RFB NO. 322031

CONSTRUCTION DOCUMENTS
PROJECT MANUAL

DANE COUNTY DEPARTMENT OF ADMINISTRATION

PUBLIC WORKS ENGINEERING DIVISION
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN 53713

REQUEST FOR BIDS NO. 322031
ELECTRICAL UPGRADES
ALLIANT ENERGY CENTER PAVILIONS 1 & 2
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN

Due Date / Time: **TUESDAY, SEPTEMBER 20, 2022 / 2:00 P.M.**

Location: **PUBLIC WORKS OFFICE**

Performance / Payment Bond: **100% OF CONTRACT AMOUNT**

Bid Deposit: **5% OF BID AMOUNT**

FOR INFORMATION ON THIS REQUEST FOR BIDS, PLEASE CONTACT:

ERIC URTES, AIA, PROJECT MANAGER
TELEPHONE NO.: 608/266-4798
E-MAIL: URTES.ERIC@COUNTYOFDANE.COM

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INVITATION TO BID

LEGAL NOTICE

Dane County Public Works Engr. Division, 1919 Alliant Energy Center Way, Madison, WI 53713, will receive sealed Bids until:

2:00 P.M., TUESDAY, SEPTEMBER 20TH, 2022

RFB NO. 322031

ELECTRICAL UPGRADES

ALLIANT ENERGY CENTER PAVILIONS 1 & 2

1919 ALLIANT ENERGY CENTER WAY

MADISON, WI

Dane County is inviting Bids for construction services. The Alliant Energy Center is looking to provide electrical upgrades at Pavilions 1 & 2 to improve electrical service for exhibitors during livestock events. Only firms with capabilities, experience & expertise with similar projects should obtain this Request for Bids (RFB) document & submit Bids.

RFB document may be obtained after **2:00 p.m., Thursday, August 25th, 2022** from bids-pwht.countyofdane.com. Call Eric Urtes, AIA, Project Mgr., 608/266-4798, or urtes.eric@countyofdane.com with any questions.

Bidders must be qualified as Best Value Contractor before Bid Due Date / Time. Complete Application at publicworks.countyofdane.com/bvc or call 608/267-0119.

Pre-bid site tour will be Wednesday, August 31th, 2022 at 10:00 a.m. at the Main Entrance of Pavilion 1, 1919 Alliant Energy Center Way, Madison, WI. Bidders strongly encouraged to attend.

PUBLISH: AUGUST 23TH & AUGUST 30TH , 2022 – WISCONSIN STATE JOURNAL

AUGUST 22TH & AUGUST 29TH, 2022 - THE DAILY REPORTER

END OF SECTION

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INSTRUCTIONS TO BIDDERS

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1. GENERAL

A. Before submitting Bid, bidder shall thoroughly examine all Construction Documents. Successful Bidder shall be required to provide all the Work that is shown on Drawings, set forth in Specifications, or reasonably implied as necessary to complete Contract for this project.

B. Bidder shall visit site to become acquainted with adjacent areas, means of approach to site, conditions of actual site and facilities for delivering, storing, placing, and handling of materials and equipment.

C. Pre-bid meeting is scheduled on August 31st, 2022 at 10:00 a.m. at Alliant Energy Center Pavilions, 1919 Alliant Energy Center Way, Madison. Attendance by all bidders is optional, however bidders and subcontractors are strongly encouraged to attend.

D. Failure to visit site or failure to examine any and all Construction Documents will in no way relieve successful Bidder from necessity of furnishing any necessary materials or equipment, or performing any work, that may be required to complete the Work in accordance with Drawings and Specifications. Neglect of above requirements will not be accepted as reason for delay in the Work or additional compensation.

2. DRAWINGS AND SPECIFICATIONS

A. Drawings and Specifications that form part of this Contract, as stated in Article 1 of General Conditions of Contact, are enumerated in Document Index of these Construction Documents.

B. Complete sets of Drawings and Specifications for all trades will be available to all Bidders, irrespective of category of work to be bid on, in order that all Bidders may be familiar with work of other trades as they affect their bid.

C. For deposit refund, return complete sets of Drawings and Specifications to same location they were picked up within ninety (90) calendar days after Bid Due Date. After that time, deposit will be forfeited.

3. INTERPRETATION

A. No verbal explanation or instructions will be given in regard to meaning of Drawings or Specifications before Bid Due Date. Bidders shall bring inadequacies, omissions or conflicts to Owner or Architect / Engineer's attention at least ten (10) calendar days before Bid Due Date. Prompt clarification will be available to all bidders by Addendum.

B. Failure to so request clarification or interpretation of Drawings and Specifications will not relieve successful Bidder of responsibility. Signing of Contract will be considered as implicitly denoting that Contractor has thorough understanding of scope of the Work and comprehension of Construction Documents.

C. Owner or Architect / Engineer will not be responsible for verbal instructions.

4. QUALIFICATIONS OF BIDDER (CONTRACTOR AND SUBCONTRACTOR)

A. Before award of Contract can be approved, Owner shall be satisfied that Bidder involved meets following requirements:

1. Has completed at least one (1) project of at least fifty percent (50%) of size or value of Division of work being bid and type of work completed is similar to that being bid. If greater magnitude of experience is deemed necessary, other than size or value of work, such requirements will be described in appropriate section of Specifications.

2. Maintains permanent place of business.

3. Can be bonded for terms of proposed Contract.

4. Contractor and subcontractors shall meet all applicable Best Value Contractor requirements.

5. Has record of satisfactorily completing past projects and supplies list of no more than five (5) most recent, similar projects, with architect or engineer's and owner's names, addresses and telephone numbers for each project. Submit to Public Works Project Manager with Bid. Criteria which will be considered in determining satisfactory completion of projects by bidder will include:

    a. Completed contracts in accordance with drawings and specifications.
    b. Diligently pursued execution of work and completed contracts according to established time schedule unless Owner grants extensions.
    c. Fulfilled guarantee requirements of construction documents.

d. Is not presently on ineligible list maintained by County's Department of Administration for noncompliance with equal employment opportunities and affirmative action requirements.
e. Authorized to conduct business in Wisconsin. By submitting Bid, bidder warrants that it has: complied with all necessary requirements to do business in State of Wisconsin; that persons executing contract on its behalf are authorized to do so; and, if corporation, that name and address of bidder's registered agent are as set forth in Contract. Bidder shall notify Owner immediately, in writing, of any change in its registered agent, their address, and bidder's legal status. For partnership, term "registered agent" shall mean general partner.

B. County's Public Works Project Manager will make such investigations as are deemed necessary to determine ability of bidder to perform the Work, and bidder shall furnish to County's Public Works Project Manager or designee all such information and data for this purpose as County's Public Works Project Manager may request. Owner reserves right to reject Bid if evidence submitted by, or investigation of, bidder fails to satisfy Owner that bidder is responsible and qualified to carry out obligations of Contract and to complete the Work contemplated therein.

5. BID GUARANTEE

A. Bank certified check, cashier's check or Bid Bond, payable to County in amount not less than five percent (5%) of maximum bid, shall accompany each Bid as guarantee that if Bid is accepted, Bidder will execute and return proposed Contract and Performance and Payment Bonds within ten (10) business days after being notified of acceptance of Bid. Company issuing bonds must be licensed to do business in Wisconsin.

