

1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. ABB Electrification Installations Products.
 - b. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - c. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - d. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - e. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
2. Source Limitations: Obtain products from single manufacturer.
3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
4. Standard Features: Threaded bushing with insulated throat and mechanical-type wire terminal.

2.5 GROUNDING AND BONDING CONNECTORS

A. UL KDER - Pressure-Type Grounding and Bonding Busbar Cable Connector:

1. Manufacturers: Subject to compliance with requirements, provide products from the following:

- a. ABB Electrification Installations Products.
 - b. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - 2. Source Limitations: Obtain products from single manufacturer.
 - 3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
 - 4. Standard Features: Copper or copper alloy, for compression bonding of one or more conductor directly to copper busbar. Listed for direct burial.
- B. UL KDER - Crimped Lug Pressure-Type Grounding and Bonding Busbar Terminal:
- 1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. ABB Electrification Installations Products.
 - b. Harger Lightning & Grounding; business of Harger, Inc.
 - c. ILSCO; brand of ECM Industries LLC; division of nVent Electric plc.
 - d. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - 2. Source Limitations: Obtain products from single manufacturer.
 - 3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
 - 4. Standard Features: Cast silicon bronze, solderless compression-type wire terminals; with long barrel and two holes spaced on 5/8 or 1 inch centers for two-bolt connection to busbar.
- C. UL KDER - Crimped Pressure-Type Grounding and Bonding Cable Connector:
- 1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. ABB Electrification Installations Products.
 - b. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - c. ILSCO; brand of ECM Industries LLC; division of nVent Electric plc.
 - 2. Source Limitations: Obtain products from single manufacturer.
 - 3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

4. Standard Features: Crimp-and-compress connectors that bond to conductor when connector is compressed around conductor.
 - a. Copper, copper alloy, tinned copper, C and H shaped.

2.6 GROUNDING (EARTHING) ELECTRODES

A. UL KDER - Rod Electrode:

1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. ABB Electrification Installations Products.
 - b. ERICO; brand of nVent Electrical plc.
 - c. Galvan Industries, Inc.; Electrical Products Division, LLC.
 - d. Harger Lightning & Grounding; business of Harger, Inc.
2. Source Limitations: Obtain products from single manufacturer.
3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
4. Standard Features: Copper-clad or zinc-coated steel, sectional type; 5/8 inch by 8 ft.

B. UL KDER - Chemically Charged Rod Electrode:

1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. ERICO; brand of nVent Electrical plc.
 - b. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
2. Source Limitations: Obtain products from single manufacturer.
3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
4. Standard Features: Copper tube, straight or L-shaped, charged electrode enhancement material.
5. Termination: Factory-attached 4/0 AWG bare conductor at least 48 inch long.
6. Backfill Material: Electrode manufacturer's recommended material.

2.7 GROUNDING BUS (EGB)

- A. Rectangular bar, annealed copper, 1/4 inch by 2 inch cross section, 2 hole length as indicated on drawings. 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.

2.8 GROUNDING ELECTRODE ENCLOSURES

- A. Description: Enclosures designed to protect grounding electrodes from damage while providing access for inspection and testing of the grounding system.
- B. Grounding Electrode Access Well Enclosure:
 - 1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. ERICO; brand of nVent Electrical plc.
 - b. Harger Lightning & Grounding; business of Harger, Inc.
 - c. Quazite; brand of Hubbell Utility Solutions; Hubbell Incorporated.
 - 2. Source Limitations: Obtain products from single manufacturer.
 - 3. Standard Features:
 - a. Well Material: HDPE or schedule 40 PVC.
 - b. Cover Material: HDPE or steel.
 - c. Cover Strength: Sidewalk or turf use.
 - 4. Other Available Features Required by the Project:
 - a. Round:
 - 1) Nominal Diameter: 10 inch.
 - 2) Nominal Height: 18 inch.
 - 3) Slotted sides for installation after grounding connections made.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine facility's grounding electrode system and equipment grounding for compliance with requirements for maximum ground-resistance level and other conditions affecting performance of grounding and bonding of electrical system.
- B. Inspect test results of grounding system measured at point of electrical service equipment connection.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with connection of electrical service equipment only after unsatisfactory conditions have been corrected.

3.2 SELECTION OF GROUNDING AND BONDING PRODUCTS

- A. Grounding and Bonding Conductors:

1. Provide solid conductor for 8 AWG and smaller, and stranded conductors for 6 AWG and larger unless otherwise indicated.
2. Bonding Cable: 28 kcmil, 14 strands of 17 AWG conductor, 1/4 inch in diameter.
3. Bonding Conductor: 4 AWG or 6 AWG, stranded conductor.
4. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch wide and 1/16 inch thick.
5. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch wide and 1/16 inch thick.
6. Underground Grounding Conductors: Install bare tinned-copper conductor, 2/0 AWG minimum.

B. Grounding and Bonding Connectors:

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.

3.3 INSTALLATION OF GROUNDING AND BONDING

A. Comply with manufacturer's published instructions.

B. Reference Standards:

1. Electrical Construction: ICC IBC, ICC IFC, NFPA 1, NFPA 70, and NECA NEIS 1.
2. Electrical Maintenance: NFPA 70B.
3. Electrical Safety: NFPA 70E.
4. Grounding and Bonding: NECA NEIS 331 and Article 250 of NFPA 70.
5. Standby Power Work: NFPA 110, NFPA 111, and NECA NEIS 416.
6. Consult Engineer for resolution of conflicting requirements.

C. Special Techniques:

1. Grounding and Bonding Conductors:

- a. 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. Underground Grounding Conductors:

- 1) Bury at least 30 inch below grade.
- 2) Duct-Bank Grounding Conductor: Bury 12 inch above duct bank when indicated as part of duct-bank installation.

2. Grounding and Bonding Connectors: 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.

- a. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 - b. Make connections with clean, bare metal at points of contact.
 - c. Make aluminum-to-steel connections with stainless steel separators and mechanical clamps.
 - d. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 - e. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
 - f. 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 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 disconnect-type connection is required, use bolted clamp.
 - g. 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 bolted clamp connector or bolt lug-type connector to pipe flange by using one of lug bolts of flange. Where 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 bolted connector.
 - 3) Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
 - h. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.
3. Electrodes:
- a. Ground Rods: Drive rods until tops are 2 inch 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 below-grade connections.

- b. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least same distance from other grounding electrodes, and connect to service grounding electrode conductor.
 - 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 must be at least 12 inch deep, with cover.
 - 1) Install at least one test well for each service unless otherwise indicated. Install at ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
 - d. Concrete-Encased Electrode (Ufer Ground):
 - 1) Fabricate in accordance with NFPA 70; use minimum of 20 ft of bare copper conductor not smaller than 4 AWG.
 - a) If concrete foundation is less than 20 ft long, coil excess conductor within base of foundation.
 - b) Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.
 - 2) Fabricate in accordance with NFPA 70; using electrically conductive coated steel reinforcing bars or rods, at least 20 ft long. If reinforcing is in multiple pieces, connect together by usual steel tie wires or exothermic welding to create required length.
4. Grounding Separately Derived Systems:
- a. Permanent Generators: Install grounding electrode(s) at location of permanent generators having switched neutral connections. Electrode must be connected to equipment grounding conductor and to frame of generator.
5. Grounding Underground Distribution System Components:
- a. Duct Bank Grounding Conductor: Bury 12 inch above duct bank when indicated as part of duct-bank installation.
 - b. Comply with IEEE C2 grounding requirements.
 - c. Grounding Handholes: Install driven ground rod through handhole floor, close to wall, and set rod depth so 4 inch will extend above finished floor. If necessary, install ground rod before manhole is placed and provide 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inch above to 6 inch below concrete. Seal floor opening with waterproof, nonshrink grout.

- d. to be supplied by utility company, revise subparagraph to comply with utility company's grounding standards or delete and indicate on the Drawings.
 - e. Pad-Mounted Transformers and Switches: Install two ground rods and ring electrode around pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than 2 AWG for ring electrode and for taps to equipment grounding terminals. Bury ring electrode not less than 6 inch from foundation.
6. Equipment Grounding and Bonding:
- a. Install insulated equipment grounding conductors with feeders and branch circuits.
 - b. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1) Feeders and branch circuits.
 - 2) Lighting circuits.
 - 3) Receptacle circuits.
 - 4) Single-phase motor and appliance branch circuits.
 - 5) Three-phase motor and appliance branch circuits.
 - 6) Flexible raceway runs.
 - 7) Armored and metal-clad cable runs.
 - c. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
 - d. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
 - e. Metallic Fences: Comply with requirements of IEEE C2.
 - 1) Grounding Conductor: Bare, tinned copper, not less than 8 AWG.
 - 2) Gates: Must be bonded to grounding conductor with flexible bonding jumper.
 - 3) Barbed Wire: Strands must be bonded to grounding conductor.
7. Fence Grounding:
- a. Grounding Method: At each grounding location, drive grounding rod vertically until top is 6 inch below finished grade. Connect rod to fence with 6 AWG conductor. Connect conductor to each fence component at grounding location.
 - b. Fences within 100 ft of Buildings, Structures, Walkways, and Roadways: Ground fence at maximum intervals of 750 ft.

- 1) Gates and Other Fence Openings: Ground fence on each side of opening.
 - a) Bond metal gates to gate posts by connecting bonding jumper between gate post and gate frame.
 - b) Bond across openings, with and without gates, except at openings indicated as intentional fence discontinuities. Use 2 AWG wire and bury it at least 18 inch below finished grade.

3.4 FIELD QUALITY CONTROL FOR GROUNDING AND BONDING

A. Administrant for Electrical Power Tests and Inspections:

1. Administer and perform tests and inspections with assistance of factory-authorized service representative.

B. 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 calibrated torque wrench in accordance with manufacturer's published instructions.
3. Test completed grounding system at each location where maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by 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 in accordance with IEEE Std 81.
 - c. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.
4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to record of tests and observations. Include number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

C. Nonconforming Work:

1. Grounding system will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective components and retest.

- D. Collect, assemble, and submit test and inspection reports.
 - 1. Report measured ground resistances that exceed the following values:
 - a. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
 - b. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
 - c. Handhole Grounds: 10 ohms.

3.5 PROTECTION

- A. After installation, protect grounding and bonding cables and equipment from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 260526

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SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Support systems.
2. Mounting, anchoring, and attachment components.
3. Installation of fabricated metal supports.
4. Installation of concrete bases.

B. Related Requirements:

1. General Provisions of the Contract and Project Drawings apply to this section.
2. Section 260500 "Common Work Requirements for Electrical" specifies additional requirements applicable to coordinating, scheduling, and sequencing of the Work specified in this Section.
3. Section 033000 "Cast-in-Place Concrete" specifies concrete materials, reinforcement, and placement requirements referenced by this Section.

1.2 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.
4. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.3 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified together with concrete Specifications.

PART 2 – PRODUCTS

2.1 SUPPORT SYSTEMS

A. Steel Slotted Support Systems:

- 1. Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
- 2. Standard Features: Preformed steel channels and angles with minimum 13/32 inch diameter holes at a maximum of 8 inch on center in at least one surface.
- 3. Referenced Standard: MFMA-4 factory-fabricated components for field assembly.
- 4. Material for Channel, Fittings, and Accessories: Galvanized steel.
- 5. Channel Width: Selected for applicable load criteria.
- 6. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
- 7. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
- 8. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
- 9. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Conduit and Cable Support Devices:

- 1. Standard Features: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit:

- 1. Standard Features: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs must have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body must be made of malleable iron.

- D. Structural Steel for Fabricated Supports and Restraints:
1. Standard Features: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.

2.2 MOUNTING, ANCHORING, AND ATTACHMENT COMPONENTS

A. Powder-Actuated Fasteners:

1. Available Manufacturers: Subject to compliance with requirements, provide products from the following:
 - a. Hilti Inc.
 - b. ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - c. MKT Fastening, LLC.
2. Standard Features: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors:

1. Standard Features: Insert-wedge-type, zinc-coated or stainless steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

C. Concrete Inserts:

1. Standard Features: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.

D. Clamps for Attachment to Steel Structural Elements:

1. Standard Features: MSS SP-58 units are suitable for attached structural element.

E. Through Bolts:

1. Standard Features: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325.

F. Toggle Bolts:

1. Standard Features: All steel springhead type.

G. Hanger Rods:

1. Standard Features: Threaded steel.

PART 3 – EXECUTION

3.1 SELECTION OF HANGERS AND SUPPORTS

- A. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and ERMC as required by NFPA 70. Minimum rod size must be 1/4 inch in diameter.
- B. 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.
- C. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2 inch and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with manufacturer's published instructions.
- B. Reference Standards for Installation: Unless more stringent installation requirements are specified in the Contract Documents or manufacturer's published instructions, comply with the following:
 - 1. Electrical Construction: ICC IBC, ICC IFC, NFPA 1, NFPA 70, and NECA NEIS 1.
 - 2. Hot Work: NFPA 51B.
 - 3. Work in Confined Spaces: NFPA 350.
 - 4. Installation of Steel Conduit: NECA NEIS 101.
 - 5. Consult Engineer for resolution of conflicting requirements.
- C. Special Installation Techniques:
 - 1. Raceway Support Methods: In addition to methods described in NECA NEIS 1, EMT may be supported by openings through structure members, in accordance with NFPA 70.
 - 2. 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 must be weight of supported components plus 200 lb.
 - 3. 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:
 - a. To Wood: Fasten with lag screws or through bolts.
 - b. To New Concrete: Bolt to concrete inserts.
 - c. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - d. To Existing Concrete: Expansion anchor fasteners.
 - e. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 - f. To Light Steel: Sheet metal screws.

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SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 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.

B. Related Requirements:

1. General Provisions of the Contract and Project Drawings apply to this section.
2. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks and handholes for underground electrical construction.

1.2 ACTION SUBMITTALS

A. Product Data: For wireways and fittings, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.3 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

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. Electri-Flex Company.
 - d. Republic Conduit.
 - e. Southwire Company.
 - f. Thomas & Betts Corporation; A Member of the ABB Group.
 - g. Western Tube and Conduit Corporation.
 - h. 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. RMC: Comply with ANSI C80.1 and UL 6.
4. IMC: Comply with ANSI C80.6 and UL 1242.
5. EMT: Comply with ANSI C80.3 and UL 797.
6. FMC: Comply with UL 1; zinc-coated steel.
7. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

1. Comply with NEMA FB 1 and UL 514B.
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. Fittings, General: Listed and labeled for type of conduit, location, and use.
4. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: Set-screw for 2" or less conduit, compression for greater than 2".
5. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651 for PVC and type XJ for steel, rated for environmental conditions were installed, and including flexible external bonding jumper.

- C. Joint Compound for IMC, GRC, or ARC: 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. Electri-Flex Company.
 - d. Kraloy
 - e. Lamson & Sessions; Carlon Electrical Products.
 - f. Thomas & Betts Corporation; A Member of the ABB Group.
2. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
3. LFNC: Comply with UL 1660.

B. Nonmetallic Fittings:

1. Fittings, General: Listed and labeled for type of conduit, location, and use.
2. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

3. 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; Eaton, Electrical Sector.
 2. Hoffman; nVent.
 3. MonoSystems, Inc.
 4. Square D; Schneider Electric USA.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1, Type 3R, Type 4 or Type 12 as noted and required for installation environment and conditions, unless otherwise indicated. Size to comply with NFPA 70.
- 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 or flanged-and-gasketed, unless otherwise indicated on drawings.
- E. Finish: ANSI 61 Gray for steel wireways.