B. Any bid, which is not accompanied by bid guarantee, will be considered "No Bid" and will not be read at Bid Due Date.

C. If successful Bidder so delivers Contract, Certificate of Insurance, and Performance and Payment Bonds, check will be returned to Bidder. In case Bidder fails to deliver such Contract, insurance, and bond, amount of bid guarantee will be forfeited to County as liquidated damages.

D. All checks tendered as bid guarantee, except those of three (3) lowest qualified, responsible bidders, will be returned to their makers within three (3) business days after Bid Due Date. All such retained checks will be returned immediately upon signing of Contract and Performance and Payment Bonds by successful Bidder.

6. WITHDRAWAL OF BIDS

A. Bids may be withdrawn by written request received from bidder or authorized representative thereof prior to time fixed for Bid Due Date, without prejudice to right of bidder to file new Bid. Withdrawn Bids will be returned unopened. Negligence on part of bidder in preparing their Bid confers no right for withdrawal of Bid after it has been opened.

B. No Bid may be withdrawn for period of sixty (60) calendar days after Bid Due Date.

C. If Bid contains error, omission or mistake, bidder may limit liability to amount of bidder's guarantee by giving written Notice of Intent not to execute Contract to Owner within seventy-two (72) hours of Bid Due Date.

7. CONTRACT FORM

A. Sample copy of contract that successful Bidder will be required to enter into is included in these Construction Documents and bidders are required to familiarize themselves with all conditions contained therein.

8. CONTRACT INTERESTS BY COUNTY PUBLIC OFFICIALS

A. In accordance with Wisconsin Statute 946.13, county official may not bid for or enter into any contract involving receipts or disbursements of more than $15,000.00 in a year, in which they have private pecuniary interest, direct or indirect if at same time they are authorized to take official action with respect to making of this Contract. Any contract entered into in violation of this Statute is void and County incurs no liability thereon. This subsection does not affect application and enforcement of Wisconsin Statute 946.13 by state prosecutors in criminal courts of this state.

9. EMERGING SMALL BUSINESS PROVISIONS

A. **Emerging Small Business Definition.** For purposes of this section, ESB is defined as:

1. Independent business concern that has been in business minimum of one year;

2. Business located in State of Wisconsin;

3. Business comprised of less than twenty-five (25) employees;

4. Business must not have gross sales in excess of three million dollars ($3,000,000.00) over past three years; and

5. Business does not have history of failing to complete projects.

B. **Emerging Small Business (ESB) Involvement.** Bidder shall make good faith effort to award minimum of ten percent (10%) of the Work to ESBs. Bidder shall submit report to Dane County Contract Compliance Specialist within ten (10) business days of Bid Due Date demonstrating such efforts. Good faith efforts means significant contact with ESBs for purposes of soliciting bids from them. Failure to make or demonstrate good faith efforts will be grounds for disqualification.

C. **Emerging Small Business Report.** Emerging Small Business Enterprise Report is to be submitted by Bidder in separate envelope marked “Emerging Small Business Report”. This report is due by 2:00 p.m. following specified ten (10) business days after Bid Due Date. Bidder who fails to submit Emerging Small Business Report shall be deemed not responsive.

D. **ESB Goal.** Goal of this project is ten percent (10%) ESB participation. ESB utilizations are shown as percentage of total Bid. If Bidder meets or exceeds specified goal, Bidder is only required to submit Form A - Certification, and Form B - Involvement. Goal shall be met if Bidder qualifies as ESB.

E. **Report Contents.** Following award of Contract, Bidder shall submit copies of executed contracts for all Emerging Small Businesses. Emerging Small Business Report shall consist of these:

1. Form A - Certification;

2. Form B - Involvement;

3. Form C - Contacts;

4. Form D - Certification Statement (if appropriate); and

5. Supportive documentation (i.e., copies of correspondence, telephone logs, copies of advertisements).

F. **ESB Listing.** Bidders may solicit bids from *Dane County Targeted Business Directory* by going to this website. Do not click as a link; copy & paste address into a web browser.
https://equity.countyofdane.com/documents/PDFs/Targeted-Business-Directory.xlsx

G. **DBE Listing.** Bidders may also solicit bids from *State of Wisconsin DOT Disadvantaged Business Enterprise Unified Certification Program (DBE / UCP) Directory* by going to this website. These are not only transportation-related designers & contractors. Do not click as a link; copy & paste address into a web browser.
https://wisconsindot.gov/Documents/doing-bus/civil-rights/dbe/dbe-ucp-directory.xlsx

H. **ESB Certification.** All contractors, subcontractors and suppliers seeking ESB certification must complete and submit Emerging Small Business Report to Dane County Contract Compliance Program.

I. **Certification Statement.** If ESB firm has not been certified by County as ESB prior to submittal of this Bid, ESB Report cannot be used to fulfill ESB goal for this project unless firm provides "Form D - Certification Statement". Certification statement must be completed and signed by ESB firm.

J. **Questions.** Questions concerning Emerging Small Business provisions shall be directed to:

OEI@countyofdane.com
or
Dane County Contract Compliance Specialist
City-County Building, Room 356
210 Martin Luther King, Jr. Blvd.
Madison, WI 53703
608/266-4192

K. **Substituting ESBs.** In event of any significant changes in subcontract arrangements or if need arises to substitute ESBs, Bidder shall report such proposed changes to Contract Compliance Specialist to making any official changes and request authorization to substitute ESB firm. Bidder further agrees to make every possible effort to replace ESB firm with another qualified ESB firm.

L. **Good Faith Efforts.** Good faith efforts can be demonstrated by meeting all of these obligations:

1. Selecting portions of the Work to be performed by ESBs in order to increase likelihood of meeting ESB goal including, where appropriate, breaking down Contract into smaller units to facilitate ESB participation.

2. Advertising in general circulation, trade associations and women / minority focus media concerning subcontracting opportunities.

3. Providing written notices to reasonable number of specific ESBs that their interest in Contract was being solicited in sufficient time to allow ESBs to participate effectively.

4. Following up on initial solicitations of interest by contacting ESBs within five (5) business days prior to Bid Due Date to determine with certainty whether ESB were interested, to allow ESBs to prepare bids.

5. Providing interested ESB with adequate information about Drawings, Specifications and requirements of Contract.

6. Using services of available minority, women and small business organizations and other organizations that provide assistance in recruitment of MBEs / WBEs / ESBs.

7. Negotiating in good faith with interested ESBs, not rejecting ESBs as unqualified without sound reason based on thorough investigation of their capabilities.

8. Submitting required project reports and accompanying documents to County's Contract Compliance Specialist within twenty-four (24) hours after Bid Due Date.

M. **Appeals Disqualification of Bid.** Bidder who is disqualified may appeal to Public Works & Transportation Committee and Equal Opportunity Commission.

10. METHOD OF AWARD - RESERVATIONS

A. Following will be basis of award of Contract, providing cost does not exceed amount of funds then estimated by County as available to finance Contract(s):

1. Lowest dollar amount submitted by qualified responsible bidder on Base Bid for all work comprising project, combined with such additive Owner accepted alternates.

2. Owner reserves right to reject all bids or any bid, to waive any informality in any bid, and to accept any bid that will best serve interests of County.

3. Unit Prices and Informational Bids will not be considered in establishing low bidder.

11. SECURITY FOR PERFORMANCE AND PAYMENTS

A. Simultaneous with delivery of signed Contract, Bidder shall be required to furnish Performance and Payment Bonds as specified in Article 29 of General Conditions of Contract. Surety Company shall be licensed to do business in Wisconsin. Performance and Payment Bonds must be dated same date or subsequent to date of Contract. Performance and Payment Bonds must emulate information in Sample Performance and Payment Bonds in Construction Documents.

B. Provide certified copy of power of attorney from Surety Company showing that agent who signs Bond has power of attorney to sign for Surety Company. Secretary or Assistant Secretary of company must sign this certification, not attorney-in-fact. Certification must bear same or later date as Bond. Power of Attorney must emulate model power of attorney information detailed in Sample Performance and Payment Bonds.

C. If Bidder is partnership or joint venture, State certified list, providing names of individuals constituting partnership or joint venture must be furnished. Contract itself may be signed by one partner of partnership, or one partner of each firm comprising joint venture, but Performance and Payment Bonds must be signed by all partners.

D. If Bidder is corporation, it is necessary that current certified copy of resolution or other official act of directors of corporation be submitted showing that person who signs Contract is authorized to sign contracts for corporation. It is also necessary that corporate seal be affixed to resolution, contract, and performance and payment bonds. If your corporation has no seal, it is required that above documents include statement or notation to effect that corporation has no seal.

12. TAXES

A. Wisconsin Statute 77.54 (9m) allows building materials that become part of local unit government facilities to be exempt from sales & use tax. Vendors & materials suppliers may not charge Bidders sales & use tax on these purchases. This does not include highways, streets or roads. Any other Sales, Consumer, Use & other similar taxes or fees required by law shall be included in Bid.

B. In accordance with Wisconsin Statute 71.80(16)(a),successful nonresident bidder, whether incorporated or not, and not otherwise regularly engaged in business in this state, shall file surety bond with State of Wisconsin Department of Revenue payable to Department of Revenue, to guarantee payment of income taxes, required unemployment compensation contributions, sales and use taxes and income taxes withheld from wages of employees, together with any penalties and interest thereon. Amount of bond shall be three percent (3%) of Contract or subcontract price on all contracts of $50,000 or more.

13. SUBMISSION OF BIDS

A. All Bids shall be submitted on standard Bid Form bound herein and only Bids that are made on this Bid Form will be considered. Entire Bid Form and other supporting documents, if any, shall be removed or copied from Construction Documents, filled out, and submitted in manner specified hereinafter. Submit completed Bid Bond with Bid as well.

B. No bids for any subdivision or any sub-classification of the Work, except as indicated, will be accepted. Any conditional Bid, amendment to Bid Form or appended item thereto, or inclusion of any correspondence, written or printed matter, or details of any nature other than that specifically called for, which would alter any essential provision of Construction Documents, or require consideration of unsolicited material or data in determining award of Contract, will disqualify Bid. Telecommunication alterations to Bid will not be accepted.

C. Bidders must submit single Bid for all the Work.

D. Bid amounts shall be inserted in words and in figures in spaces provided on Bid Form; in case of conflict, written word amounts will govern.

E. Addenda issued after Bid Letting shall become part of Construction Documents. Bidders shall acknowledge receipt of such addenda in appropriate space provided on Bid Form. Bid may be rejected if receipt of any particular addendum applicable to award of Contract has not been acknowledged on Bid Form.

F. Bids shall be signed, placed in envelope, sealed and delivered before due time to place designated in Invitation to Bid, and identified with project name, bid number, location, category of work being bid upon, Bid Due Date, name and address of bidder.

G. Bidder shall be responsible for sealed Bid being delivered to place designated for Bid Due Date on or before date and time specified. Bids received after time of closing will be rejected and returned to bidder unopened.

H. Bid will be opened on listed due date & time & results should be available within 24 hours at bids-pwht.countyofdane.com.

I. Bid will be considered invalid and will be rejected if bidder has not signed it.

J. Faxed or emailed Bids will not be accepted.

K. Bidder's organization shall submit completed with Bid, Fair Labor Practices Certification form, included in these Construction Documents.

14. SUBCONTRACTOR LISTING

A. Bidders are required to submit Section 00 43 36, Proposed Subcontractors Form listing all subcontractors for this project including committed prices for each subcontractor. Project Manager must receive Form no later than when successful Bidder submits their signed Contract. Failure to submit may delay progress payments.

15. ALTERNATE BIDS

A. Bidder shall carefully read requests for Alternate Bids, and thoroughly examine Drawings and Specifications to determine extent various changes and conditions will affect Bid.

B. Space is provided in Bid Form for requested Alternate Bids. Failure to submit bid for any requested Alternate Bids may result in rejection of entire Bid.

C. Bidder shall state amount to be added / subtracted to Base Bid for providing alternates, including all incidentals, omissions, additions, and adjustments as may be necessary or required by such changes. If there is no difference in price, Bidder shall state, "No Change".

D. Descriptions of requested Alternate Bids are as set forth in Construction Documents.

16. INFORMATIONAL BIDS

A. Bidder shall state amount that is included in Base Bid for all equipment, materials and labor required to complete the Work described. Informational bids are amounts requested for accounting purposes and for allocation of funds only. It is not intended to omit any of the Work described or related items from this project.

B. Description of requested Informational Bids, if any, is as set forth in Construction Documents.

17. UNIT PRICES

A. Provide unit prices where requested on Bid Form. Unit prices will include all costs for materials, labor, insurance, taxes, overhead and profit necessary to perform specified work. Estimated quantities are approximate only. Payment will be based upon actual quantities placed, provided or installed. Failure to provide requested unit prices may result in rejection of entire Bid.

B. Owner reserves right to accept or reject any unit prices as given in Bid.

C. Bidder shall refer to Bid Form and applicable specification section to determine basis of unit measure and detailed information related to each unit price item requested.

18. COMMENCEMENT AND COMPLETION

A. Successful Bidder shall commence work when schedule and weather permit, but no later than stated in Bid Form. Contractor shall pursue the Work regularly and continuously at reasonable rate to insure completion of the Work within time stated in Bid.

B. Should it be found impossible to complete the Work on or before time specified for completion, written request may be submitted for extension of time setting forth reasons believed to justify granting of such request. Refer to Article 20 of General Conditions of Contract, titled "Time for Completion".

19. WORK BY OWNER

A. Not Applicable.

20. SPECIAL HAZARDS COVERAGE

A. Not Applicable.

FORM A

DANE COUNTY
EMERGING SMALL BUSINESS REPORT - CERTIFICATION

In accordance with General Conditions of Contract, submit this Emerging Small Business Report within ten (10) days after Bid Due Date.