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. Erickson Electrical Equipment Company.
 4. Hoffman; a brand of Pentair Equipment Protection.
 5. Hubbell Incorporated.
 6. Kraloy.
 7. O-Z/Gedney; a brand of Emerson Industrial Automation.
 8. RACO; Hubbell.
 9. Thomas & Betts Corporation; A Member of the ABB Group.
 10. Wiremold / Legrand.
- 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. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, deep-type, ferrous alloy, Type FD, with gasketed cover, threaded hubs.
- E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

- F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- G. Sheet Metal Pull and Junction Boxes: NEMA OS 1, galvanized steel.
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover and stainless-steel cover screws.
 - 1. Flanged Type boxes shall be used where installed flush in wall.
- I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- J. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- K. Telecommunications and Security Device Box Dimensions: 4 11/16 inches square by 2-1/8 inches deep unless noted otherwise.
- L. Gangable boxes are prohibited.
- M. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1, Type 3R, Type 4 or Type 12 as required for installed environmental conditions with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- N. Cabinets:
 - 1. NEMA 250, Type 1, Type 3R, Type 4 or Type 12 as required for installed environmental conditions 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.
 - 5. Accessory feet where required for freestanding equipment.
- O. Accessories
 - 1. Fire rated Moldable pads: UL #9700, moldable sheet putty at required thickness on all five sides of back boxes.
 - a. Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti
 - 2) IsoBacker Pad
 - 3) Kinetics Noise Control
 - 4) SSP Putty and Pads

PART 3 – EXECUTION

3.1 RACEWAY SIZING

- A. Size conduit as shown on the drawings and specifications. Where not indicated in the contract documents, conduit size shall be according to NEC. (Latest Edition). Conduit and conductor sizing shall be coordinated to limit conductor fill to less than 40%, maintain conductor ampere capacity as required by the National Electrical Code (to include enlarged conductors due to temperature and quantity derating values) and to prevent excessive voltage drop and pulling tension due to long conduit/conductor lengths.
- B. Minimum Raceway Size (Unless noted otherwise): 3/4-inch (21 mm) trade size.
- C. The use of 1/2 inch would be allowed for conduit installed to serve individual light switches, individual receptacles and individual fixture whips from junction boxes.
- D. Minimum Raceway Size Control Conduit: 1-inch, unless noted otherwise in documents.
- E. Minimum Raceway Size; Below Grade more than 5'-0" from Building Foundation: 1-inch, unless noted otherwise in documents.
- F. Conduit sizes shall change only at the entrance or exit to a junction box, unless specifically noted on the drawings.

3.2 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: RMC.
 - 2. Concealed Conduit, Aboveground: IMC.
 - 3. Underground Conduit: Refer to Section 260543.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R or 4X as noted.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 - 3. Exposed and Subject to Physical Damage: IMC or RMC as noted. Raceway locations include the following:
 - a. Loading docks.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - d. Inbound and outbound baggage rooms.
 - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.

5. Connection to Vibrating Equipment (Including Transformers, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Flexible Metal Conduit (FMC) 3/4 inch, unless otherwise noted.
7. Lighting branch circuit wiring to an individual luminaire may be a UL listed, manufactured 3/8-inch flexible metal conduit (FMC) with fittings and #14 AWG THHN conductors and an insulated ground wire. Maximum length of 3/8 inch FMC shall be six (6) feet.
8. Damp or Wet Locations: IMC.
9. Damp or Wet Locations and Subject to Physical Damage: RMC.
10. Hazardous Locations: All raceways installed in hazardous (classified) areas shall be suitable for locations defined in the most current version of the NEC, Article 500.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. Rigid Nonmetallic Conduit: Use PVC fittings, unless otherwise indicated.
3. EMT: Use set-screw, steel fittings up to 2" and compression fittings over 2". Comply with NEMA FB 2.10.
4. Flexible Conduit: Use fittings listed only for use with flexible conduit. Comply with NEMA FB 2.20.

3.3 BOXES AND ENCLOSURES APPLICATIONS

A. Boxes and Enclosures:

1. NEMA 250, Type 1, except use NEMA 250, Type 3R and 4X in damp or wet locations as noted on drawings.
2. Hazardous Locations: All boxes and enclosures installed in hazardous (classified) areas shall be suitable for locations defined in the most current version of the NEC, Article 500.

3.4 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 NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. In general, conduits shall be installed concealed in walls, in finished spaces and where possible or practical, or as noted otherwise. In unfinished spaces, mechanical and utility areas, conduit may run either concealed or exposed as conditions dictate and as practical unless noted otherwise on drawings. Installation shall maintain headroom in exposed vicinities of pedestrian or vehicular traffic.

- D. Route conduit through roof openings provided for piping and ductwork where possible. If not provided or routing through provided openings is not possible, rough through jack with pitch pocket. Coordinate roof penetrations with others.
- E. Conduit routing on drawings scaled $\frac{1}{4}'' = 1'-0''$ or less shall be considered diagrammatic, unless noted otherwise. The correct routing, when shown diagrammatically shall be chosen by the Contractor based on information provided in the contract documents, in accordance with manufacturer's written instructions, applicable coded, NECA 1 and NECA 101 and coordinated with other contractors.
- F. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.
- G. Do not fasten conduits onto the bottom side of a metal deck roof.
- H. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- I. Complete raceway installation before starting conductor installation.
- J. Install temporary closures to prevent foreign matter from entering raceways.
- K. Unused openings in boxes and fittings shall be plugged with suitable devices rated for the proper environment.
- L. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.
- M. Arrange stub-ups so curved portions of bends are not visible above finished slab. Where rigid non-metallic conduit (RNC) conduit is used below grade, in slab, below slab, etc., a transition to rigid galvanized steel or PVC-coated steel conduit shall be installed before conduit exits the earth. The metallic conduit shall extend a minimum of 6" into the surface concealing the non-metallic conduit.
- N. Stub-Ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- O. 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 of changes in direction and within 12 inches of enclosures to which attached to.
- P. 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.
- Q. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines. Conduit runs installed above

suspended ceilings shall be properly supported. In no case shall conduit rest on the suspended ceiling construction, nor utilize ceiling support system for conduit supports.

- R. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
 - 1. Run parallel or banked raceways together on common supports.
 - 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- S. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.
- T. Conduit shall not be routed under floor slab unless specifically noted on drawings.
- U. Raceways Penetrating Concrete Equipment Pads:
 - 1. Run conduit at right angles to concrete foundation walls and equipment pads.. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to stub-up from underground through concrete equipment pad with expansion fitting to meet NEC.
 - 4. Change from RNC, Type EPC-40-PVC, to RMC before rising above concrete equipment pad.
- V. Telecommunication Conduits:
 - 1. Conduits that protrude through the structural floor shall be installed 1 to 3" above finished floor (AFF).
 - 2. Conduits that enter into Telecommunications Rooms (TRs) below the finished ceiling shall terminate a minimum of 4-inches below ceiling and as close to the wall as possible
 - 3. Conduits that are below grade and enter the building shall terminate a minimum of 4-inches above finished floor (AFF) and as close to the wall as possible.
 - 4. Conduit terminations shall have nylon bushings installed on each end of every conduit run.
 - 5. Telecommunication conduits shall have no more than two (2) 90 degree bends between pull points and contain no continuous sections longer than 100 feet. Insert pull points or pull boxes for conduits exceeding 100 feet in length. A third bend is acceptable if: The total run is no longer than (33) feet.
 - 6. The conduit size is increased to the next trade size.
 - 7. Telecommunications pull boxes shall not be used in lieu of a bend. Align conduits that enter into the pull box from the opposite ends with each other. Pull box size shall be twelve (12) times the diameter of the largest conduit. Slip sleeves or gutters can be used in place of a pull box.
 - 8. Conduit bend radius shall be six (6) times the diameter for conduits under 2-inches and ten (10) times the diameter for conduits over 2-inches.

- W. Contractor shall be responsible for all openings required in masonry or exterior walls under this division. At the expense of this Contractor, a qualified mason shall repair all openings to match existing conditions.

3.5 CONDUIT TERMINATIONS

- A. 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.
- B. Join raceways with fittings designed and approved for that purpose and make joints tight.
- C. When raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
- D. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.
- E. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- F. 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 trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- G. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- H. 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.
- I. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- K. 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.

- L. 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. Conduit extending into pressurized duct and equipment.
 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 6. Where otherwise required by NFPA 70.
- M. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- N. Expansion fittings shall be installed across expansion joints in structures and concrete construction where such joints are shown on the architectural and structural drawings.
- O. Expansion-Joint Fittings:
1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.00078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- P. Stub-up Connections: Extend conduits through concrete equipment pads for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs to terminate approximately 6" above concrete pad. Extend conductors to

equipment with rigid steel conduit unless subject to vibration or movement, in which case LFMC may be used at 6 inches (150 mm) or greater above the concrete pad.

- Q. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations.

3.6 BOX INSTALLATION

- A. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- B. Recessed Boxes in Masonry Walls: Saw-cut opening for box in corner of cell of masonry block and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- C. Locate and install boxes to allow access to them. Where installation is inaccessible, coordinate locations and provide 18 inch by 24 inch access doors.
- D. No back to back outlet boxes shall be installed.
1. Provide a minimum horizontal separation of 6 inches between boxes installed on opposite sides of non-rated stud walls. When the minimum separation cannot be maintained, install sound insulation pads on all five sides of the back box in accordance with the manufacturer's instructions.
 2. Provide a minimum horizontal separation of 24 inches between boxes installed on opposite sides of fire-rated stud walls. When the minimum separation cannot be maintained, the box is greater than 16 square inches of the total box area (all trades) per 100 square feet is greater than or equal to 100 square inches, install fire-rated moldable pads on all five sides of the back box to maintain the fire rating of the wall. Install moldable pads in accordance with UL listing for the specific product. Sound insulation pads are not acceptable for use in fire-rated wall applications unless the product carries the necessary fire rating.
- E. Electrical box locations shown on drawings are approximate unless dimensioned. Verify location of floor boxes and outlets in offices and work areas prior to rough-in.
- F. No outlet shall be located where it will be obstructed by other equipment, piping, lockers, benches, counters, etc.
- G. It shall be the Contractor's responsibility to study drawings pertaining to other trades, to discuss location of outlets with workmen installing other piping and equipment and to fit all electrical outlets to job conditions.
- H. The proper location of each outlet is considered a part of this contract and no additional compensation will be paid to the Contractor for moving outlets which were improperly located.

- I. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- J. Locate boxes so that cover or plate will not span different building finishes.
- K. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- L. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- M. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

3.7 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."

3.8 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Division 07.

3.9 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 PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type ERMC-S raceways, elbows, couplings, and fittings
2. Type PVC raceways and fittings.
3. Electrically conductive corrosion-resistant compounds for threaded conduit.
4. Solvent cements.
5. Duct accessories.
6. Handholes and boxes for exterior underground wiring.
7. Duct sealing.

B. Related Documents

1. General Provisions of the Contract and Project Drawings apply to this Section.
2. Section 260519 "Low-Voltage for Electrical Power Conductors and Cables".
3. Section 260533 "Raceways and Boxes for Electrical Systems".
4. Section 260553 "Identification for Electrical Systems" specifies underground identification requirements, including warning tape.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Coordination Meeting(s): For underground ducts and raceways. Conduct meeting(s) at Project site before underground construction activity.

1. Attendees: Installers, fabricators, representatives of manufacturers, and administrators for field tests and inspections. Notify Engineer of scheduled meeting dates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include duct-bank materials, spacers and miscellaneous components.
2. Include ducts, conduits, and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
3. Include accessories for handholes, boxes.
4. Include underground-line warning tape.

B. Shop Drawings:

1. Factory-Fabricated Handholes and Boxes Other Than Precast Concrete:
 - a. Include dimensioned plans, sections, and elevations, and fabrication and installation details.

- b. Include duct entry provisions, including locations and duct sizes.
- c. Include cover design.
- d. Include grounding details.
- e. Include dimensioned locations of cable rack inserts, and pulling-in and lifting irons.

1.4 FIELD CONDITIONS

- A. Ground Water: Assume ground-water level is 6" below ground surface unless a higher water table is noted on Drawings.

PART 2 – PRODUCTS

2.1 TYPE ERMC-S RACEWAY AND FITTINGS

- A. Performance Criteria:
 - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - 2. General Characteristics: UL 6 and UL CCN DYIX.
- B. Galvanized-Steel Electrical Rigid Metal Conduit (ERMC-S-G), Elbows, Coupling and Fittings:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. Republic Conduit.
 - c. Thomas & Betts Corporation; A Member of the ABB Group.
 - d. Western Tube and Conduit Corporation.
 - e. Wheatland Tube Company.
 - 2. Exterior Coating: Zinc.
 - 3. Interior Coating: Zinc with organic top coating.

2.2 SCHEDULE 40 RIGID PVC CONDUIT (PVC-40) AND FITTINGS:

- A. Performance Criteria:
 - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - 2. General Characteristics: UL 651 and UL CCN DZYR.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Allied Tube and Conduit; a part of Atkore International.
 - 2. CANTEX INC.
 - 3. Kraloy.

4. Lamson & Sessions; Carlon Electrical Products.
5. Thomas & Betts Corporation; A Member of the ABB Group.

2.3 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL Subject 2419 and UL CCN FOIZ.

2.4 SOLVENT CEMENTS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: As recommended by conduit manufacturer in accordance with UL 514B and UL CCN DWTT.
3. Sustainability Characteristics:
 - a. VOC Content: 510 g/L or less for PVC conduit and fittings.

2.5 DUCT ACCESSORIES

- A. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.
- B. Underground-Line Warning Tape: Comply with requirements for underground-line warning tape specified in Section 260553 "Identification for Electrical Systems."

2.6 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:
 - a. ASTM C858 for design and manufacturing processes.
 - b. SCTE 77.

B. Polymer Concrete Handholes and Boxes with Polymer Concrete Cover

1. Description: Molded of sand, concrete and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or combination.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. American Polymer Company.
 - b. Armorock.
 - c. NewBasis.
 - d. Oldcastle Infrastructure.
 - e. Quazite; Hubbell Power Systems, Inc.
3. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.
4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
- a. Cover Finish: Nonskid finish must have minimum coefficient of friction of 0.50.
 - b. Cover Legend: Molded lettering, "ELECTRIC", or as noted on drawings.
 - c. Color: Gray.
- C. Conduit Entrance Provisions: Conduit-terminating fittings must mate with entering ducts for secure, fixed installation in enclosure wall.
- D. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.
- E. Handholes 12 inches wide by 24 inches long and larger shall have factory-installed inserts for cable racks and pulling-in irons.

2.7 DUCT SEALING

- A. Duct-Sealing Compound: Nonhardening, safe for contact with human skin, not deleterious to cable insulation, and workable at temperatures as low as 35 deg F. Compound must be capable of withstanding temperature of 300 deg F without slump and adhering to clean surfaces of plastic ducts, metallic conduit, conduit and duct coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals. Duct sealing compound must be removable without damaging ducts or cables.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Coordinate layout and installation of duct, duct bank, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Architect if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.
- B. Coordinate elevations of duct and duct-bank entrances into handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Engineer.

- C. Clear and grub vegetation to be removed and protect vegetation to remain according to Project Manual.
- D. Remove and stockpile topsoil for reapplication according to Project Manual.

3.2 UNDERGROUND DUCT APPLICATION

- A. Duct for Electrical Feeders 600 V and Less: Type PVC-40, direct-buried unless otherwise indicated.
- B. Duct for Electrical Branch Circuits: Type PVC-40, direct-buried unless otherwise indicated.
- C. Underground Ducts Crossing Existing Paved Paths Walks and Driveways: Type PVC-40, concrete-encased unless otherwise indicated.
- D. Underground Ducts Crossing Existing Roadways: Type PVC-40, concrete-encased unless otherwise indicated.
- E. Stub-ups: Concrete encased, Type PVC-40, concrete-encased unless otherwise indicated.

3.3 UNDERGROUND ENCLOSURE APPLICATION

- A. Handholes and Boxes for 600 V and Less:
 - 1. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
 - 2. Units Subject to Light-Duty Pedestrian Traffic Only: Polymer concrete units, SCTE 77, Tier 8.
 - 3. Cover design load shall not exceed the design load of the handhole or box.

3.4 EARTHWORK

- A. Excavation and Backfill: Comply with Section 312000 "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.
- B. Restoration: Replace area immediately after backfilling is completed after construction vehicle traffic in immediate area is complete.
- C. Restore surface features at areas disturbed by excavation and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- D. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Section 329200 "Turf and Grasses".
- E. Cut and patch existing pavement in the path of underground duct, duct bank, and underground structures according to the Project Manual.

3.5 INSTALLATION OF DUCT AND DUCT-BANKS

A. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NEMA TCB 2 for installation of underground ducts and duct banks.
2. Consult Engineer for resolution of conflicting requirements.

B. Special Techniques:

1. Where indicated on Drawings, install duct, spacers, and accessories into the duct-bank configuration shown. Duct installation requirements in this Section also apply to duct bank.
2. Steel raceway, bends, and fittings in single duct run or duct bank must be of same type.
3. Slope: Pitch duct a minimum slope of 1:300 down toward handholes and away from buildings and equipment. Slope duct from a high point between two manholes, to drain in both directions.
4. Expansion and Deflection Fittings: Install expansion and deflection fitting in each duct in area of disturbed earth adjacent to manhole or handhole.
5. Install expansion fitting near center of straight line duct with calculated expansion of more than 3/4 inch.
6. Curves and Bends:
 - a. Use 5-degree angle couplings for slight changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches, both horizontally and vertically, at other locations unless otherwise indicated.
 - b. Field bending must be in accordance with NFPA 70 minimum radii requirements, except bends over 45 degrees must be made with minimum radius of 48 inches. Use only equipment specifically designed for material and size involved. Use PVC heating bender for bending PVC conduit.
 - c. Ducts must have a maximum of two 90 degree bends, or a total 180 degrees between pull points.

C. Joints: Use solvent-cemented joints in nonmetallic duct and fittings and make watertight in accordance with manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with minimum 3 inches of concrete for minimum of 12 inches on each side of coupling.

D. End Bell Entrances to Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches on center for 5-inch duct, and vary proportionately for other duct sizes.

1. Begin change from regular spacing to end-bell spacing 10 feet from the end bell, without reducing duct slope and without forming a trap in the line.
2. Grout end bells into structure walls from both sides to provide watertight entrances

- E. Building Wall Penetrations: Make a transition from underground duct to RMC at least 10 feet outside the building wall, without reducing duct line slope away from the building and without forming a trap in the line. Use fittings manufactured for RNC-to-RMC transition. Install RMC penetrations of building walls as specified in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."
- F. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.
- G. Pulling Cord: Install 200-lbf-test nylon cord in empty ducts.
- H. Direct-Buried Duct and Duct Bank:
 - 1. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements of drawing details for preparation of trench bottoms for pipes less than 6 inches in nominal diameter.
 - 2. Width: Excavate trench 12 inches wider than duct on each side.
 - 3. Depth: Install top of duct at least 36 inches below finished grade unless otherwise indicated.
 - 4. Set elevation of bottom of duct bank below frost line.
 - 5. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
 - 6. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than four spacers per 20 feet of duct. Place spacers within 24 inches of duct ends. Stagger spacers approximately 6 inches between tiers. Secure spacers to earth and to ducts to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
 - 7. Install duct with a minimum of 3 inches between ducts for like services and 6 inches between power and communications duct.
 - 8. Elbows: Install manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
 - 9. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements of Project Manual and drawing details for installation of backfill materials.
 - a. Place minimum 3 inches of sand as a bed for duct. Place sand to a minimum of 6 inches above top level of duct.
- I. Underground-Line Warning Tape: Bury conducting underground line specified in Section 260553 "Identification for Electrical Systems" no less than 12 inches above all duct banks and approximately 12 inches below grade. Align tape parallel to and within 3

inches of centerline of duct bank. Provide an additional warning tape for each 12-inch increment of ductbank width over a nominal 18 inches. Space additional tapes 12 inches apart, horizontally.

3.6 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. Special Techniques:

1. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of duct, and seal joint between box and extension as recommended by manufacturer.
2. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
3. Elevation: In paved areas and trafficways, set cover flush with finished grade. Set covers of other handholes 1 inch above finished grade.
4. Install handholes and boxes with bottom below frost line, below grade.
5. Field cut openings for duct 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.
6. For enclosures installed in asphalt paving and grass areas and subject to occasional, nondeliberate, heavy-vehicle loading, form and pour a concrete ring encircling, and in contact with, enclosure and with top surface screeded to top of box cover frame. Bottom of ring shall rest on compacted earth.
 - a. Concrete: 3000 psi, 28-day strength, complying with Section 033000 "Cast-in-Place Concrete," with a troweled finish.
 - b. Dimensions: 10 inches wide by 12 inches deep.

3.7 FIELD QUALITY CONTROL

A. Field tests and inspections must be witnessed by Engineer.

B. Perform the following tests and inspections:

1. Demonstrate capability and compliance with requirements on completion of installation of underground duct and duct bank, .
2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 12-inch-long mandrel equal to duct size minus 1/4 inch. If obstructions are indicated, remove obstructions and retest.
3. Test handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Section 260526 "Grounding and Bonding for Electrical Systems."

C. Nonconforming Work:

1. Underground ducts, raceways, and structures will be considered defective if they do not pass tests and inspections.

2. Correct deficiencies and retest as specified above to demonstrate compliance.

3.8 CLEANING

A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

END OF SECTION 260543

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SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Round sleeves.
2. Rectangular sleeves.
3. Sleeve-seal systems.
4. Sleeve-seal fittings.
5. Grout.
6. Pourable sealants.
7. Foam sealants.

B. Related Requirements:

1. General Provisions of the Contract and Project Drawings apply to this section.
2. Section 260500 "Common Work Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 – PRODUCTS

2.1 ROUND SLEEVES

A. Steel Wall Sleeves:

1. General Characteristics: ASTM A53/A53M, Type E, Grade B, Schedule 40, zinc coated, plain ends and integral waterstop.

B. Cast-Iron Wall Sleeves:

1. General Characteristics: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop.

C. PVC Molded Sleeves:

1. General Characteristics: With nailing flange for attaching to wooden forms.

D. Round, Galvanized-Steel, Sheet Metal Sleeves:

1. General Characteristics: Galvanized-steel sheet; thickness not less than 0.0239 inch; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

2.2 RECTANGULAR SLEEVES

A. Rectangular, Galvanized-Steel, Sheet Metal Sleeves:

1. General Characteristics:
 - a. Material: Galvanized sheet steel.
 - b. Minimum Metal Thickness:
 - 1) For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness must be 0.052 inch.
 - 2) For sleeve cross-section rectangle perimeter not less than 50 inches or with one or more sides larger than 16 inches, thickness must be 0.138 inch.

2.3 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products from the following:

1. Advance Products & Systems, LLC.
2. American Polywater Corporation.
3. CALPICO, Inc.
4. GPT Industries, LLC.
5. Metraflex Company (The).

B. General Characteristics: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable or between raceway and cable.

C. Options:

1. Sealing Elements: EPDM or Nitrile (Buna N) rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.4 SLEEVE-SEAL FITTINGS

A. Manufacturers: Subject to compliance with requirements, products from the following:

1. Holdrite; a division of Reliance Worldwide Corporation.

- B. General Characteristics: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit must have plastic or rubber waterstop collar with center opening to match piping OD.

2.5 GROUT

- A. Manufacturers: Subject to compliance with requirements, products from the following:

1. Specified Technologies Inc.
2. W. R. Meadows, Inc.

- B. General Characteristics: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

1. Standard: ASTM C1107/C1107M, Grade B, post-hardening, and volume-adjusting, dry, hydraulic-cement grout.
2. Design Mix: 5000 psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

2.6 POURABLE SEALANTS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Carlisle Syntec Systems.
2. GAF.
3. Johns Manville; a Berkshire Hathaway company.
4. Specified Technologies Inc.

- B. Performance Criteria:

1. General Characteristics: Single-component, neutral-curing elastomeric sealants of grade indicated below.
 - a. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.

2.7 FOAM SEALANTS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Innovative Chemical Products (Building Solutions Group).
2. The Dow Chemical Company.

- B. Performance Criteria:

1. General Characteristics: Multicomponent, liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam. Foam expansion must not damage cables or crack penetrated structure.

PART 3 – EXECUTION

3.1 INSTALLATION OF SLEEVES FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Sleeves for Conduits Penetrating Above-Grade, Non-Fire-Rated, Concrete and Masonry-Unit Floors and Walls:
1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall or floor so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - b. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Project Manual.
 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 3. Size pipe sleeves to provide 1/4 inch annular clear space between sleeve and raceway or cable, unless sleeve-seal system is to be installed.
 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inch above finished floor level. Install sleeves during erection of floors.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Wall Assemblies:
1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 2. Seal space outside of sleeves with approved joint compound for wall assemblies.
- C. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- D. Aboveground, Exterior-Wall Penetrations: Seal penetrations using **[steel]** **[cast-iron]** pipe sleeves and mechanical sleeve-seal systems. Size sleeves to allow for 1 inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- E. Underground, Exterior-Wall and Floor Penetrations:
1. Install steel pipe sleeves. Size sleeves to allow for 1 inch annular clear space between raceway or cable and sleeve for installing sleeve-seal system. Grout sleeve into wall or floor opening.

3.2 INSTALLATION OF RECTANGULAR SLEEVES AND SLEEVE SEALS

- A. Install sleeves in existing walls without compromising structural integrity of walls. Do not cut structural elements without reinforcing the wall to maintain the designed weight bearing and wall stiffness.

- B. Install conduits and cable with no crossings within the sleeve.
- C. Fill opening around conduits and cables with expanding foam without leaving voids.
- D. Provide metal sheet covering at both wall surfaces and finish to match surrounding surfaces. Metal sheet must be same material as sleeve.

3.3 INSTALLATION OF SLEEVE-SEAL SYSTEMS

- 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

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SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Labels.
2. Extruded insulating tubing.
3. Bands.
4. Tapes and stencils.
5. Tags.
6. Signs.
7. Cable ties.

B. Related Requirements:

1. General provisions of the Contract and Project Drawings apply to this section.
2. Section 260500 "Common Work Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
3. Section 260519 "Low-Voltage Electrical Power Conductors and Cables".
4. Section 260523 "Control-Voltage Electrical Power Cables".
5. Section 260526 "Grounding and Bonding for Electrical Systems".
6. Section 260533 "Raceways and Boxes for Electrical Systems".
7. Section 262726 "Wiring Devices".
8. Section 263600 "Transfer Switches".
9. Section 263213 "Gas Engine-Driven Generator Sets".

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Identification Schedule: For each piece of electrical equipment and electrical system components to be index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 – PRODUCTS

2.1 LABELS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN PGDQ2 for components; including UL 969.

- B. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
- C. Self-Adhesive Wraparound Labels: Preprinted, 3 mil thick, polyester flexible label with acrylic pressure-sensitive adhesive.
 - 1. Self-Lamination: Clear; UV-, weather-, and chemical-resistant; self-laminating, with protective shield over legend. Size labels such that clear shield overlaps entire printed legend.
 - 2. Marker for Labels:
 - a. Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.
- D. Self-Adhesive Labels: Polyester, thermal, transfer-printed, 3 mil thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
 - 1. Minimum Nominal Size:
 - a. 1-1/2 by 6 inch for raceway and conductors.
 - b. 3-1/2 by 5 inch for equipment.
 - c. As required by authorities having jurisdiction.

2.2 EXTRUDED INSULATING TUBING

- A. Performance Criteria:
 - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 2. Listing Criteria: UL CCN YDPU2 for components; including UL 224.
- B. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at maximum of 200 deg F.

2.3 BANDS

- A. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.

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.
- B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mil thick by 1 to 2 inch wide; compounded for outdoor use.

- C. Floor Marking Tape: 2 inch wide, 5 mil pressure-sensitive vinyl tape, with yellow and black stripes and clear vinyl overlay.
- D. Underground-Line Warning Tape:
 - 1. Tape:
 - a. Recommended by manufacturer for method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - b. Printing on tape must be permanent and may not be damaged by burial operations.
 - c. Tape material and ink must be chemically inert and not be subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
 - 2. Color and Printing:
 - a. Comply with APWA Uniform Color Code using NEMA Z535.1 safety colors.
 - b. Inscriptions for Red Tapes: "CAUTION BURIED ELECTRIC LINE BELOW".
 - c. Inscriptions for Orange Tapes: "CAUTION BURIED FIBER OPTIC LINE BELOW" or "CAUTION BURIED COMMUNICATION LINE BELOW".
 - 3. Reinforced Detectable Line-Warning Tape:
 - a. Reinforced, detectable three-layer laminate, consisting of printed pigmented woven scrim, solid aluminum-foil core, and clear protective film that allows inspection of continuity of conductive core; bright-colored, continuous-printed on one side with inscription of utility, compounded for direct-burial service.
 - b. Width: 3 inch.
 - c. Overall Thickness: 8 mil.
 - d. Foil Core Thickness: 0.35 mil.
 - e. Weight: 34 lb/1000 sq. ft.
 - f. Tensile in accordance with ASTM D882: 300 lbf and 12,500 psi.

2.5 TAGS

- A. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
- B. Nonmetallic Preprinted Tags: Polyethylene tags, 0.023 inch thick, color-coded for phase and voltage level, with factory printed permanent designations; punched for use with self-locking cable tie fastener.

2.6 SIGNS

- A. Baked-Enamel Signs:

1. Preprinted aluminum signs, high-intensity reflective, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4 inch grommets in corners for mounting.
3. Nominal Size: 7 by 10 inch.

B. Metal-Backed Butyrate Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396 inch galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.
2. 1/4 inch grommets in corners for mounting.
3. Nominal Size: 10 by 14 inch.

C. Laminated Acrylic or Melamine Plastic Signs:

1. Engraved legend.
2. Thickness:
 - a. For signs up to 20 sq. inch, minimum 1/16 inch thick.
 - b. For signs larger than 20 sq. inch, 1/8 inch 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.

2.7 CABLE TIES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN ZODZ; including UL 1565 or UL 62275.

B. UL ZODZ - UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F in accordance with ASTM D638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black.

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 SELECTION OF COLORS AND IDENTIFICATION MARKINGS

- A. Comply with 29 CFR 1910.144 for color identification of hazards, and the following:
 - 1. Ceiling-mounted hangers, supports, and raceways must be finished, painted, or suitably marked safety yellow where less than 7.7 ft above finished floor.
- B. Pipe and Conduit Labeling: Comply with ASME A13.1.
- C. Color-Coding for Phase- and Voltage-Level Identification, 1000 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors. Confirm existing color-coding in building matches colors listed below. Notify Engineer of any and all discrepancies noted in the existing facility.
 - 1. Color must be factory applied.
 - 2. Colors for 208Y/120 V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Colors for 480Y/277 V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - 4. Color for Neutral (Grounded Conductor): White.
 - 5. Color for Equipment Ground: Green.
- D. Color-Coding Instructional Signs: Self-adhesive labels, including color code for grounded and ungrounded conductors.
- E. Accessible Fittings for Raceways: Identify cover of junction and pull box of the following systems with wiring system legend and system voltage. System legends must be as follows:
 - 1. "EMERGENCY POWER."
 - 2. "POWER."
 - 3. "UPS."
 - 4. "EMERGENCY LIGHTING INVERTER"
- F. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- G. Locations of Underground Lines: Underground-line warning tape for power and lighting.
- H. Handholes, Pull Boxes and Junction Boxes, 1000 V or Less: For conductors in pull boxes, junction boxes, and handholes, use self-adhesive vinyl tape to identify phase.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50 ft maximum intervals in straight runs, and at 25 ft maximum intervals in congested areas.
 2. Identify system voltage and system or service type with black letters on orange field.
- I. Accessible Raceways and Metal-Clad Cables, 1000 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.
1. Locate identification at changes in direction, at penetrations of walls and floors, at 50 ft maximum intervals in straight runs, and at 25 ft maximum intervals in congested areas.
 2. Identify system voltage and system or service type with black letters on orange field.
- J. Conductors to Be Extended in Future: Attach marker tape to conductors and list source.
- K. Cover Plates: Label individual cover plates with self-adhesive labels. Place label at top of cover plate. Label cover plate with the following information, in the order listed:
1. Panelboard designation.
 2. Colon or dash.
 3. Branch circuit number.
- L. Workspace Indication: Apply floor marking tape or tape and stencil to finished surfaces. Show working clearances in direction of access to live parts. Workspace must 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.
- M. Equipment Identification Labels:
1. Black letters on white field for normal (utility) power.
 2. White letters on red face for emergency and generator power.
 3. Indoor Equipment: Laminated acrylic or melamine plastic sign.
 4. Outdoor Equipment: Laminated acrylic or melamine sign.
 5. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in location provided by panelboard manufacturer. Panelboard identification must be in form of self-adhesive, engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.
 - d. Emergency system boxes and enclosures.
 - e. Enclosed switches.
 - f. Enclosed circuit breakers.
 - g. Enclosed controllers.
 - h. Variable-speed controllers.
 - i. Push-button stations.
 - j. Power-transfer equipment.
 - k. Contactors.