PROJECT NAME: _____

_____

BID NO.: _____ BID DUE DATE: _____

BIDDER INFORMATION

COMPANY NAME: _____

ADDRESS: _____

_____

TELEPHONE NO.: _____

CONTACT PERSON: _____

EMAIL ADDRESS: _____

FORM B

DANE COUNTY
(Copy this Form as necessary to provide complete information)
EMERGING SMALL BUSINESS REPORT - INVOLVEMENT

COMPANY NAME: _____

PROJECT NAME: _____

BID NO.: _____ BID DUE DATE: _____

ESB NAME: _____

CONTACT PERSON: _____

ADDRESS: _____

_____

PHONE NO & EMAIL.: _____

_____

Indicate percentage of financial commitment to this ESB: _____% Amount: $_____

ESB NAME: _____

CONTACT PERSON: _____

ADDRESS: _____

_____

PHONE NO & EMAIL.: _____

_____

Indicate percentage of financial commitment to this ESB: _____% Amount: $_____

FORM C

DANE COUNTY
(Copy this Form as necessary to provide complete information)
EMERGING SMALL BUSINESS REPORT - CONTACTS

COMPANY NAME: _____

PROJECT NAME: _____

BID NO.: _____ BID DUE DATE: _____

	ESB FIRM NAME CONTACTED	DATE	PERSON CONTACTED	DID ESB BID?	ACC-EPT BID?	REASON FOR REJECTION
1)						
2)						
3)						
4)						
5)						
6)						
7)						
8)						

FORM D

DANE COUNTY
EMERGING SMALL BUSINESS REPORT - CERTIFICATION STATEMENT

I, _____ , _____ of
Name Title

_____ certify to best of my knowledge and
Company

belief that this business meets Emerging Small Business definition as indicated in Article 9 and that information contained in this Emerging Small Business Report is true and correct.

_____ _____
Bidder's Signature Date

Name of Bidding Firm: _____

SECTION 00 41 13

BID FORM

BID NO. 322031

PROJECT: ELECTRICAL UPGRADES
ALLIANT ENERGY CENTER PAVILIONS 1 & 2

TO: DANE COUNTY PUBLIC WORKS ENGINEERING DIVISION
PROJECT MANAGER
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN 53713

NOTE: WISCONSIN STATUTE 77.54 (9M) ALLOWS FOR NO SALES & USE TAX ON THE PURCHASE OF MATERIALS FOR COUNTY PUBLIC WORKS PROJECTS.

BASE BID - LUMP SUM:
The Alliant Energy Center is looking to provide electrical upgrades at Pavilions 1 & 2 to improve electrical service for exhibitors during livestock events. The undersigned, having examined the site where the Work is to be executed and having become familiar with local conditions affecting the cost of the Work and having carefully examined the Drawings and Specifications, all other Construction Documents and Addenda thereto prepared by Dane County Public Works Engineering Division hereby agrees to provide all design expertise, labor, materials, equipment and services necessary for the complete and satisfactory execution of the entire Work, as specified in the Construction Documents, for the Base Bid stipulated sum of:

_____ and __ /100 Dollars
Written Price

$_____
Numeric Price

ALTERNATE BID 1 - LUMP SUM:
Electrical Contractor shall provide an add cost to the project for the installation of the noted additional cord drops as indicated on Drawings #E201 thru #E206, and #E401 thru #E403. This work shall include all associated labor, equipment, wiring, conduits, supports, hangers, and circuit breaker assemblies required for complete work.

_____ and __ /100 Dollars
Written Price

$_____
Numeric Price

ALTERNATE BID 2 - LUMP SUM:
Electrical contractor shall provide an add cost to the project for the addition of an 84-circuit, 400A, main lugs only, branch circuit panel board fed from one of the existing sets of branch panels along the exterior walls (like the new panels being added in the base bid). This panel

should include 20 @ 20A/3P and 20 @ 20A/1P branch breakers. This work shall include all associated labor, equipment, wiring, conduits, supports, hangers, sub-feed/feed-thru lugs, and circuit breaker assemblies required for complete work.

_____ and __ /100 Dollars
Written Price

$_____
Numeric Price

UNIT PRICING:
Electrical Contractor shall provide a unit cost for the installation of one cord drop assembly including all associated labor, equipment, wiring, conduit, supports, hangers, and circuit breaker assembly back a existing panel location required for complete work. Assume branch breaker exists in the panel.

_____and __ /100 Dollars
Written Price

$_____
Numeric Price

Receipt of the following addenda and inclusion of their provisions in this Bid is hereby acknowledged:

Addendum No(s). _____ through _____

Dated _____

Dane County Alliant Energy Center must have this project completed by March 31st, 2023, 2022. Assuming this Work starts by October 31, 2022, what dates can you commence and complete this job?

Commencement Date: _____ Completion Date: _____
(final, not substantial)

I hereby certify that all statements herein are made on behalf of:

_____
(Name of Corporation, Partnership or Person submitting Bid)

Select one of the following:
1. A corporation organized and existing under the laws of the State of _____, or

2. A partnership consisting of _____, or

3. A person conducting business as _____;

Of the City, Village, or Town of _____ of the State of _____.

I have examined and carefully prepared this Bid from the associated Construction Documents and have checked the same in detail before submitting this Bid; that I have full authority to make such statements and submit this Bid in (its) (their) (my) behalf; and that the said statements are true and correct. In signing this Bid, we also certify that we have not, either directly or indirectly, entered into any agreement or participated in any collusion or otherwise taken any action in restraint of free competition; that no attempt has been made to induce any other person or firm to submit or not to submit a Bid; that this Bid has been independently arrived at without collusion with any other bidder, competitor, or potential competitor; that this Bid has not been knowingly disclosed prior to the Bids Due Date to another bidder or competitor; that the above statement is accurate under penalty of perjury.

The undersigned is qualified as a Best Value Contractor or has proven their exemption. Qualification or exemption shall be complete before Bid Due Date / Time.

The undersigned further agrees to honor the Base Bid and the Alternate Bid(s) for sixty (60) calendar days from date of Award of Contract.

SIGNATURE: _____
(Bid is invalid without signature)

Print Name: _____ Date: _____

Title: _____

Address: _____

Telephone No.: _____ Fax No.: _____

Email Address: _____

Contact Person: _____

END OF SECTION

THIS PAGE IS FOR BIDDERS' REFERENCE

DO NOT SUBMIT WITH BID FORM.

BID CHECK LIST:
These items **must** be included with Bid:
☐ Bid Form ☐ Bid Bond
☐ Fair Labor Practices Certification

DANE COUNTY BEST VALUE CONTRACTING QUALIFICATION

General Contractors & all Subcontractors must be qualified as a Best Value Contractor with the Dane County Public Works Engineering Division. Qualification & listing is not permanent. Renewal is required every 36 months. Complete a *Best Value Contracting Application* online at:
publicworks.countyofdane.com/bvc

DANE COUNTY VENDOR REGISTRATION PROGRAM

All bidders are strongly encouraged to be a registered vendor with Dane County. Registering allows vendors an opportunity to receive notifications for RFBs & RFPs issued by the County and provides the County with up-to-date company contact information. Complete a new form or renewal online at:
danepurchasing.com/Account/Login?

SECTION 00 43 36

PROPOSED SUBCONTRACTORS FORM

General Contractor Name: _____ Bid No: _____

Instructions:
1. Complete all information in table below.
2. Include this Form with signed Construction Contract (Section 00 52 96).
3. General contractors & subcontractors must be qualified & registered as Best Value Contractor (Dane County Ordinances, Chapter 40.07). General contractors must be qualified & registered before bids are due. Subcontractors must be qualified & registered 10 working days before performing any work related to Construction Contract. No contractor can perform work without being qualified & registered.
4. Sample Best Value Contracting Application is included in this RFB package for informational purposes; fill out form online (publicworks.countyofdane.com/bvc).

SUBCONTRACTOR NAME	ADDRESS & PHONE NO.	DIVISION OF WORK	ESB (Y or N)	$$ AMOUNT OF CONTRACT

Check box if there is another form page attached to include additional subcontractors. ☐

The undersigned, for and on behalf of the General Contractor named herein, certifies the information on this Form is accurate.

_____ _____
Officer or Authorized Agent Signature Date

_____
Printed or Typed Name and Title

SUBCONTRACTOR NAME	ADDRESS & PHONE NO.	DIVISION OF WORK	$$ AMOUNT OF CONTRACT

END OF SECTION

COUNTY OF DANE

PUBLIC WORKS CONSTRUCTION CONTRACT

Contract No. _____ Bid No. 322031

Authority: 2021 RES -_____

THIS CONTRACT, made and entered into as of the date by which authorized representatives of both parties have affixed their signatures, by and between the County of Dane (hereafter referred to as "COUNTY") and _____ (hereafter, "CONTRACTOR"), and

W I T N E S S E T H :

WHEREAS, COUNTY, whose address is c/o Public Works Director, 1919 Alliant Energy Center Way, Madison, WI 53713, desires to have CONTRACTOR provide electrical upgrades at 1919 Alliant Energy Center Way ("the Project"); and

WHEREAS, CONTRACTOR, whose address is _____ _____ is able and willing to construct the Project, in accordance with the Construction Documents;

NOW, THEREFORE, in consideration of the above premises and the mutual covenants of the parties hereinafter set forth, the receipt and sufficiency of which is acknowledged by each party for itself, COUNTY and CONTRACTOR do agree as follows:

1. CONTRACTOR agrees to construct, for the price of $_____ the Project and at the CONTRACTOR'S own proper cost and expense to furnish all materials, supplies, machinery, equipment, tools, superintendence labor, insurance, and other accessories and services necessary to complete the Project in accordance with the conditions and prices stated in the Bid Form, General Conditions of Contract, the drawings which include all maps, plats, plans, and other drawings and printed or written explanatory matter thereof, and the specifications therefore as prepared by _____ (hereinafter referred to as "the Architect / Engineer"), and as enumerated in the Project Manual Table of Contents, all of which are made a part hereof and collectively evidence and constitute the Contract.

2. The term of this Contract shall commence when fully executed by the parties. The CONTRACTOR shall commence the Work by _____. The Work's substantial completion date shall be _____. Failure to meet commence work or substantial completion dates on the Work as set forth herein is grounds for termination of the Contract and other remedies as set forth in the General Conditions of Contract incorporated herein.

3. COUNTY agrees to pay the CONTRACTOR in current funds for the performance of the Contract subject to additions and deductions, as provided in the General Conditions of Contract and to make payments on account thereof as provided in Article entitled, "Payments to Contractor" of the General Conditions of Contract.

4. During the term of this Contract, CONTRACTOR agrees to take affirmative action to ensure equal employment opportunities. The CONTRACTOR agrees in accordance with Wisconsin Statute 111.321 and Chapter 19 of the Dane County Code of Ordinances not to discriminate on the basis of age, race, ethnicity, religion, color, gender, disability, marital status, sexual orientation, national origin, cultural differences, ancestry, physical appearance, arrest record or conviction record, military participation or membership in the national guard, state defense force or any other reserve component of the military forces of the United States, or political beliefs. Such equal opportunity shall include, but not be limited to, the following: employment, upgrading, demotion, transfer, recruitment, advertising, layoff, termination, training, rates of pay, and any other form of compensation. CONTRACTOR agrees to post in conspicuous places, available to all employees and applicants for employment, notices setting forth the provisions of this paragraph.

5. CONTRACTOR shall file an Affirmative Action Plan with the Dane County Contract Compliance Specialist in accord with Chapter 19 of the Dane County Code of Ordinances. CONTRACTOR must file such plan within fifteen (15) business days of the effective date of this Contract. During the term of this Contract CONTRACTOR shall also provide copies of all announcements of employment opportunities to COUNTY'S Office of Equity & Inclusion, and shall report annually the number of persons, by race, ethnicity, gender, and disability status, which apply for employment and, similarly classified, the number hired and number rejected.

6. During the term of this Contract, all solicitations for employment placed on CONTRACTOR'S behalf shall include a statement to the effect that CONTRACTOR is an "Equal Opportunity Employer".

7. CONTRACTOR agrees to furnish all information and reports required by COUNTY'S Contract Compliance Specialist as the same relate to affirmative action and nondiscrimination, which may include any books, records, or accounts deemed appropriate to determine compliance with Chapter 19, Dane County Code of Ordinances, and the provisions of this Contract.

8. The intent of this Contract is to be a Contract solely between the parties hereto and for their benefit only. Do not construe any part of this Contract to add to, supplement, amend, abridge or repeal existing rights, benefits or privileges of any third party or parties including, but not limited to, employees of the parties.

9. The entire agreement of the parties is contained herein and this Contract supersedes any and all oral agreements and negotiations between the parties relating to the subject matter hereof. The parties expressly agree that the express terms of this Contract shall not be amended in any fashion except in writing, executed by both parties.

10. CONTRACTOR must be qualified as a Best Value Contractor or have proven their exemption with Dane County Public Works Engineering Division before Bid Due Date / Time. All contractors and subcontractors must be qualified as a Best Value Contractor or have proven their exemption to perform any work under this Contract.

11. This Contract, and any amendment or addendum relating to it, may be executed and transmitted to any other party by legible facsimile reproduction or by scanned legible electronic PDF copy, and utilized in all respects as, an original, wet-inked manually executed document. Further, this Contract and any amendment or addendum thereto, may be stored and reproduced by each party electronically, photographically, by photocopy or other similar process, and each party may at its option destroy any original document so reproduced. All parties hereto stipulate that any such legible reproduction shall be admissible in evidence as the original itself in any judicial, arbitration or administrative proceeding whether or not the original is in existence and whether or

not each party made such reproduction in the regular course of business. This term does not apply to the service of notices under this Contract.

IN WITNESS WHEREOF, COUNTY and CONTRACTOR, by their respective authorized agents, have caused this Contract and its Schedules to be executed, effective as of the date by which all parties hereto have affixed their respective signatures, as indicated below.

* * * * * * *

FOR CONTRACTOR:

Signature | Date

Printed or Typed Name and Title

Signature | Date

Printed or Typed Name and Title

NOTE: If CONTRACTOR is a corporation, Secretary should attest. In accordance with IRS Regulations, unincorporated entities are required to provide either their Social Security or Employer Number in order to receive payment for services rendered.

* * * * * * *

This Contract is not valid or effectual for any purpose until approved by the appropriate authority designated below, and no work is authorized until the CONTRACTOR has been given notice to proceed by COUNTY'S Public Works Director.

FOR COUNTY:

Joseph T. Parisi, County Executive | Date

Scott McDonell, County Clerk | Date

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

BOND AMOUNT:

PROJECT:
(Name, location or address, and Project number, if any)

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of

(Witness)	*(Contractor as Principal)* *(Seal)*
	(Title)
(Witness)	*(Surety)* *(Seal)*
	(Title)

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

Init.
/

AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

AIA Document A312–2010 combines two separate bonds, a Performance Bond and a Payment Bond, into one form. This is not a single combined Performance and Payment Bond.