- l. Remote-controlled switches, dimmer modules, and control devices.
- m. Power-generating units.
- n. Monitoring and control equipment.

N. Cable Ties: General purpose, for attaching tags, except as listed below:

- 1. Outdoors: UV-stabilized nylon.

3.3 SELECTION OF SIGNS AND HAZARD MARKINGS

A. Comply with 29 CFR 1910.145 for danger, caution, warning, and safety instruction signs.

B. Signs, labels, and tags required for personnel safety must comply with the following standards:

- 1. Safety Colors: NEMA Z535.1.
- 2. Facility Safety Signs: NEMA Z535.2.
- 3. Safety Symbols: NEMA Z535.3.
- 4. Product Safety Signs and Labels: NEMA Z535.4.
- 5. Safety Tags and Barricade Tapes for Temporary Hazards: NEMA Z535.5.

C. Electrical Hazard Warnings:

- 1. Arc-Flash Hazard Warning: Self-adhesive labels. Comply with NFPA 70E requirements for arc-flash hazard warning labels.
- 2. Multiple Power Sources Warning Legend: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
- 3. OSHA Workspace Clearance Warning Legend: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 3 FEET MINIMUM."

D. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive labels, 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.
 - b. Controls with external control power connections.

E. Operating Instruction Signs: Self-adhesive labels, baked-enamel warning signs.

F. Emergency Operating Instruction Signs: Laminated acrylic or melamine plastic signs with white legend on red background with minimum 3/8 inch high letters for emergency instructions at equipment used for power transfer.

3.4 INSTALLATION

- 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. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes typical for electrical equipment environments specified in Section 260011 "Facility Performance Requirements for Electrical."
- C. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- D. Fasteners for Labels and Signs: Self-tapping, stainless steel screws or stainless steel machine screws with nuts and flat and lock washers.
- E. 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.
- F. Install identifying devices before installing acoustical ceilings and similar concealment.
- G. Verify identity of item before installing identification products.
- H. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- I. Apply identification devices to surfaces that require finish after completing finish work.
- J. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- K. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from floor.
- L. Vinyl Wraparound Labels:
 - 1. Secure tight to surface of raceway or cable at location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to location and substrate.
- M. Snap-Around Labels: Secure tight to surface at location with high visibility and accessibility.
- N. Self-Adhesive Wraparound Labels: Secure tight to surface at location with high visibility and accessibility.

- O. Snap-Around Color-Coding Bands: Secure tight to surface at location with high visibility and accessibility.
- P. Heat-Shrink, Preprinted Tubes: Secure tight to surface at location with high visibility and accessibility.
- Q. Marker Tapes: Secure tight to surface at location with high visibility and accessibility.
- R. Self-Adhesive Vinyl Tape: Secure tight to surface at location with high visibility and accessibility.
 - 1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for minimum distance of 6 inch where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- S. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
- T. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's instructions.
- U. Underground Line Warning Tape:
 - 1. During backfilling of trenches, install continuous underground-line warning tape not less than 12 inch directly above cables or raceways buried 18 inch or more below grade. Use multiple tapes where width of multiple lines installed in common trench or concrete envelope exceeds 16 inch overall.
 - 2. Install underground-line warning tape for direct-buried cables and cables in raceways.
- V. Metal Tags:
 - 1. Place in location with high visibility and accessibility.
 - 2. Secure using UV-stabilized cable ties.
- W. Nonmetallic Preprinted Tags:
 - 1. Place in location with high visibility and accessibility.
 - 2. Secure using UV-stabilized cable ties.
- X. Baked-Enamel Signs: Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.
- Y. Metal-Backed Butyrate Signs: Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.
- Z. Laminated Acrylic or Melamine Plastic Signs: Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.

END OF SECTION 260553

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SECTION 260573 - POWER SYSTEM STUDIES

PART 1 – GENERAL

1.1 SUMMARY

A. The Work of this Section Includes:

1. Short-circuit study.
2. Overcurrent protective device coordination study.
3. Arc-flash hazard study.

B. Related Requirements:

1. General Provisions of the Contract and Project Drawings apply to this section.
2. Section 260500 "Common Work Requirements for Electrical" specifies additional requirements applicable to coordinating, scheduling, and sequencing of the Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For power system analysis software to be used for studies.

1. Product Certificates: For power system study software applications, include certificate stating compliance with specified requirements, signed by software manufacturer.

B. Power System Study Reports:

1. Submit reports after approval of system protective devices submittals. Submittals must be in digital form.
2. Submit short-circuit study input data, including completed computer-program input data sheets.
3. Submit coordination study input data, including completed computer-program input data sheets.
 - a. Submit load-flow, voltage-drop, and motor-starting data with coordination study.
4. Submit arc-flash study input data, including completed computer-program input data sheets.
5. 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 Engineer for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.
6. Submit revised one-line diagram, reflecting field investigation results and results of short-circuit study.

C. Data files for studies in format compatible with Owner's power system analysis software.

1.3 QUALITY ASSURANCE

- A. Submittals for power system studies must be signed and sealed by qualified electrical professional engineer responsible for their preparation.
- B. Studies must be performed using commercially developed and distributed software designed specifically for power system analysis.
- C. Software algorithms must comply with requirements of standards and guides specified in this Section.
- D. Manual calculations are unacceptable.

PART 2 – PRODUCTS

2.1 POWER SYSTEM ANALYSIS SOFTWARE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. EasyPower; brand of Bentley Systems, Inc.
 - 2. Power Tools for Windows (PTW); brand of SKM Systems Analysis, Inc.
- B. Standard Features:
 - 1. Power System Analysis:
 - a. Power-systems-analysis software applications must have analytical capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 3002 series standards.
 - b. Computer software application must be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program must report device settings and ratings of overcurrent protective devices and must demonstrate selective coordination by computer-generated, time-current coordination plots.
 - c. Computer software application must be designed to perform arc-flash analysis or have function, component, or add-on module designed to perform arc-flash analysis.
 - 2. Analysis Standards:
 - a. Short-Circuit Current Analysis: In accordance with IEEE 3002.3.
 - b. Device Coordination Analysis: In accordance with IEEE 3004.3 and IEEE 3004.5.
 - c. Load-Flow Analysis: In accordance with IEEE 3002.2.
 - d. Arc-Flash Hazard Analysis: In accordance with IEEE 1584.

3. Capable of printing arc-flash hazard warnings for equipment on polyester, weather- and UV-resistant, pressure-sensitive adhesive labels complying with NFPA 70E.
 - a. Label must have orange header with wording, "WARNING, ARC-FLASH HAZARD," and must include the following information taken directly from arc-flash hazard study:
 - 1) Equipment 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. Other Available Features Required by the Project:

1. Simultaneous faults.
2. Mutual coupling in zero sequence.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Collect and analyze data for power system studies.

1. Verify completeness of data supplied in one-line diagram on Drawings. Call discrepancies to Architect's attention.
2. For equipment included as Work on the Project, use characteristics submitted under provisions of action submittals and information submittals for the Project.
3. For relocated equipment and equipment that is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers in accordance with NFPA 70E.
4. Gather and tabulate required input data to support power system studies. Comply with requirements in the Project Manual for "Project Record Documents" for recording circuit protective device characteristics. Record data on Record Document copy of one-line diagram. Comply with recommendations in IEEE 3002 series standards as to amount of detail that is required to be acquired in field. Field data gathering must be by, or under supervision of, qualified electrical professional engineer. Data include, but are not limited to, the following:
 - a. Product data for the 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.

- b. Electrical power utility impedance at service.
- c. Power sources and ties.
- d. Short-circuit current at each system bus (three phase and line to ground).
- e. Full-load current of loads.
- f. Voltage level at each bus.
- g. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
- h. 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.
- i. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
- j. For the generator controller protective relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios if applicable, and each relay setting.
- k. Maximum demands from service meters.
- l. Motor horsepower and NEMA MG 1 code letter designation.
- m. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).
- n. Medium-voltage cable sizes, lengths, conductor material, cable construction, metallic shield performance parameters, and conduit material (magnetic or nonmagnetic).
- o. Derating factors.

3.2 PREPARATION

A. Preparation of Data for Short-Circuit Study:

- 1. Verify completeness of data supplied on one-line diagram. Call discrepancies to Engineer's attention.
- 2. For equipment included as Work on the Project, use characteristics submitted under provisions of action submittals and information submittals for the Project.
- 3. Prepare one-line diagram of modeled power system, showing the following:
 - a. Protective device designations and ampere ratings.
 - b. Conductor types, sizes, and lengths.
 - c. Transformer kVA and voltage ratings.
 - d. Motor and generator designations and kVA ratings.
 - e. Switchboard and panelboard designations and ratings.
 - f. Derating factors and environmental conditions, where applicable.
 - g. Revisions to electrical equipment required by study.

B. Preparation of Data for Overcurrent Protective Device Coordination Study:

- 1. Prepare data sheets to supplement electrical distribution system one-line diagram, cross-referenced with tag numbers on diagram, indicating 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, instantaneous adjustment range, and GFCI setting where applicable, 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. Switchboards and panelboards ampacity, and SCCR in amperes rms symmetrical.
 - k. Identify series-rated interrupting devices for condition where available fault current is greater than 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.
2. Examine the Project's 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.
 3. 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.

C. Preparation of Data for Arc-Flash Hazard Study:

1. Assemble data from short-circuit study and overcurrent protective device coordination study.
2. 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.

3.3 SHORT-CIRCUIT STUDY

- A. Base study on device characteristics supplied by device manufacturer.
- B. Extent of electrical power system to be studied is indicated on Drawings.
- C. Begin short-circuit current analysis at service, extending down to system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 5 kA or less.
- D. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for the Project. Study cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- E. Include AC fault-current decay from induction motors and generators and apply to low-voltage, three-phase AC systems. Also account for fault-current DC decrement to address asymmetrical requirements of interrupting equipment.
- F. Calculate short-circuit momentary and interrupting duties for three-phase bolted fault and single line-to-ground fault at equipment indicated on one-line diagram.
 1. For grounded systems, provide bolted line-to-ground fault-current study for areas as defined for three-phase bolted fault short-circuit study.
- G. Include in report identification of protective device applied outside its capacity.

3.4 OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

- A. Base study on device characteristics supplied by device manufacturer.
- B. Extent of electrical power system to be studied is indicated on Drawings.
- C. Begin analysis at service, extending down to system overcurrent protective devices as follows:
 1. To normal system low-voltage load buses where fault current is 5 kA or less.
- D. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for the Project. Study cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- E. Transformer Primary Overcurrent Protective Devices:
 1. Device must 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 in accordance with IEEE C57.96 if required by unusual loading or emergency conditions.
 2. Device settings must protect transformers in accordance with IEEE C57.12.00, for fault currents.
- F. Motor Protection:
 1. Select protection for low-voltage motors in accordance with IEEE 3004.8 and NFPA 70.

- G. Conductor Protection: Protect cables against damage from fault currents in accordance with ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 3004.7. Demonstrate that equipment withstands maximum short-circuit current for time equivalent to tripping time of primary relay protection or total clearing time of fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.
- H. Generator Protection: Select protection in accordance with manufacturer's published instructions and IEEE C37.102.
- I. Include AC fault-current decay from induction motors and generators and apply to low-voltage, three-phase AC systems. Also account for fault-current DC decrement, to address asymmetrical requirements of interrupting equipment.
- J. Include coordination of ground-fault protection devices as applicable.
- K. Calculate short-circuit momentary and interrupting duties for three-phase bolted fault and single line-to-ground fault at equipment indicated on one-line diagram.
 - 1. For grounded systems, provide bolted line-to-ground fault-current study for areas as defined for three-phase bolted fault short-circuit study.
- L. 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. Application of series-rated devices must be recertified, complying with requirements in NFPA 70.
 - 4. Include in report identification of protective device applied outside its capacity.

3.5 ARC-FLASH HAZARD STUDY

- A. Comply with NFPA 70E, including Annex D, for arc-flash hazard study.
- B. Preparatory Studies: Obtain short-circuit study and overcurrent protective device coordination study results prior to starting arc-flash hazard study.
- C. Calculate maximum and minimum contributions of fault-current size.
 - 1. Maximum calculation must assume maximum contribution from utility and must assume motors to be operating under full-load conditions.
 - 2. Calculate arc-flash energy at 85 percent of maximum short-circuit current in accordance with IEEE 1584 recommendations.
 - 3. Calculate arc-flash energy at 38 percent of maximum short-circuit current in accordance with NFPA 70E recommendations.
- D. Calculate arc-flash protection boundary and incident energy at locations in electrical distribution system where personnel could perform work on energized parts.
- E. Include low-voltage equipment locations.

- F. Calculate limited, restricted, and prohibited approach boundaries for each location.
- G. Incident energy calculations must consider accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations must account for changing current contributions, as sources are interrupted or decremented with time. Fault contribution from motors and generators must be decremented as follows:
 - 1. Fault contribution from induction motors must not be considered beyond three to five cycles.
 - 2. Fault contribution from generators must be decayed to match actual decrement of each as closely as possible (for example, contributions from permanent magnet generators will typically decay from 10 p.u. to 3 p.u. after 10 cycles).
- H. Arc-flash energy must generally be reported for maximum of line or load side of circuit breaker. However, arc-flash computation must be performed and reported for both line and load side of circuit breaker as follows:
 - 1. When circuit breaker is in separate enclosure.
 - 2. When line terminals of circuit breaker are separate from 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.

3.6 POWER SYSTEM STUDY REPORTS

- A. Preparation of Power System Study Reports: Prepare and submit the following:
 - 1. 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 kVA and voltage ratings.
 - 4) Motor and generator designations and kVA ratings.
 - 5) Switchboard and panelboard designations and ratings.
 - 6) Derating factors and environmental conditions.
 - 7) Revisions to electrical equipment required by study.
 - d. Comments and recommendations for system improvements or revisions in written document, separate from one-line diagram.
 - e. 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.
- f. 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.
- 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 based on fault-point X/R ratio; based on calculated symmetrical value multiplied by 1.6; and 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 symmetrical basis.
- g) Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on total basis.