CONSTRUCTION CONTRACT
Date:

Amount:

Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	Name	Name and Title:	

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address		Address	

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

AIA® Document A312™ – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:

Amount:

Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	Name	Name and Title:	

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

AIA Document A312–2010 combines two separate bonds, a Performance Bond and a Payment Bond, into one form. This is not a single combined Performance and Payment Bond.

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address		Address	

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

SECTION 00 72 12

GENERAL CONDITIONS OF CONTRACT

TABLE OF CONTENTS

1. CONSTRUCTION DOCUMENTS

A. Construction Documents, listed in Table of Contents of this Specification volume shall form part of this Contract and provisions of Construction Documents shall be as binding upon parties as if they were fully set forth in Contract itself.

B. These shall also be considered as part of Construction Documents: Addenda, including additions and modifications incorporated in such addenda before execution of Contract; requests for information; construction bulletins; change orders; and written interpretations by Architect / Engineer or Public Works Project Manager that are made after execution of Contract.

C. Construction Documents are complementary, and what is required by one shall be as binding as if required by all. Intent of Construction Documents is to include all labor, materials and equipment necessary for proper execution of the Work.

2. DEFINITIONS

A. These terms as used in this Contract are respectively defined as follows:
   1. All uses of term "County" in Construction Documents shall mean Dane County.
   2. All uses of term "Department" in Construction Documents shall mean Department of Administration - Public Works Engineering Division, which is a unit of Dane County government. Department is County agency overseeing Contract with Contractor.
   3. Public Works Project Manager is appointed by and responsible to Department. Public Works Project Manager has authority to act on behalf of Department and will sign change orders, payment requests and other administrative matters related to projects.
   4. Public Works Project Manager is responsible for supervision, administration and management of field operations involved in construction phase of this Work.
   5. Term "Work" includes all labor, equipment and materials necessary to produce project required by Construction Documents.
   6. Term "Substantial Completion" is date when project or specified area of project is certified by Architect / Engineer that construction is sufficiently completed, in accordance with Construction Documents, and as modified by any subsequent changes agreed to by parties, so that County may occupy project or specified area of project for use for which it was intended subject to permit approval for occupancy.
   7. Contractor is person, firm, or corporation with whom County makes Contract. Though multiple contracts may be involved, Construction Documents treat them throughout as if each were of singular number.

3. ADDITIONAL INSTRUCTIONS AND DRAWINGS

A. Contractor may be furnished additional instructions and detail drawings as necessary to carry out the Work included in Contract. Additional drawings and instructions thus supplied to Contractor will coordinate with Construction Documents and will be so prepared that they can be reasonably interpreted as part thereof. Contractor shall carry out the Work in accordance with additional detail drawings and instructions.

4. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. Unless otherwise specified, Contractor shall submit electronic copies of all Shop Drawings for each submission, until receiving final approval.

B. Contractor shall submit, on an on-going basis and as directed, Product Data such as brochures that shall contain catalog cuts and specifications of all furnished mechanical and electrical equipment. After Architect / Engineer's final approval, keep one (1) copy at job site by Contractor for reference purposes.

C. Samples shall consist of physical examples furnished by Contractor in sufficient size and quantity to illustrate materials, equipment or workmanship, and to establish standards to compare the Work.
   1. Submit Samples to Architect / Engineer & Public Works Project Manager. Submit Samples in sufficient quantity (minimum of one (1)) to permit Architect / Engineer to make all necessary tests and of adequate size showing quality, type, color range, finish, and texture. Label each Sample stating material, type, color, thickness, size, project name, and Contractor's name.
   2. Submit transmittal letter requesting approval, and prepay transportation charges to Architect / Engineer's office on samples forwarded.
   3. Materials installed shall match approved Samples.

D. Contractor shall review Shop Drawings and place their dated stamp thereon to evidence their review and approval and shall submit with reasonable promptness and in orderly sequence to cause no delay in the Work or in work of any other contractor. At time of submission, Contractor shall inform Architect / Engineer in writing of any deviation in Shop Drawings or Samples from requirements of Construction Documents. Architect / Engineer will not consider partial lists.

E. Architect / Engineer will review and approve or reject Shop Drawings with reasonable promptness to cause no delay. Architect / Engineer's approval shall not relieve Contractor from responsibility for errors or omissions in Shop Drawings.

F. Contractor shall not commence any work requiring Shop Drawing, Product Data or Sample submission until Architect / Engineer has approved submission. All such work shall be in accordance with approved Shop Drawings, Product Data and Samples.

G. Contractor shall keep on site of the Work, approved or conformed copy of Shop Drawings and shall at all times give Department access thereto.

H. By stamping and submitting Shop Drawings, Product Data and Samples, Contractor thereby represents that he or she has or will determine and verify all field measurements, field construction criteria, materials, catalog numbers, and similar data and that he or she has checked and coordinated each Shop Drawing, Product Data and Sample with requirements of the Work and of Construction Documents. Architect / Engineer shall return without examination, Shop Drawings, Product Data and Samples not so noted.

I. All Shop Drawings from any one Contractor should be numbered consecutively and on cover sheet shall bear name and location of project, name of Contractor, date of submittal and date of each correction or revision and associated Specification section and page number.

5. CUTTING AND PATCHING

A. Contractor shall be responsible for all cutting, fitting or patching required to make its parts fit together properly in the Work.

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

6. CLEANING UP

A. Contractor shall keep premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under Contract. Contractor shall remove from and about the Work waste materials, rubbish, Contractor's tools, construction equipment, machinery, and surplus materials at completion of the Work. Contractor shall maintain streets and sidewalks around the Work site in clean condition. Contractor shall remove all spillage and prevent tracking of spillage arising from performance of the Work, into, out of, and within the Work site. Contractor shall establish regular maintenance program of sweeping, vacuuming and / or hosing to minimize accumulation of dirt and dust upon such areas.

B. If Contractor fails to clean up as directed in Construction Documents, County may do so and shall charge Contractor cost thereof.

C. Contractor shall be responsible for broken windows and glass, and at completion of the Work shall replace such damaged or broken windows and glass. After replacing damaged or broken windows and glass, Contractor shall remove all labels, wash and polish both sides of all windows and glass.

D. In addition to general cleaning (sweeping, vacuuming and / or hosing, as is appropriate to work surface), Contractor shall perform following final cleaning for all trades at completion of the Work:
   1. Remove temporary protections;
   2. Remove marks, stains, fingerprints and other soil or dirt from painted, decorated and finished woodwork and wall surfaces;
   3. Remove spots, plaster, soil and paint from ceramic tile, marble and other finished materials, and wash or wipe clean;
   4. Clean fixtures, cabinet work and equipment, removing stains, paint, dirt and dust, and leave same in undamaged, new condition;
   5. Clean aluminum in accordance with recommendations of manufacturer; and
   6. Clean resilient floors thoroughly with well-rinsed mop containing only enough moisture to clean off any surface dirt or dust and buff dry by machine to bring surfaces to sheen.

7. USE OF SITE

A. Contractor shall provide County and Architect / Engineer access to the Work under all circumstances.

B. Contractor shall confine operations at site to areas permitted by County, law, ordinance, permits and Construction Documents and shall not unreasonably encumber site with materials

or equipment. Contractor shall assure free, convenient, unencumbered, direct and safe access to all properties adjacent to the Work for County, its employees, invitees and guests.

8. MATERIALS AND WORKMANSHIP

A. Contractor shall perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, necessary to complete the Work required by this Contract, within time specified, in accordance with provisions of Construction Documents.