2. Overcurrent Protection Device 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 kVA and voltage ratings.
 - 4) Motor and generator designations and kVA ratings.
 - 5) Switchboard, motor-control center, and panelboard designations.
 - 6) Revisions to electrical equipment required by study.
- d. Report recommended settings of protective devices, ready to be applied in field. Use manufacturer's data sheets for recording recommended setting of overcurrent protective devices when available.
 - 1) Phase and Ground Relays:
 - a) Device tag.
 - b) Relay current transformer ratio and tap, time dial, and instantaneous pickup value.
 - c) Recommendations on improved relaying systems, if applicable.
 - 2) Circuit Breakers:
 - a) Adjustable pickups and time delays (long time, short time, and ground).
 - b) Adjustable time-current characteristic.
 - c) Adjustable instantaneous pickup.
 - d) Recommendations on improved trip systems, if applicable.
 - 3) 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 switching schemes and for emergency periods where power source is local generation. Show the following information:

- 1) Device tag and title, one-line diagram with legend identifying portion of system covered.
- 2) Terminate device characteristic curves at point reflecting maximum symmetrical or asymmetrical fault current to which device is exposed.
- 3) Identify 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) Low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
 - c) Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.
 - d) Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.
 - e) Cables and conductors damage curves.
 - f) Ground-fault protective devices.
 - g) Motor-starting characteristics and motor damage points.
 - h) Generator short-circuit decrement curve and generator damage point.
 - i) 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.

3. Arc-Flash Hazard 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, showing the following:
 - 1) Protective device designations and ampere ratings.
 - 2) Conductor types, sizes, and lengths.
 - 3) Transformer kVA and voltage ratings, including derating factors and environmental conditions.
 - 4) Motor and generator designations and kVA ratings.
 - 5) Switchboard, motor-control center, panelboard designations, and ratings.
- d. Short-circuit study output data.
- e. Overcurrent protective device coordination study report contents.
- f. Arc-Flash Study Output Reports:

- 1) Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each equipment location included in 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 symmetrical basis.
 - g) Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on total basis.

- g. 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.

- h. Fault study input data, case descriptions, and fault-current calculations including definition of terms and guide for interpretation of computer printout.

3.7 FIELD ADJUSTMENT FOR DEVICE COORDINATION

- A. Adjust relay and protective device settings in accordance with recommended settings provided by coordination study. Field adjustments must be completed by engineering service division of equipment manufacturer under "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 must be by qualified low-voltage electrical testing and inspecting agency.
 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 adjustable overcurrent protective devices.

3.8 WARNING LABELING OF ARC-FLASH HAZARDS

- A. Apply one arc-flash label on front cover of each section of equipment for each equipment included in study, including each piece of equipment listed below:
 - 1. Switchboards.
 - 2. Panelboards.
 - 3. Generator load center.
 - 4. Low voltage transformers.
 - 5. Safety switches.
 - 6. Control panels.
- B. Base arc-flash label data on highest values calculated at each location.
- C. Machine print warning labels with no handwritten or field-applied markings.
- D. Install arc-flash warning labels under direct supervision and control of qualified professional electrical engineer.
- E. Indicate on record Drawings location of equipment where personnel could be exposed to arc-flash hazard during their work.
 - 1. Indicate arc-flash energy.
 - 2. Indicate protection level required.

END OF SECTION 260573

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SECTION 260913 - ELECTRICAL POWER MONITORING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Multifunction power and energy meters.
2. Raceways and boxes.
3. Wires and cables.
4. Surge protection devices.

B. Related Requirements:

1. General Provisions of the Contract and Project Drawings apply to this section.
2. Section 260500 "Common Work Requirements for Electrical" specifies additional abbreviations, definitions, submittals, qualifications, testing agencies, and other requirements applicable to the Work for electrical on Project, including wiring methods.
3. Section 260523 "Control-Voltage Electrical Power Cables" for control systems communications cables and Classes 1, 2, and 3 control cables.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Multifunction energy meters.

B. Shop Drawings: For power monitoring equipment.

1. Include plans, elevations, sections, and attachment details.
2. Include details of equipment assemblies. Indicate dimensions, method of field assembly, components, and location and size of each field connection.
 - a. Attach copies of approved Product Data submittals for products (such as switchboards, switchgear, and motor-control centers) that describe the following:
 - 1) Location of the meters and gateways, and routing of the connecting wiring.
 - 2) Details of power monitoring and control features to illustrate coordination among related equipment and power monitoring and control.
3. Block Diagram: Show interconnections between components specified in this Section and devices furnished with power distribution system components. Indicate data communication paths and identify networks, data buses, data gateways, concentrators, and other devices to be used. Describe characteristics of network and other data communication lines.

4. Include diagrams for power, signal, and control wiring. Coordinate nomenclature and presentation with a block diagram.

1.3 INFORMATIONAL SUBMITTALS

A. Design Data:

1. Manufacturer's system installation and setup guides, with data forms to plan and record options and setup decisions.
 - a. Testing and commissioning reports and checklists of completed final versions of reports, checklists, and trend logs.
 - b. As-built versions of submittal Product Data.
 - c. Names, addresses, e-mail addresses, and 24-hour telephone numbers of Installer and service representatives for the system and products.
 - d. Operator's manual with procedures for operating control systems including logging on and off, handling alarms, producing point reports, trending data, overriding computer control, and changing set points and variables.
 - e. Programming manuals with description of programming language and syntax, of statements for algorithms and calculations used, of point database creation and modification, of program creation and modification, and of editor use.
 - f. Engineering, installation, and maintenance manuals that explain how to do the following:
 - 1) Perform preventive maintenance and calibration.
 - 2) Debug hardware problems.
 - 3) Repair or replace hardware.
 - g. Recommended preventive maintenance procedures for system components, including schedule of tasks such as inspection, cleaning, and calibration; time between tasks; and task descriptions.
 - h. Owner training materials.

1.4 COORDINATION

- #### A. Coordinate features of distribution equipment and power monitoring components to form an integrated interconnection of compatible components.
1. Match components and interconnections for optimum performance of specified functions.

PART 2 – PRODUCTS

2.1 SYSTEM DESCRIPTION

- #### A. Microprocessor-based monitoring and control of electrical power distribution system(s) that includes the following:

1. Electrical meters that monitor and connect to the data transmission network.
 2. LAN: High-speed, multi-access, open, nonproprietary, industry-standard communication protocols.
 3. Include with web access, with its operating system and application software, connected to data transmission network.
- B. The electrical power monitoring and control system must be Internet based.
1. System software must be based on server thin-client architecture, designed around open standards of internet technology.
 2. Intent of thin-client architecture is to provide operators complete access to power monitoring via an Internet browser. No special software other than an Internet browser must be required to access graphics, point displays, and trends; to configure trends, points, and controllers; and to edit programming.
 3. Internet access must be password protected.
- C. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with UL 61010-1 and marked for intended location and application.

2.2 PERFORMANCE REQUIREMENTS

- A. Surge Protection: For external wiring of each conductor entry connection to components to protect components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads.
1. Minimum Protection for Power Lines 120 V and More: SPDs complying with UL 1449, listed and labeled for intended use by an NRTL acceptable to authorities having jurisdiction.
 2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Lines: Comply with requirements as recommended by manufacturer for type of line being protected.
- B. Addressable Devices: Transmitters and receivers must communicate unique device identification and status reports to monitoring and control clients.
- C. Backup Power Source:
1. Electrical power distribution equipment served by a backup power source for controls must have associated power monitoring and control system products that monitor and control such systems and equipment also served from a backup power source.

2.3 MULTIFUNCTION POWER AND ENERGY METERS

- A. Subject to compliance with requirements, provide products from the following:
1. ABB.
 2. Cutler Hammer - Eaton.
 3. Electro Industries - Shark
 4. Square D; by Schneider Electric.

- B. Description: Separately mounted, modular, permanently installed, solid-state, digital I/O instrument for power monitoring and control; complying with UL 61010-1.
1. Capable of metering four-wire wye, three-wire wye, three-wire delta, and single-phase power systems.
 2. Memory Backup: Self-contained to maintain memory throughout power outages of 72 hours, minimum.
 3. Equipped with security lock to protect revenue related metering from unauthorized and accidental changes.
- C. Comply with IEC 60529 degree of protection code of IP51 for the front of the meter, and code of IP30 for the body.
- D. Overvoltage: Comply with UL 61010-1 overvoltage withstand rating for CAT III.
- E. Accuracy:
1. Comply with ANSI C12.20, Class 0.5.
- F. Data Link:
1. 100BaseT Ethernet communication card shall provide Modbus TCP/IP or DNP3 over Ethernet communication using IPv4 and/or IPv6.
 - a. When two Ethernet cards are installed in the meter, an independent IP address and MAC address shall be assignable to each card.
 - b. Ethernet card shall provide 12 simultaneous sockets of Modbus TCP to support multiple simultaneous requests for data.
 - c. Ethernet card shall provide 5 simultaneous sockets of DNP3 Level 2 over TCP/IP.
 - d. Modbus TCP and DNP3 Level 2 over Ethernet shall be available simultaneously.
 - e. Ethernet card shall provide an embedded HTML5-based web server for access to metered readings and network card configuration through the Internet.
 - f. Ethernet card shall support NTP time server for high accuracy time sync.
 - g. Ethernet card shall have port control, firewalls consisting of Allow/Block lists for IPv4/ IPv6/MAC addresses, and encrypted email with SMTPS.
 - h. Ethernet card shall have digital firmware signature for network card upgrades.
- G. Meter Physical Characteristics:
1. Display: Backlit LCD with antiglare and scratch-resistant lens.
 2. Display of Metered Values: One screen to show at least **[four]** **<Insert number>** lines of user-selected values on one screen at the same time. Provide graphical representation of user-selected values. The screen selections available at the display must include the following:
 - a. Meters, including those listed under the following:

- 1) Measurements.
- 2) THD.
- 3) Energy.
- 4) Demand.
- 5) Minimum and maximum values.
- 6) Power demand.

H. Sampling Rate: Continuously sample and record voltage and current at a rate not less than 400 samples per cycle, simultaneously on voltage and current channels of the meter.

I. Meters:

1. Measurements: Instantaneous, in real time, RMS to the 15th harmonic.
 - a. Voltage: L-L each phase, L-N each phase, and three-phase average.
 - b. Current: Each phase, three-phase average, and neutral.
 - c. Unbalanced current, L-L V(ac) and L-N V(ac).
 - d. Active Power (+/- kW): Each phase and three-phase total.
 - e. Reactive Power (+/- kVAR): Each phase and three-phase total.
 - f. Apparent Power (+/- kVA): Each phase and three-phase total.
 - g. Displacement Power Factor: Each phase and three-phase total.
 - h. Distortion Power Factor: Each phase and three-phase total.
 - i. Frequency.
2. THD from measurements simultaneously from the same cycle, through 15th harmonic.
 - a. Voltage THD: L-L each phase, L-N each phase, and three-phase average.
 - b. Current THD: Each phase and three-phase average.
 - c. Total demand distortion.
3. Energy: Accumulated, indicate whether in-flow or out-flow, net and absolute values. Store the values in instrument's nonvolatile memory.
 - a. Active kWh.
 - b. Reactive kVARh.
 - c. Apparent kVAh.
4. Demand: Present, last, predicted, peak.
 - a. Three-phase average current.
 - b. Three-phase total active power (kW).
 - c. Reactive power (kVAR).
 - d. Apparent power (kVA).
5. Minimum and Maximum Values:
 - a. L-L and L-N voltages.
 - b. Current in each phase.

- c. Power factor.
- d. Active power total.
- e. Reactive power total.
- f. Apparent power total.
- g. THD L-L and L-N voltages.
- h. THD current in each phase.
- i. Frequency.

J. Power Demand, User Selectable:

- 1. Thermal Demand: Sliding window updated every second for the present demand and at end of the interval for the last interval. Adjustable window that can be set in 1-minute intervals, from 1 to 60 minutes.
- 2. Block Interval with Optional Subintervals: Adjustable for 1-minute intervals, from 1 to 60 minutes. User-defined parameters for the following block intervals:
 - a. Sliding block that calculates demand every second, with intervals less than 15 minutes, and every 15 seconds with an interval between 15 and 60 minutes.
 - b. Fixed block that calculates demand at end of the interval.
 - c. Rolling block subinterval that calculates demand at end of each subinterval and displays it at end of the interval.
- 3. Demand Calculation Initiated by a Synchronization Signal:
 - a. Signal is a communication signal. Calculation must be configurable as either a block or rolling block calculation.
 - b. Provide for synchronizing the demand with the internal of this instrument.

K. Data Recording: Store up to 128 MB memory for logging. Store the listed values in instrument's nonvolatile memory, indicate which of the three phases relates to the value. Attach a date and time stamp to the peak values and the alarms.

- 1. Minimum and maximum of real-time RMS measurement.
- 2. Energy.
- 3. Demand values.
- 4. Alarms, store the last 40 events.

L. Alarms: Transmit a digital output and show on display when alarmed. Provide for no fewer than 15 metered items. Each alarm must be user configured, by using the following options:

- 1. Date and time stamp.
- 2. Enable-disable (default) or enable.
- 3. Pickup magnitude.
- 4. Pickup time delay.
- 5. Dropout magnitude.
- 6. Dropout time delay.
- 7. Alarm type.
- 8. Alarm label.

- M. Output Signals: Provide two mechanical relays, rated not less than 250 V(ac), 2 A resistive, and rated for 200,000 cycles or more. The relays must be user configurable in one of the following listed modes:
1. Normal contact closure where the contacts change state for as long as the signal exists.
 2. Latched mode when the contacts change state when a pickup signal is received and are held until a dropout signal is received.
 3. Timed mode when the contacts change state when a pickup signal is received and are held for a preprogrammed duration.
- N. Meter Face:
1. Display: Backlit LCD display, six lines, with antiglare and scratch-resistant lens.
 2. Display of Metered Values: One screen to show at least four user-selected values on one screen at the same time.
 3. Provide for the reset of metered peak values.
- O. Capacities and Characteristics:
1. Power Supply: 120 V(ac), 60 Hz.
 2. Circuit Connections:
 - a. Voltage: Measurements auto-ranging, 60 to 400 V(ac) L-N. Meter impedance must be 2 megohm L-L or greater. Overload Tolerance: 1500 V(ac), RMS, continuously.
 - b. Current: Connect to instrument grade current transformer with a metering range of 5 mA to 6 A. Overcurrent tolerance of the instrument must be 10 A continuous, 50 A for 10 seconds once per hour, and 120 A for one second per hour.
 - c. Frequency: 45 to 65 Hz.
 - d. Time: Input from a GPS receiver to synchronize the internal clock of the instrument and to time-synchronize this instrument with the network to a deviation of not greater than 1 ms.
- P. Waveform Capture:
1. Steady State Waveform Capture: Manually initiated.
 - a. Capture, record with time stamp, and store voltage and current waveforms for two cycles.
 - b. Capture, record with time stamp, and store 128 digitally sampled data points for each cycle of each phase voltage. The number of waveform captures stored onboard must be user configurable.
 - c. Captured waveforms must be recorded from actual circuit performance.
 2. Disturbance Waveform Capture:
 - a. Capture, record with time stamp, and store 128 digitally sampled data points for each cycle of each phase voltage. Disturbance waveform capture may be initiated manually, by an external contact closure, or by

an alarm. The waveform captures must be user configurable from 185 cycles on 1 channel at 16 points per cycle, to 3 cycles on 6 channels at 128 points per cycle.

Q. Disturbance Detection and Alarm:

1. Detect and initiate alarm when detecting voltage or current sag and swell.
 - a. Detect disturbance events of less than half-cycle in length, by monitoring and calculating RMS magnitude of each half-cycle.
 - b. Event detection must be with user-defined parameters of threshold and delay. The threshold must be user defined as a fixed or relative set point. With relative set point, the instrument will alarm based on the nominal current or voltage equal to its present average value. The instrument must automatically adjust the nominal current and voltage values to avoid nuisance alarms caused by gradual daily variations of currents and voltages.
 - c. When detecting an alarm condition:
 - 1) Initiate disturbance waveform capture.
 - 2) Record the disturbance parameters into an onboard alarm log with a date and time stamp to the millisecond.
 - 3) Alarm on must be visible on the display and be transmitted over the data link.

R. Harmonics Information:

1. Calculate the harmonic magnitudes and angles for each phase voltage and current through the 63rd harmonic. Provide harmonic power flows up to the 41st harmonic for active, reactive, and apparent power.
2. The current and voltage information for phases must be obtained simultaneously from the same cycle.
3. Report harmonic information as a percentage of the fundamental or as a percentage of the RMS values, as selected by the user.

2.4 RACEWAYS AND BOXES

- A. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for raceways for electrical power wiring and NFPA 70 Class 1 remote-control and signaling circuits.
- B. Comply with requirements in Section 260523 "Control-Voltage Electrical Power Cables" for control wiring, TIA-232 cable, and NFPA 70 Class 2 remote-control and signaling circuits.

2.5 WIRES AND CABLES

- A. Electrical Power Wiring: Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
 1. Copper conductors are Type THHN/THWN-2.

- B. Control Wiring: Comply with requirements in Section 260523 "Control-Voltage Electrical Power Cables."

2.6 ENCLOSURES

- A. Indoor Enclosures: NEMA 250, Type 1.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF POWER AND ENERGY MONITORING SYSTEMS

- A. Wiring Method: Install cables in raceways cabinets. Conceal raceway and cables except in unfinished spaces using exposed raceways.
- B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
- C. Wiring and Cabling Installation:
 - 1. Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for electrical power wiring.
 - 2. Comply with Section 260523 "Control-Voltage Electrical Power Cables" for control wiring.
- D. Raceways Installation:
 - 1. Comply with Section 260533 "Raceways and Boxes for Electrical Systems" for electrical power wiring and NFPA 70 Class 1 remote-control and signaling circuits.
 - 2. Comply with Section 260523 "Control-Voltage Electrical Power Cables" for control wiring, TIA-232 cable, and NFPA 70 Class 2 remote-control and signaling circuits.
- E. Identification Installation:
 - 1. Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for electrical power wiring.
 - 2. Comply with Section 260523 "Control-Voltage Electrical Power Cables" for control wiring, TIA-232 cable, and NFPA 70 Class 2 remote-control and signaling circuits

3.3 NETWORK NAMING AND NUMBERING

- A. Coordinate with Owner and provide unique naming and addressing for networks and devices.

3.4 GROUNDING

- A. For data communication wiring, comply with BICSI N1.
- B. For control-voltage wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Tests and Inspections:

1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
2. Visually inspect balanced twisted pair cabling and optical-fiber cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of components.
4. Power Monitoring and Control System Tests.

- a. Test Analog Signals:

- 1) Check analog voltage signals using a precision voltage meter at zero, 50, and 100 percent.
- 2) Check analog current signals using a precision current meter at zero, 50, and 100 percent.
- 3) Check resistance signals for temperature sensors at zero, 50, and 100 percent of operating span using a precision-resistant source.

- b. Test Digital Signals:

- 1) Check digital signals using a jumper wire.
- 2) Check digital signals using an ohmmeter to test for contact making or breaking.

- B. Nonconforming Work:

1. Wiring and cabling will be considered defective if they do not pass tests and inspections.

- C. Prepare test and inspection reports.

3.6 FINAL REVIEW

- A. Submit written request to Engineer when the power monitoring and control system is ready for final review. Written request must state the following:

1. The system has been thoroughly inspected for compliance with Contract Documents and found to be in full compliance.
 2. The system has been calibrated, adjusted, and tested and found to comply with requirements of operational stability, accuracy, speed, and other performance requirements indicated.
 3. The system monitoring and control of electrical distribution systems results in operation according to sequences of operation indicated.
 4. The system is complete and ready for final review.
 5. A field report must be issued to document observations and deficiencies.
- B. Take prompt action to remedy deficiencies indicated in field report and submit a second written request when deficiencies have been corrected. Repeat process until no deficiencies are reported.
- C. Final review must include a demonstration to stakeholders participating in final review.

3.7 TRAINING

- A. Attendee Training Manuals:
1. Provide a color hard copy of training materials and visual presentations.
 2. In addition to hard-copy materials included in training manual, provide Owner with a PDF copy of hard-copy materials.
- B. On-Site Training:
1. Owner will provide conditioned conference room with ample desks or tables, chairs, power, data connectivity and audiovisual equipment for instructor and each attendee.
 2. Instructor must provide training materials.
 3. Provide as much of training located on-site as deemed feasible and practical by Owner.
 4. On-site training must include walk-through tour to observe installed product with hands-on review of operation, calibration, and service requirements.
- C. At Completion of Training: Owner's staff familiar with the system installed are capable of demonstrating operation of the system during final review.
- D. Demonstration must include, but not be limited to, the following:
1. Accuracy and calibration of 10 I/O points randomly selected by reviewers. If review finds that some I/O points are not properly calibrated and not satisfying performance requirements indicated, additional I/O points may be selected by reviewers until total I/O points being reviewed that satisfy requirements equals quantity indicated.
 2. Reporting of alarm conditions for randomly selected alarms, including different classes of alarms, to ensure that alarms are properly received by operators and workstations.
 3. Trends, summaries, logs, and reports set-up for Project.
 4. Data entry to show Project-specific customizing capability including parameter changes.

5. Online user guide and help functions.
6. For Each Meter:
 - a. Memory: Programmed data, parameters, trend, and alarm history collected during normal operation is not lost during power failure.
 - b. Operator Interface: Ability to connect directly to each meter with a portable workstation.
 - c. Wiring Labels: Match control drawings.
 - d. Network Communication: Ability to locate a meter on the network. Communication architecture matches Shop Drawings.
 - e. Nameplates and Tags: Accurate and permanently attached to control panel doors, instrument, actuators, and devices.

END OF SECTION 260913

SECTION 262726 - WIRING DEVICES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Extra heavy-duty grade switches.
2. Extra heavy-duty grade duplex straight-blade receptacles.
3. Receptacles with ground-fault protective devices
4. Connectors, cords, and plugs.

B. Related Requirements:

1. General Provisions of the Contract and Project Drawings apply to this section.
2. Section 260500 "Common Work Requirements for Electrical" specifies additional coordination, scheduling, sequencing, submittal, and installation requirements applicable to the Work for electrical on the Project, including wiring methods.
3. Section 260526 "Grounding and Bonding for Electrical Systems" specifies grounding and bonding referenced by this Section.
4. Section 260533 "Raceways and Boxes for Electrical Systems" specifies electrical conduits and boxes.
5. Section 260553 "Identification for Electrical Systems" specifies electrical equipment labels and warning signs referenced by this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Product Listing: Include copy of unexpired approval letter, on letterhead of qualified electrical testing agency, certifying product's compliance with specified listing criteria.
 - a. If listed manufacturer differs from selling manufacturer, indicate relationship between entities on submittal. Clearly indicate which entity warrants product performance and fitness for purpose.
 - b. Listing criteria identified in approval letter must match specified listing criteria. UL label indicating approval of equipment's enclosure is not considered approval of equipment for intended application.
 - c. Product identification in approval letter must match product branding and model numbers in submittal. Approval letters for discontinued or superseded products are not acceptable for submitted product.

B. Product Data: For each type of product.

C. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

D. Manufacturer's published instructions.

1.3 CLOSEOUT SUBMITTALS

- A. Warranty documentation.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Products or components listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2.2 EXTRA HEAVY-DUTY GENERAL-USE SWITCHES

- A. Toggle Switch:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Wiring Devices; Arrow Hart.
 - b. Hubbell Incorporated; Hubbell Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand; Pass & Seymour
 - 2. Source Limitations: Obtain products from single manufacturer.
 - 3. Listing Criteria: UL CCN WМУZ and UL 20.
 - 4. Standard Features:
 - a. Device Color: White for normal power; red for generator power.
 - b. Configuration: Extra-heavy-duty, 120-277 V, 20 A, single pole and three way. See drawings for switch types.
 - 5. Accessories:
 - a. Cover Plate: 302/304 lined stainless steel from same manufacturer as wiring device. Note requirement for stainless steel plates on emergency and standby branch outlets and switches.
 - b. Securing Screws for Cover Plate: Metal with head color matching wall plate finish.

2.3 EXTRA HEAVY-DUTY DUPLEX STRAIGHT-BLADE RECEPTACLES

- A. Duplex Straight-Blade Receptacle:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Wiring Devices; Arrow Hart.
 - b. Hubbell Incorporated; Hubbell Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour; Legrand North America, LLC.

2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Receptacles for Plugs and Attachment Plugs: UL CCN RTRT and UL 498.
3. Standard Features:
 - a. Device Color: White for normal power; red for generator power.
 - b. Configuration: Extra-heavy-duty, NEMA 5-20R.
4. Other Available Features Required by the Project:
5. Accessories:
 - a. Cover Plate: 302/304 lined stainless steel from same manufacturer as wiring device. Note requirement for stainless steel plates on emergency and standby branch outlets and switches.
 - b. Securing Screws for Cover Plate: Metal with head color matching wall plate finish.

B. Tamper-Resistant Duplex Straight-Blade Receptacle:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Wiring Devices; Arrow Hart.
 - b. Hubbell Incorporated; Hubbell Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour; Legrand North America, LLC.
2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Receptacles for Plugs and Attachment Plugs: UL CCN RTRT and UL 498.
3. Standard Features:
 - a. Device Color: White for normal power; red for generator power.
 - b. Configuration: Extra-heavy-duty, NEMA 5-20R.
4. Accessories:
 - a. Cover Plate: 302/304 lined stainless steel from same manufacturer as wiring device. Note requirement for stainless steel plates on emergency and standby branch outlets and switches.
 - b. Securing Screws for Cover Plate: Metal with head color matching wall plate finish.

2.4 RECEPTACLES WITH GROUND-FAULT PROTECTIVE DEVICES

- A. Heavy-Duty Grade, Weather-Resistant, Tamper-Resistant Duplex Straight-Blade Receptacle with GFCI Device:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Wiring Devices; Arrow Hart.
 - b. Hubbell Incorporated; Hubbell Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour; Legrand North America, LLC.
 2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Receptacle GFCIs: UL CCN KCXS, UL 498, and UL 943.
 3. Standard Features:
 - a. Device Color: White for normal power; red for generator power.
 - b. Heavy-duty, NEMA 5-20R.
 4. Accessories:
 - a. Cover Plate: 302/304 lined stainless steel from same manufacturer as wiring device. Note requirement for stainless steel plates on emergency and standby branch outlets and switches.
 - b. Securing Screws for Cover Plate: Metal with head color matching wall plate finish.

2.5 CONNECTORS, CORDS, AND PLUGS

- A. Outdoor-Use, Watertight, Sealed Cord Connector:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Wiring Devices; Arrow Hart.
 - b. Hubbell Incorporated; Hubbell Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour; Legrand North America, LLC.
 2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Reference Standards: UL CCN AXUT and UL 498.

3. Standard Features:
 - a. Configuration: NEMA 5-20 with diagnostic LED indicator.

2.6 MAINTENANCE MATERIAL ITEMS FOR STRAIGHT-BLADE RECEPTACLES

- A. Extra Stock Material: Furnish to Owner extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Include the following:
 1. GFCI Receptacles: Equal to 10 percent of quantity installed for each kind specified, but no fewer than one units.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Receptacles:
 1. Verify that receptacles to be procured and installed for Owner-furnished equipment are compatible with mating attachment plugs on equipment.

3.2 INSTALLATION OF SWITCHES

- A. Comply with manufacturer's published instructions.
- B. Reference Standards for Installation: Unless more stringent installation requirements are specified in the Contract Documents or manufacturer's published instructions, comply with the following:
 1. Electrical Construction: ICC IBC, ICC IFC, NFPA 1, NFPA 70, and NECA NEIS 1.
 2. Electrical Safety: NFPA 70E.
 3. Life Safety and Means of Egress Work: NFPA 101.
 4. Wiring Devices: NECA NEIS 130.
 5. Mounting Heights: NECA NEIS 1.
 6. Consult Architect for resolution of conflicting requirements.
- C. Interfaces with Other Work:
 1. Identification:
 - a. Identify cover or cover plate for device with panelboard identification and circuit number.
 - b. Mark cover or cover plate using hot, stamped, or engraved machine printing with black-filled lettering, and provide durable wire markers or tags inside device box or outlet box.
 - c. Provide warning signs and arc-flash hazard warning labels for electrical equipment.

2. Coordinate installation of new products with existing conditions in all renovated spaces.

3.3 INSTALLATION OF STRAIGHT-BLADE RECEPTACLES

- A. Comply with manufacturer's published instructions.
- B. Reference Standards for Installation: Unless more stringent installation requirements are specified in the Contract Documents or manufacturer's published instructions, comply with the following:
 1. Electrical Construction: ICC IBC, ICC IFB, NFPA 1, NFPA 70, and NECA NEIS 1.
 2. Electrical Safety: NFPA 70E.
 3. Grounding and Bonding: NECA NEIS 331 and Article 250 of NFPA 70.
 4. Work in Telecommunications Rooms (TRs): NFPA 75.
 5. Installing and Maintaining Wiring Devices: NECA NEIS 130.
 6. Mounting Heights: Unless otherwise indicated in the Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
 7. Receptacle Orientation: Unless otherwise indicated in the Contract Documents, orient receptacle with ground pin at top.
 8. Consult Engineer for resolution of conflicting requirements.
- C. Interfaces with Other Work:
 1. Identification: Provide labels for receptacles and associated electrical equipment.
 - a. Identify field-installed conductors, interconnecting wiring, and components.
 - b. Label each enclosure with engraved metal or laminated-plastic nameplate.
 - 1) Identify cover or cover plate for device with panelboard identification and circuit number.
 - 2) Mark cover or cover plate using hot, stamped, or engraved machine printing with black-filled lettering, and provide durable wire markers or tags inside device box or outlet box.
 - c. Provide warning signs and arc-flash hazard warning labels for electrical equipment.
 2. Do not install Type 3 SPD, including surge-protected relocatable taps and power strips, on branch circuit downstream of GFCI device.
 3. Coordinate installation of new products with existing conditions in all renovated spaces.

3.4 INSTALLATION OF CONNECTORS, CORDS, AND PLUGS

- A. Comply with manufacturer's published instructions.

- B. Reference Standards for Installation: Unless more stringent installation requirements are specified in the Contract Documents or manufacturer's published instructions, comply with the following:
1. Electrical Construction: ICC IBC, ICC IFC, NFPA 1, NFPA 70, and NECA NEIS 1.
 2. Electrical Maintenance: NFPA 70B.
 3. Electrical Safety: NFPA 70E.
 4. Grounding and Bonding: NECA NEIS 331 and Article 250 of NFPA 70.
 5. Work in Telecommunications Rooms (TRs): NFPA 75.
 6. Consult Engineer for resolution of conflicting requirements.
- C. Interfaces with Other Work:
1. Coordinate installation of new products in work areas with existing conditions.

3.5 FIELD QUALITY CONTROL OF SWITCHES

- A. Tests and Inspections:
1. Perform tests and inspections in accordance with manufacturers' published instructions.
- B. Nonconforming Work:
1. Unit will be considered defective if it does not pass tests and inspections.
 2. Remove and replace defective units and retest.
- C. Field Quality-Control Reports: Collect, assemble, and submit test and inspection reports.

3.6 FIELD QUALITY CONTROL OF STRAIGHT-BLADE RECEPTACLES

- A. Tests and Inspections:
1. Insert and remove test plug to verify that device is securely mounted.
 2. Verify polarity of hot and neutral pins.
 3. Measure line voltage.
 4. Measure percent voltage drop.
 5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.
- B. Nonconforming Work:
1. Device will be considered defective if it does not pass tests and inspections.
 2. Remove and replace defective units and retest.
- C. Field Quality-Control Reports: Collect, assemble, and submit test and inspection reports.

3.7 FIELD QUALITY CONTROL OF CONNECTORS, CORDS, AND PLUGS

- A. Tests and Inspections:
 - 1. Perform tests and inspections indicated in manufacturer's published instructions.
- B. Nonconforming Work:
 - 1. Unit will be considered defective if it does not pass tests and inspections.
 - 2. Remove and replace defective units and retest.
- C. Field Quality-Control Reports: Collect, assemble, and submit test and inspection reports.