B. All equipment and materials incorporated in the Work covered by this Contract are to be new; use recycled and / or recovered materials to extent that such use is technically and economically feasible. Recovered materials are products recovered from solid waste in form identical to original form for use that is same as, or similar to original use. Recycled materials are products manufactured from solid waste.

C. If requested, Contractor shall furnish satisfactory evidence as to kind and quality of construction materials proposed or used. Contractor shall furnish to Architect / Engineer, for approval, manufacturer name and model, performance capacities and other pertinent information of machinery, mechanical, electrical or other types of equipment, which Contractor plans to install.

D. If not otherwise provided, materials and labor called for in this Contract shall be provided and performed in accordance with established practice and standards recognized by Architects, Engineers, Department, and construction industry.

E. Reference to "Standard" specifications of any association or manufacturer, or codes of County authorities, intends most recent printed edition or catalog in effect on date that corresponds with date of Construction Documents.

F. Whenever reference is made in Specifications that work shall be "performed", "applied", in accordance with "manufacturer's directions or instructions", Contractor to whom those instructions are directed shall furnish three (3) printed copies of such instructions to Architect / Engineer before execution of the Work.

9. CONTRACTOR'S TITLE TO MATERIALS

A. Contractor or any subcontractor shall not purchase materials or supplies for the Work subject to any chattel mortgage or under conditional sale contract or other agreement by which seller retains interest. Contractor warrants that all materials and supplies used in the Work are free from all liens, claims or encumbrances and Contractor has good title to them.

10. "OR EQUAL" CLAUSE

A. Whenever equipment or materials are identified on Drawings or in Specifications by reference to manufacturer's or vendor's name, trade name, catalog number, and other identifying information, it is intended to establish standards; and any equipment or material of other manufacturers and vendors which will perform adequately duties imposed by general design will be considered equally accepted provided equipment or material so proposed is, in opinion of Architect / Engineer, of equal substance and function. Architect / Engineer and Department shall provide written approval before Contractor may purchase or install it.

B. Equipment or materials of manufacturers, other than those named, may be used only upon following conditions:
   1. That, in opinion of Architect / Engineer and Department, proposed material or equipment item is fully equal or superior (in design, materials, construction, workmanship, performance, finish, etc.) to named item. No compromise in quality level, however small, is acceptable.
   2. That, in substituting materials or equipment, Contractor assumes responsibility for any changes in system or for modifications required in adjacent or related work to accommodate such substitution despite Architect / Engineer's and Department's approval, and all costs growing out of approval of "or equal" items shall be responsibility of Contractor. No extra costs resulting from such approval shall become responsibility of Department, Architect / Engineer or any other separate Contractor.
   3. It shall be understood that use of materials or equipment other than those specified, or approved equal by Architect / Engineer and Department, shall constitute violation of Contract, and that Architect / Engineer and Department shall have right to require removal of such materials or equipment and their replacement with specified materials or equipment at Contractor's expense.
   4. Product and manufacturer named first in Specifications or on information shown on Drawings is basis of selection of manufactured items and equipment, particularly mechanical equipment. In using other than first named products or manufacturers, including those specified as additionally approved or acceptable, Contractor assumes responsibility for any changes in system and for modifications in any work required to accommodate them. Architect / Engineer's approval of such additionally acceptable products or manufacturers, either in Specifications or in Addendum, does not relieve Contractor from obligation to coordinate such optional products with other Contractors, whose work may be affected by them, and to pay all additional costs resulting from their inclusion into the Work. Contractor's liability shall include payment of Architect / Engineer's fees for any additional services made necessary by or directly connected to such product changes. No extra costs resulting from such changes shall become responsibility of Department, Architect / Engineer or any other separate Contractor.

C. No request for approval of "or equal" materials will be entertained except from Contractor. Identify any request for substitution as substitution on Contractor's letter of transmittal and give reasons for substitution. Department may in its sole discretion allow substitutions of materials.

11. PATENTS AND ROYALTIES

A. If Contractor uses any design, device or material covered by letters, patent or copyright, it is mutually agreed and understood, that, without exception, contract prices shall include all royalties or costs arising from use of such design, device or materials, in any way involved in the Work.

B. Contractor shall indemnify and save harmless County from any and all claims for infringement by reason of use of such patent or copyright in connection with the Work agreed to be performed under this Contract, and shall indemnify County for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during prosecution of the Work or after completion of the Work.

12. SURVEYS, PERMITS, REGULATIONS AND TAXES

A. Department will furnish to Contractor all site, topography and property surveys necessary for execution of the Work.

B. Contractor shall procure all permits, licenses and approvals necessary for execution of this Contract.

C. Contractor shall give all notices and comply with all State of Wisconsin, Federal and local laws, codes, rules and regulations relating to performance of the Work, protection of adjacent property, and maintenance of passageways, guard fences or other protective facilities.

D. Contractor does not need to pay State and local sales & use taxes on building materials that become part of local unit government facilities. See Wisconsin Statute 77.54 (9m). This does not include materials for highways, streets or roads. Contractor shall pay any other Sales, Consumer, Use & other similar taxes or fees required by law.

E. Contractor shall promptly notify Architect / Engineer of any variances of Drawings or Specifications with that of any State of Wisconsin, federal or local law, code, rule or regulation. Upon such notification, Architect / Engineer will require correction of variance to comply with applicable law, code, rule or regulation at no additional cost to Contractor.

F. Work under this Contract shall comply with all applicable State of Wisconsin, Federal and local laws, codes and regulations.

G. Contractor shall pay charges for water, sewer and other utility connections made by municipalities where required by Specifications.

13. CONTRACTOR'S OBLIGATIONS AND SUPERINTENDENCE

A. Contractor shall provide and pay for all materials, labor, tools, equipment, transportation and superintendence necessary to execute, complete and deliver the Work within specified time. Contractor agrees to secure at their own expense all personnel necessary to carry out the Work. Such personnel shall not be deemed County employees nor shall they have or be deemed to have any direct contractual relationship with County.

B. Performance of any work necessary after regular working hours, on Sundays or Legal Holidays shall be without additional expense to County. Performance of any work at site at other than normal working hours must be coordinated with Public Works Project Manager.

C. Contractor shall furnish, erect, maintain and remove such temporary works as may be required.

D. Contractor shall observe, comply with, and be subject to all terms, conditions, requirements and limitations of Construction Documents.

E. At the Work site, Contractor shall give personal superintendence to the Work or shall employ construction superintendent or foreman, experienced in character of work covered by Contract, who shall have full authority to act for Contractor. Understand that such superintendent or foreman shall be acceptable to Architect / Engineer and Department.

F. Remove from project or take other corrective action upon notice from Architect / Engineer or Department for Contractor's employees whose work is considered by Architect / Engineer or Department to be unsatisfactory, careless, incompetent, unskilled or otherwise objectionable.

G. Contractor and subcontractors shall be required to conform to Labor Laws of State of Wisconsin and various acts amendatory and supplementary thereto and to other laws, ordinances and legal requirements applicable to the Work.

H. Presence and observation of the Work by Architect / Engineer or Public Works Project Manager shall not relieve Contractor of any obligations.