3.8 SYSTEM STARTUP FOR SWITCHES

- A. Perform startup service.
 - 1. Complete installation and startup checks in accordance with manufacturer's published instructions.

3.9 PROTECTION

- A. Devices:
 - 1. Schedule and sequence installation to minimize risk of contamination of wires and cables, devices, device boxes, outlet boxes, covers, and cover plates by plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other materials.
 - 2. After installation, protect wires and cables, devices, device boxes, outlet boxes, covers, and cover plates from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.
- B. Connectors, Cords, and Plugs:
 - 1. After installation, protect connectors, cords, and plugs from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 262726

SECTION 263213 - GAS ENGINE-DRIVEN GENERATOR SETS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Gas engine-driven generator sets.
2. Gas engine.
3. Gas fuel system.
4. Control and monitoring.
5. Generator overcurrent and fault protection.
6. Generator, exciter, and voltage regulator.
7. Outdoor generator-set enclosure.

B. Related Requirements:

1. General provisions of the Contract and Project Drawings apply to this section.
2. Section 260500 "Common Work Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
3. Section 260519 "Low-Voltage Electrical Power Conductors and Cables".
4. Section 260523 "Control-Voltage Electrical Power Cables".
5. Section 260526 "Grounding and Bonding for Electrical Systems".
6. Section 260533 "Raceways and Boxes for Electrical Systems".
7. Section 260543 "Underground Ducts and Raceways for Electrical Systems".
8. Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine generators.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
2. Include thermal damage curve for generator.
3. Include time-current characteristic curves for generator protective device.
4. Include fuel consumption for each fuel source (natural gas and LPG) in cubic feet per hour (cubic meters per hour) at 0.8 power factor at 0.5, 0.75 and 1.0 times generator capacity.
5. Include generator efficiency at 0.8 power factor at 0.5, 0.75, and 1.0 times generator capacity.
6. Include air flow requirements for cooling and combustion air in cfm at 0.8 power factor, with air supply temperature of 95 deg F, 80 deg F, 70 deg F, and 50 deg F. Provide drawings showing requirements and limitations for location of air intake and exhausts.
7. Include generator characteristics, including, but not limited to, kilowatt rating, efficiency, reactances, and short-circuit current capability.

B. Shop Drawings:

1. Include plans and elevations for engine generator and other specified components.
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 EPS equipment and functional relationship between all electrical components.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, Manufacturer and Testing Agency.

B. 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. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
5. Report of sound generation.
6. Report of exhaust emissions showing compliance with applicable regulations.

C. Field quality-control reports.

D. Warranty for Standby operation.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For engine generators to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Division 01 "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.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
 - 2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
 - 3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.
 - 4. Tools: Each tool listed by part number in operations and maintenance manual.

1.6 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.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 GAS-ENGINE-DRIVEN GENERATOR SETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cummins Power Generation.
 - 2. Caterpillar
 - 3. MTU Onsite Energy Corporation.
- B. Source Limitations: Obtain packaged engine generators and auxiliary components through one source from a single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. B11 Compliance: Comply with B11.19.
- B. NFPA Compliance:
 - 1. Comply with NFPA 37.
 - 2. Comply with NFPA 70.

3. Comply with NFPA 110 requirements for Level 1 EPSS.
- C. UL Compliance: Comply with UL 2200.
 - D. Engine Exhaust Emissions: Comply with EPA Tier requirements to meet the manufacturer's requirements for the application, and applicable state and local government requirements.
 - E. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at due to sound emitted by engine generator including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.
 - F. Environmental Conditions: Engine generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
 1. Ambient Temperature: 5 to 104 deg F.
 2. Relative Humidity: Zero to 95 percent.
 3. Altitude: Sea level to 700 feet.

2.3 ENGINE GENERATOR ASSEMBLY DESCRIPTION

- A. Factory-assembled and factory-tested, water-cooled engine, with brushless generator and accessories.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to authorities having jurisdiction, and marked for intended location and use.
- C. Power Rating: Standby.
- D. EPSS Class: Engine generator shall be classified Class X according to NFPA 110.
- E. Service Load: 80 kW / 100 kVA.
- F. Power Factor: 0.8, lagging.
- G. Frequency: 60 Hz.
- H. Voltage: 480Y/277 V ac.
- I. Phase: Three-phase, four wire, wye.
- J. Induction Method: Turbocharged.
- K. Governor: Adjustable isochronous, with speed sensing.
- L. Mounting Frame: Structural steel framework to maintain alignment of mounted components without depending on concrete foundation. Provide lifting attachments sized and spaced to prevent deflection of base during lifting and moving.

1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.

M. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated at 0.8 power factor excluding power required for the continued and repeated operation of the unit and auxiliaries, with capacity as required to operate as a unit as evidenced by records of prototype testing.
2. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of components.

N. Engine Generator Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a three-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time: Comply with NFPA 110, Type 60 system requirements.

2.4 GAS ENGINE

A. Fuel: **Natural gas and Propane (dual fuel).**

B. Rated Engine Speed: 1800 rpm.

C. Lubrication System: Engine or skid-mounted.

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.

3. Oil Heater: 120V ac, 150 watts, factory installed and protected by overcurrent protective device (circuit breaker) as part of fully factory assembled package for a complete winterized enclosure.
 4. Closed Crankcase Ventilation (CCV) Heater: 120V ac, 120 watts, factory installed and protected by overcurrent protective device (circuit breaker) as part of fully factory assembled package for a complete winterized enclosure.
 5. Crankcase Drain: Arranged for complete gravity drainage to the outdoor enclosure exterior for ease of drainage to an external, removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- D. Jacket Coolant Heater: Electric-immersion type, factory installed in coolant jacket system. 120V ac, 1,000 watts, factory installed and protected by overcurrent protective device (circuit breaker) as part of factory assembled package for a complete winterized enclosure.
- E. Comply with UL 499 and with NFPA 110 requirements for Level for heater capacity.
- F. Integral Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine generator mounting frame and integral engine-driven coolant pump.
1. Coolant: Solution of long-life 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
 2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
 3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
 4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
 5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.
 - a. Rating: 50-psig maximum working pressure with coolant at 180 deg F, and not collapsible under vacuum.
 - b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.
- G. Muffler/Silencer:
1. Critical type sized as recommended by engine manufacturer. Silencer mounted in radiator discharge plenum arranged for vertical air flow. Fully factory assembled package for a complete winterized enclosure. Size selected with exhaust piping system factory designed to not exceed engine manufacturer's engine backpressure requirements.
 - a. Minimum sound attenuation of 25 dB at 500 Hz.
 - b. Sound level measured at a distance of 25 feet from exhaust discharge after installation is complete shall be 78 dBA or less.

- H. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.
- I. Starting System: 12-V electric, with negative ground.
1. Components: Sized so they are not damaged during a full engine-cranking cycle with ambient temperature at maximum specified in "Performance Requirements" Article.
 2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
 3. Cranking Cycle: As required by NFPA 110 for Level 1 specified arrangements.
 4. Battery: Lead acid, with capacity within ambient temperature range specified in "Performance Requirements" Article to provide specified cranking cycle at least three times without recharging.
 5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
 6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 50 deg F regardless of external ambient temperature within range specified in "Performance Requirements" Article. Include accessories required to support and fasten batteries in place. Provide ventilation to exhaust battery gases.
 7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35 A minimum continuous rating.
 8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type designed for lead-acid batteries. Charger completely factory installed, including ac wiring to circuit breakers provided with packaged set and dc wiring to generator controller Unit shall comply with UL 1236 and include the following features:
 - a. Operation: Equalizing-charging rate of 6A (minimum) to 10 A (as recommended by manufacturer) shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
 - b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg F to 140 deg F to prevent overcharging at high temperatures and undercharging at low temperatures.
 - c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
 - d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
 - e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.

- f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.5 GAS FUEL SYSTEM

- A. Natural Gas Piping: Comply with requirements in Division 23"Facility Natural Gas Piping."
- B. Gas Train: Comply with NFPA 37.
- C. Engine Fuel System:
 - 1. Vapor-Withdrawal System:
 - a. Carburetor.
 - b. Secondary Gas Regulators: One for each fuel type, with atmospheric vents piped to enclosure exterior.
 - c. Fuel-Shutoff Solenoid Valves: NRTL-listed, normally closed, safety shutoff valves; one for each fuel source.
 - 2. Fuel Filters: One for each fuel type.
 - 3. Manual Fuel Shutoff Valves: One for each fuel type.
 - 4. Flexible Fuel Connectors: Minimum one for each fuel connection.
 - 5. Propane gas flow adjusting valve.
 - 6. Fuel change gas pressure switch.

2.6 CONTROL AND MONITORING

- A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of engine generator. When mode-selector switch is switched to the on position, engine generator starts. The off position of same switch initiates generator-set shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.
- B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts engine generator. The off position of same switch initiates generator-set shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.
- C. Provide minimum run time control set for 15 minutes with override only by operation of a remote emergency-stop switch.
- D. Comply with UL 508A.
- E. Configuration:
 - 1. Operating and safety indications, overcurrent protective devices for engine-generator set and enclosure, enhanced system controller with engine combined gages, bar graph indicators, auxiliary signal, and emergency stop switch shall be

grouped in a common panel mounted on one side of the generator. Overcurrent protective devices, circuit breakers, for generator output shall be grouped and mounted on the opposite side of the generator set. Mounting methods shall isolate the control panel from generator-set vibration. Panel shall be powered from the engine generator battery.

F. Control and Monitoring Panel:

1. Digital controller with integrated LCD, controls, and microprocessor, capable of local and remote control, monitoring, and programming, with battery backup.
2. Instruments: Located on the control and monitoring panel and viewable during operation.
 - a. Engine lubricating-oil pressure gage.
 - b. Engine-coolant temperature gage.
 - c. DC voltmeter (alternator battery charging).
 - d. Running-time meter.
 - e. AC voltmeter, for each phase connected to a phase selector touchscreen switch.
 - f. AC ammeter, for each phase connected to a phase selector touchscreen switch.
 - g. AC frequency meter.
 - h. Generator-voltage adjusting rheostat.
3. Controls and Protective Devices: Controls, shutdown devices, and common visual alarm indication, including the following:
 - a. Cranking control equipment.
 - b. Run-Off-Auto switch.
 - c. Control switch not in automatic position alarm.
 - d. Overcrank alarm.
 - e. Overcrank shutdown device.
 - f. Low water temperature alarm.
 - g. High engine temperature pre-alarm.
 - h. High engine temperature.
 - i. High engine temperature shutdown device.
 - j. Overspeed alarm.
 - k. Overspeed shutdown device.
 - l. Low gas pressure.
 - m. Coolant low-level alarm.
 - n. Coolant low-level shutdown device.
 - o. Coolant high-temperature pre-alarm.
 - p. Coolant high-temperature alarm.
 - q. Coolant low-temperature alarm.
 - r. Coolant high-temperature shutdown device.
 - s. EPS supplying load indicator.
 - t. Battery high-voltage alarm.
 - u. Low cranking voltage alarm.
 - v. Battery-charger malfunction alarm.
 - w. Battery low-voltage alarm.
 - x. Lamp test.

- y. Contacts for local and remote common alarm.
 - z. Remote manual stop shutdown device.
 - aa. Air shutdown damper alarm when used.
 - bb. Hours of operation.
 - cc. Engine generator metering, including voltage, current, Hz, kW, kVA, and power factor.
 - dd. Generator overcurrent protective device not closed alarm.
- G. Engine Generator Metering: Comply with Section 260913 "Electrical Power Monitoring and Control." See drawings for multifunction power and energy meter location.
- H. Connection to Datalink:
- 1. A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication.
 - 2. Provide connections for datalink transmission of alarm and shutdown indications from generator controller to remote annunciator panel shown on drawing via cabling requirements of the manufacturer.
 - 3. Provide connections from gen set controller to transfer switches via Modbus cabling requirements of the manufacturer.
- I. Remote Alarm Annunciator: An LED indicator light labeled with proper alarm conditions shall identify each alarm event, and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.
- 1. Overcrank alarm.
 - 2. Coolant low-temperature alarm.
 - 3. High engine temperature pre-alarm.
 - 4. High engine temperature alarm.
 - 5. Low lube oil pressure alarm.
 - 6. Overspeed alarm.
 - 7. Low gas pressure alarm.
 - 8. Low coolant level alarm.
 - 9. EPS supplying load
 - 10. Control switch not in automatic position alarm
 - 11. High battery voltage
 - 12. Low cranking voltage alarm.
 - 13. Battery charger ac failure/battery voltage common alarm.
 - 14. Contacts for local and remote common alarm.
 - 15. Audible-alarm silencing switch.
 - 16. Air shutdown damper when used.
 - 17. Remote emergency stop alarm.
 - 18. Lamp test.
 - 19. Generator overcurrent protective device not closed.
- J. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

- K. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

2.7 GENERATOR OVERCURRENT AND FAULT PROTECTION

- A. Overcurrent protective devices shall be coordinated to optimize selective tripping when a short circuit occurs.
1. Overcurrent protective devices for the entire EPSS shall be coordinated to optimize selective tripping when a short circuit occurs. Coordination of protective devices shall consider both utility and EPSS as the voltage source.
 2. Overcurrent protective devices for the EPSS shall be accessible only to authorized personnel.
- B. Generator Overcurrent Protective Device:
1. Molded-case circuit breakers (two required), electronic-trip type; 100 percent rated; complying with UL 489:
 - a. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
 - b. Trip Settings: Selected to coordinate with generator thermal damage curve.
 - c. Shunt Trip: Connected to trip breaker when engine generator is shut down by other protective devices.
 - d. Mounting: Adjacent to or integrated with control and monitoring panel.
- C. Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time, and predict when thermal damage of alternator will occur. When signaled by generator protector or other generator-set protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector performs the following functions:
1. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
 2. Under single or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.
 3. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the engine generator.
 4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.

2.8 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

- A. Comply with NEMA MG 1.

- B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C. Electrical Insulation: Class H.
- D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required. Provide 12 lead alternator.
- E. Range: Provide limited range of output voltage by adjusting the excitation level.
- F. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.
- G. Enclosure: Drip proof.
- H. Instrument Transformers: Mounted within generator enclosure.
- I. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified and as required by NFPA 110.
 - 1. Adjusting Rheostat on Control and Monitoring Panel: Provide plus or minus 5 percent adjustment of output-voltage operating band.
 - 2. Maintain voltage within 15 percent on one step, full load.
 - 3. Provide anti-hunt provision to stabilize voltage.
 - 4. Maintain frequency within 5 percent and stabilize at rated frequency within 2 seconds.
- J. Alternator Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.
- K. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.
- L. Subtransient Reactance: 12 percent, maximum.

2.9 OUTDOOR GENERATOR-SET ENCLOSURE

- A. Description:
 - 1. Winterized, vandal-resistant, sound-attenuating, weatherproof steel housing, wind resistant up to 100 mph. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.
 - a. Sound Attenuation Level: Per manufacturer's construction details for winterized enclosure with motorized intake and discharge louvers.
- B. Structural Design and Anchorage: Comply with ASCE/SEI 7 for wind loads up to 100 mph.
- C. Hinged Doors: With padlocking provisions.

- D. Space Heater: Thermostatically controlled and sized to prevent condensation.
- E. Lighting: Provide weather-resistant LED lighting with 50 fc average maintained.
- F. Thermal Insulation: Manufacturer's standard materials and thickness selected in coordination with space heater to maintain winter interior temperature within operating limits required by engine generator components.
- G. Muffler Location: Within enclosure discharge plenum or internal to enclosure.
- H. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.
 - 1. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.
 - 2. Ventilation: Provide temperature-controlled exhaust fan interlocked to prevent operation when engine is running.
- I. Interior Lights with Switch: Factory-wired, vapor-proof fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.
 - 1. AC lighting system and connection point for operation when remote source is available.
- J. Convenience Outlets: Factory wired, GFCI. Arrange for external electrical connection.

2.10 VIBRATION ISOLATION DEVICES

- A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.
 - 1. Material: Standard neoprene separated by steel shims.
 - 2. Shore "A" Scale Durometer Rating: 50.
 - 3. Number of Layers: Two.
 - 4. Minimum Deflection: 1 inch.
- B. Vibration isolation devices shall not be used to accommodate misalignments.

2.11 FINISHES

- A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.12 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.

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 Natural Gas: Do not interrupt natural gas service to facilities occupied by Owner or to the existing generator set 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 seven 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 and with NFPA 110.
- 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. Install anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
 3. Install packaged engine generator with elastomeric isolator pads having a minimum deflection of 1 inch on 4-inch-high concrete base. Secure engine generator to anchor bolts installed in concrete bases.
- D. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

- E. Drain Piping: Install condensate drain piping to muffler drain outlet with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe, the full size of the drain connection, with welded joints.
- F. Gaseous Fuel Piping:
 - 1. Natural gas piping, valves, and specialties for gas distribution are specified in Division 23 "Facility Natural Gas Piping."
- G. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.4 CONNECTIONS

- A. Connect fuel system piping adjacent to packaged engine generator to allow service and maintenance.
- B. Gaseous Fuel Connections:
 - 1. Connect fuel piping to engines with a gate valve and union and flexible connector.
 - 2. Install manual shutoff valve in a remote location to isolate gaseous fuel supply to the generator.
 - 3. Vent gas pressure regulators outside building a minimum of 60 inches from building openings.
- 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." Provide a minimum of one 90-degree bend in flexible conduit routed to the engine generator from a stationary element.
- E. Balance single-phase loads to obtain a maximum of 10 percent imbalance between any two phases.

3.5 IDENTIFICATION

- A. Identify system components according to Section 260553 "Identification for Electrical Systems."
- B. Install a sign indicating the generator neutral is bonded to the main service neutral at the main service location.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency:
 - 1. Perform tests and inspections with the assistance of a factory-authorized service representative.

B. Tests and Inspections:

1. Perform tests recommended by manufacturer and each visual and mechanical inspection and electrical and mechanical test listed in the first two subparagraphs below as specified in the NETA ATS. Certify compliance with test parameters.
 - a. Visual and Mechanical Inspection:
 - 1) Compare equipment nameplate data with drawings and specifications.
 - 2) Inspect physical and mechanical condition.
 - 3) Inspect anchorage, alignment, and grounding.
 - 4) Verify the unit is clean.
 - b. Electrical and Mechanical Tests:
 - 1) Perform insulation-resistance tests in accordance with IEEE 43.
 - a) Machines 200 hp 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. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here, including, but not limited to, single-step full-load pickup test.
3. 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.
4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
5. 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.
6. 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.

7. Harmonic-Content Tests: Measure harmonic content of output voltage at 25 percent and 100 percent of rated linear load. Verify that harmonic content is within specified limits.
- C. Coordinate tests with tests for transfer switches and run them concurrently.
 - D. Test instruments shall have been calibrated within the last 12 months, traceable to NIST Calibration Services, and adequate for making positive observation of test results. Make calibration records available for examination on request.
 - E. Leak Test: After installation, charge exhaust, coolant, and fuel systems and test for leaks. Repair leaks and retest until no leaks exist.
 - F. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation for generator and associated equipment.
 - G. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - H. Remove and replace malfunctioning units, reinspect and retest as specified above.
 - I. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.
 - J. 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.

3.7 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly 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. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

3.8 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Training Owner's staff for the generator set and transfer switches shall be provided for a minimum of four (4) hours.

END OF SECTION 263213

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SECTION 264313 - SURGE PROTECTIVE DEVICES FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type 2 surge protective devices (SPDs).
2. Enclosures.
3. Conductors and cables.

B. Related Requirements:

1. General Provisions of the Contract and Project Drawings apply to this section.
2. Section 260500 "Common Work Requirements Electrical" for abbreviations, definitions, submittals, qualifications, and other Project requirements applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.
 - a. Include electrical characteristics, specialties, and accessories for SPDs.
 - b. Certification of compliance with UL 1449 by qualified electrical testing laboratory recognized by authorities having jurisdiction including the following information:
 - 1) Tested values for VPRs.
 - 2) I_n ratings.
 - 3) MCOV, type designations.
 - 4) OCPD requirements.
 - 5) Manufacturer's model number.
 - 6) System voltage.
 - 7) Modes of protection.

B. Field quality-control reports.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For SPDs. Include in maintenance manuals.

PART 2 – PRODUCTS

2.1 TYPE 2 SURGE PROTECTIVE DEVICES (SPDs)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. ABB, Electrification Products Division.
 2. Advanced Protection Technologies Inc. (APT).
 3. Eaton.
 4. Schneider Electric USA, Inc.
 5. LEA International LSS Series.
- B. Source Limitations: Obtain devices from single source from single manufacturer.
- C. General Characteristics:
1. Reference Standards: UL 1449, Type 2; UL 1283.
 2. MCOV: Not less than 125 percent of nominal system voltage for 208Y/120 V and 120/240 V power systems, and not less than 115 percent of nominal system voltage for 480Y/277 V power systems.
 3. Peak Surge Current Rating: Minimum single-pulse surge current withstand rating per phase must not be less than 150 kA. Peak surge current rating must be arithmetic sum of the ratings of individual MOVs in a given mode.
 4. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277 V, three-phase, four-wire circuits must not exceed the following:
 - a. Line to Neutral: 1200 V for 480Y/277 V.
 - b. Line to Ground: 1200 V for 480Y/277 V.
 - c. Neutral to Ground: 1200 V for 480Y/277 V.
 - d. Line to Line: 2000 V for 480Y/277 V.
 5. SCCR: Equal or exceed 200 kA.
- D. Options:
1. Include LED indicator lights for power and protection status.
 2. Include internal thermal protection that disconnects the SPD before damaging internal suppressor components.
 3. Include surge counter.

2.2 CONDUCTORS AND CABLES

- A. Power Wiring: Same size as SPD leads, complying with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Provide OCPD and disconnect for installation of SPD in accordance with UL 1449 and manufacturer's instructions.
- B. Install leads between disconnects and SPDs short, straight, twisted, and in accordance with manufacturer's instructions. Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
 - 1. Do not splice and extend SPD leads unless specifically permitted by manufacturer.
 - 2. Do not exceed manufacturer's recommended lead length.
 - 3. Do not bond neutral and ground.
- C. Use crimped connectors and splices only. Wire nuts are unacceptable.

3.2 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Compare equipment nameplate data for compliance with Drawings and the Specifications.
 - 2. Inspect anchorage, alignment, grounding, and clearances.
 - 3. Verify that electrical wiring installation complies with manufacturer's installation requirements.
- B. Nonconforming Work:
 - 1. SPDs that do not pass tests and inspections will be considered defective.
 - 2. Remove and replace defective units and retest.

3.3 STARTUP SERVICE

- A. Complete startup checks in accordance with manufacturer's instructions.
- B. Do not perform insulation-resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation-resistance tests; reconnect them immediately after the testing is over.
- C. Energize SPDs after power system has been energized, stabilized, and tested.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to operate and maintain SPDs.

END OF SECTION 264313

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SEGMENT IV
WAGE RATES

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"General Decision Number: WI20260003 01/02/2026

Superseded General Decision Number: WI20250003

State: Wisconsin

Construction Type: Building

County: La Crosse County in Wisconsin.

BUILDING CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories)

Modification Number 0 Publication Date 01/02/2026

ASBE0019-001 06/01/2025

Rates Fringes

Asbestos Removal worker/hazardous material handler

Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not.....\$ 45.88 38.15

BOIL0107-001 01/01/2025

Rates Fringes

BOILERMAKER

Boilermaker.....\$ 46.52 34.63

BRWI0001-004 06/01/2025

Rates Fringes

Bricklayer & Tile Setter.....\$ 40.09 28.10

CARP1056-001 06/01/2024

Rates Fringes

MILLWRIGHT.....\$ 42.00 28.85

CARP1143-005 06/01/2025

Rates Fringes

CARPENTER (Including Acoustical Work, Drywall Hanging, Piledriverman; Excluding Batt Insulation).....\$ 41.43 29.99 SOFT FLOOR LAYER.....\$ 41.43 29.99

ELEC0014-004 05/25/2025

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 44.29 | 25.21 |

ELEC0014-005 05/25/2025

| | Rates | Fringes |
|---|----------|---------|
| Electricians (Teledata System Installer/Technician)..... | \$ 31.17 | 20.08 |

Low voltage construction, installation, maintenance and removal of teledata facilities (voice, data, and video) including outside plant, telephone and data inside wire, interconnect, terminal equipment, central offices, PABX, fiber optic cable and equipment, micro waves, V-SAT, bypass, CATV, WAN (wide area networks), LAN (local area networks), and ISDN (integrated systems digital network).

ELEV0132-001 01/01/2025

| | Rates | Fringes |
|------------------------|----------|------------|
| ELEVATOR MECHANIC..... | \$ 65.17 | 38.435+a+b |

FOOTNOTE:

- a. PAID VACATION: Employer contributes 8% of basic hourly rate as vacation pay for employees with more than 5 years or more of service, and 6% for less than 5 years of service.
- b. PAID HOLIDAYS: New Years Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

ENGI0139-002 06/02/2025

| | Rates | Fringes |
|---------------------------|----------|---------|
| OPERATOR: Power Equipment | | |
| Group 1..... | \$ 50.53 | 27.89 |
| Group 2..... | \$ 49.28 | 27.89 |
| Group 3..... | \$ 45.73 | 27.89 |
| Group 4..... | \$ 45.20 | 27.89 |
| Group 5..... | \$ 43.13 | 27.89 |
| Group 6..... | \$ 41.60 | 27.89 |

HAZARDOUS WASTE PREMIUMS:

- EPA Level "A" Protection: \$3.00 per hour
- EPA Level "B" Protection: \$2.00 per hour
- EPA Level "C" Protection: \$1.00 per hour

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Cranes, Tower Cranes and Derricks with or without attachments with a lifting capacity of over 100 tons; Cranes, Tower Cranes, and Derricks with boom, leads and/or jib lengths 176 ft or longer.

GROUP 2: Backhoes (Excavators) weighing 130,000 lbs & over; Cranes, Tower Cranes and Derricks with or without attachments with a lifting capacity of 100 tons or less; Cranes, Tower Cranes, and Derricks with boom, leads, and/or

jib lengths 175 ft or less; Caisson Rigs; Pile Driver

GROUP 3: Backhoes (Excavators) weighing under 130,000 lbs; Travelling Crane (bridge type); Milling Machine; Concrete Paver over 27 E; Concrete Spreader and Distributor; Concrete Laser Screed; Concrete Grinder and Planing Machine; Slipform Curb and Gutter Machine; Boring Machine (Directional); Dredge Operator; Skid Rigs; Over 46 meter Concrete Pump.

GROUP 4: Hydraulic Backhoe (tractor or truck mounted); Hydraulic Crane, 10 tons or less; Tractor, Bulldozer, or End Loader (over 40 hp); Motor Patrol; Scraper Operator; Bituminous Plant and Paver Operator; Screed-Milling Machine; Roller over 5 tons; Concrete Pumps 46 meter & under; Grout Pumps; Rotec Type Machine; Hydro Blaster, 10,000 psi and over; Rotary Drill Operator; Percussion Drilling Machine; Air Track Drill with or without integral hammer; Blaster; Boring Machine (vertical or horizontal); Side Boom; Trencher, wheel type or chain type having 8 inch or larger bucket; Rail Leveling Machine (Railroad); Tie Placer; Tie Extractor; Tie Tamper; Stone Leveler; Straddle Carrier; Material Hoists; Stack Hoist; Man Hoists; Mechanic and Welder; Off Road Maaerial Haulers

GROUP 5: Tractor, Bulldozer, or Endloader (under 40 hp); Tampers -Compactors, riding type; Stump Chipper, large; Roller, Rubber Tire; Backfiller; Trencher, chain type (bucket under 8 inch); Concrete Auto Breaker, large; Concrete Finishing Machine (road type); Concrete Batch Hopper; Concrete Conveyor Systems; Concrete Mixers, 14S or over; Pumps, Screw Type and Gypsum); Hydrohammers, small; Brooms and Sweeprs; Lift Slab Machine; Roller under 5 tons; Industrial Locomotives; Fireman (Pile Drivers and Derricks); Pumps (well points); Hoists, automatic; A-Frames and Winch Trucks; Hoists (tuggers); Boats (Tug, Safety, Work Barges and Launches); Assistant Engineer

GROUP 6: Shouldering Machine Operator; Farm or Industrial Tractor mounted equipment; Post Hole Digger; Auger (vertical and horizontal); Skid Steer Loader with or without attachments; Robotic Tool Carrier with or without attachments; Power Pack Vibratory/Ultra Sound Driver and Extractor; Fireman (Asphalt Plants); Screed Operator; Stone Crushers and Screening Plants; Air, Electric, Hydraulic Jacks (Slip Form); Prestress Machines; Air Compressor, 400 CFM or over; Refrigeration Plant/Freese Machine; Boiler Operators (temporary heat); Forklifts; Welding Machines; Generators; Pumps over 3""; Compressors, under 400 CFM; Heaters, Mechanical; Combination small equipment operator; Winches, small electric; Oiler; Greaser; Rotary Drill Tender; Conveyor; Elevator Operator

IRON0383-002 06/01/2025

| | Rates | Fringes |
|-----------------|----------|---------|
| IRONWORKER..... | \$ 44.00 | 32.66 |

LAB00140-001 06/01/2025

| | Rates | Fringes |
|-----------------------|----------|---------|
| Laborer, General..... | \$ 37.70 | 19.97 |

Laborer: Asbestos/hazardous material remover
 (Preparation, Removal and Encapsulation of Hazardous Materials from Non-Mechanical Systems).....\$ 36.65 19.97

NOTE: Mason Tender \$1.00 over general laborer scale;
 Pipelayer \$1.00 over general laborer scale

 PAIN0259-005 05/01/2017

| | Rates | Fringes |
|--------------|----------|---------|
| PAINTER..... | \$ 22.99 | 13.29 |

 PLAS0599-006 06/01/2025

| | Rates | Fringes |
|-----------------------------------|----------|---------|
| CEMENT MASON/CONCRETE FINISHER... | \$ 37.25 | 27.84 |
| PLASTERER..... | \$ 39.75 | 25.10 |

 PLUM0434-001 06/01/2025

| | Rates | Fringes |
|---|----------|---------|
| PLUMBER/PIPEFITTER (Including HVAC work)..... | \$ 50.94 | 25.98 |

 SFWI0669-002 04/01/2025

| | Rates | Fringes |
|-----------------------|----------|---------|
| SPRINKLER FITTER..... | \$ 51.68 | 29.73 |

 SHEE0018-008 06/01/2025

| | Rates | Fringes |
|--|----------|---------|
| SHEET METAL WORKER (Including HVAC Duct Work and Technicians)..... | \$ 45.63 | 29.02 |

 TEAM0662-003 06/01/2025

| | Rates | Fringes |
|----------------------|----------|---------|
| TRUCK DRIVER | | |
| 1 & 2 Axles..... | \$ 39.57 | 28.70 |
| 3 or more Axles..... | \$ 39.72 | 28.70 |

 SUWI2002-004 01/23/2002

| | Rates | Fringes |
|---|----------|---------|
| Asbestos Worker/Heat and Frost Insulator..... | \$ 25.36 | 8.37 |
| Laborers: | | |
| Concrete Workers..... | \$ 16.34 | 3.59 |
| Landscape..... | \$ 8.73 | 4.90 |
| ROOFER..... | \$ 18.01 | 3.28 |

Tile & Marble Finisher.....\$ 13.89 8.33

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

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was

prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which

the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.

Washington, DC 20210.

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END OF GENERAL DECISION

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PLEASE ATTACH
ANY ADDENDA HERE