14. WEATHER CONDITIONS

A. In event of temporary suspension of work, or during inclement weather, or whenever Architect / Engineer shall direct, Contractor shall, and shall cause subcontractors to protect carefully all work and materials against damage or injury from weather. If, in opinion of Architect / Engineer or Department, any work or materials that have been damaged or injured due to failure on part of Contractor or any subcontractors so to protect the Work, such materials shall be removed and replaced at expense of Contractor.

15. PROTECTION OF WORK AND PROPERTY

A. Contractor shall at all times safely guard County's property from injury or loss in connection with this Contract. Contractor shall at all times safely guard and protect the Work, and adjacent property, from damage. Contractor shall replace or make good any such damage, loss or injury unless such is caused directly by errors contained in Contract, or by County, or County's duly authorized representative.

B. Contractor may act diligently, without previous instructions from Architect / Engineer and / or Department, in emergency that threatens loss or injury of property, or safety of life. Contractor shall notify Architect / Engineer and / or Department immediately thereafter. Promptly submit any claim for compensation by Contractor due to such extra work to Architect / Engineer and / or Department for approval as provided for in Article 18 herein.

16. INSPECTION AND TESTING OF MATERIALS

A. Authorized representatives and agents of County government shall have access at all times to the Work wherever it is in preparation or progress and Contractor shall provide facilities for such access and for inspection.

B. Should it be considered necessary or advisable at any time before final acceptance of the Work to make examination of work already completed, by removing or tearing out same, Contractor shall upon request, promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any aspect, due to fault of Contractor or subcontractors thereof, Contractor shall assume all expenses of such examination and of satisfactory reconstruction. Contractor will be reimbursed for such examination and replacement in accordance with Article 18 - A.3., of these General Conditions of Contract if such work is found to meet requirements of Contract.

C. If Specifications, Architect / Engineer's, or Public Works Project Manager's instructions require any work to be specially tested or approved, Contractor shall give Architect / Engineer and Public Works Project Manager timely notice of its readiness for testing or inspection. Test all materials and equipment requiring testing in accordance with accepted or specified standards, as applicable. Architect / Engineer shall recommend laboratory or inspection agency and Department will select and pay for all initial laboratory inspection

services. Should retesting be required, due to failure of initial testing, cost of such retesting shall be borne by Contractor.

D. Cost of any testing performed by manufacturers or Contractor for substantiating acceptability of proposed substitution of materials and equipment, or necessary conformance testing in conjunction with manufacturing processes or factory assemblage, shall be borne by Contractor or manufacturer responsible.

17. REPORTS, RECORDS AND DATA

A. Contractor shall submit to Architect / Engineer and Public Works Project Manager such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, invoices, records and other data as either may request concerning work performed or to be performed under this Contract.

18. CHANGES IN THE WORK

A. Make no changes, except in cases of emergency, in the Work covered by approved Construction Documents without having prior written approval of Department. Charges or credits for the Work covered by approved change shall be determined by one of these methods:
   1. Unit bid prices previously approved.
   2. Agreed lump sum based on actual cost of:
      a) Labor, including foremen, and all fringe benefits that are associated with their wages.
      b) Materials entering permanently into the Work.
      c) Ownership or rental cost of construction tools and equipment during time of use on extra work.
      d) Power and consumable supplies for operation of power equipment.
      e) Workmen's Compensation Insurance, Contractor's Public Liability and Property Damage Insurance, and Comprehensive Automobile Liability Insurance.
      f) Social Security and old age and unemployment contributions.
      g) Add to cost under (2), fixed fee to be agreed upon, but not to exceed fifteen percent (15%) of actual cost of work performed with their own labor force. Fee shall be compensation to cover cost of supervision, overhead, bond, profit and any other general expense.
      h) On that portion of the Work under (2) done under subcontract, Contractor may include not over seven and one-half percent (7½%) for supervision, overhead, bond, profit and any other general expense.
      i) Department may require correct amount of costs with supporting vouchers; Contractor shall keep and present in such form as directed.
   3. Cost-plus work, with not-to-exceed dollar limit, based on actual cost of:
      a) Labor, including foremen, and all fringe benefits that are associated with their wages.
      b) Materials entering permanently into the Work.
      c) Ownership or rental cost of construction tools and equipment during time of use on extra work. Rental cost cannot exceed fifty percent (50%) replacement value of rented equipment.
      d) Power and consumable supplies for operation of power equipment.
      e) Workmen's Compensation Insurance, Contractor's Public Liability and Property Damage Insurance, and Comprehensive Automobile Liability Insurance.
      f) Social Security and old age and unemployment contributions.
      g) To cost under (3), there shall be added fixed fee to be agreed upon but not to exceed fifteen percent (15%) of actual cost of work performed with their own labor force.

Fee shall be compensation to cover cost of supervision, overhead, bond, profit, and any other general expense.

h) On that portion of the Work under (3) done under subcontract, Contractor may include not over seven and one-half percent (7½%) for supervision, overhead, bond, profit, and any other general expense.

i) Contractor shall keep and present, in such form as directed, correct amount of cost together with such supporting vouchers as may be required by Department.

B. If Contractor claims that by any instructions given by Architect / Engineer, Department, by drawings or otherwise, regarding performance of the Work or furnishing of material under Contract, involves extra cost, Contractor shall give Department written notice of cost thereof within two (2) weeks after receipt of such instructions and in any event before proceeding to execute work, unless delay in executing work would endanger life or property.

C. No claim for extra work or cost shall be allowed unless it was done in pursuance of written Change Order from Architect / Engineer and approved by Department, as previously mentioned, and claim presented with payment request submitted after changed or extra work is completed.

D. Negotiation of cost for change in the Work shall not be cause for Contractor to delay prosecution of the Work when authorized in writing by Public Works Project Manager to proceed.

19. EXTRAS

A. Without invalidating Contract, Department may order extra work or make changes by altering, adding to or deducting from the Work, contract sum being adjusted in accordance with Article 18 herein.

20. TIME FOR COMPLETION

A. Contractor agrees that the Work shall be prosecuted regularly and diligently and complete the Work as stated in Construction Documents.

21. CORRECTION OF WORK

A. All work, all materials whether incorporated in the Work or not, and all processes of manufacture shall at all times and places be subject to inspection of Architect / Engineer and Public Works Project Manager who shall be judge of quality and suitability of the Work, materials, and processes of manufacture for purposes for which they are used. If they fail to meet Architect / Engineer's and Public Works Project Manager's approval, they shall be reconstructed, made good, replaced or corrected, by Contractor at Contractor's expense. Immediately remove all rejected material from site.

B. If Contractor defaults or neglects to carry out the Work in accordance with Construction Documents or fails to perform any provision of Contract, Department may, after ten (10) business days' written notice to Contractor and without prejudice to any other remedy County may have, make good such deficiencies. In such case, appropriate Change Order shall be issued deducting from Contractor's payments then or thereafter, cost of correcting such deficiencies, including cost of Architect / Engineer's additional services made necessary by such default, neglect or failure.

22. SUBSURFACE CONDITIONS FOUND DIFFERENT

A. If Contractor encounters subsurface or latent conditions at site materially differing from those shown on Drawings or indicated in Specifications, Contractor shall immediately give notice to Architect / Engineer and Public Works Project Manager of such conditions before they are disturbed. Architect / Engineer will thereupon promptly investigate conditions, and if Architect / Engineer finds that they materially differ from those shown on Drawings or indicated in Specifications, Architect / Engineer will at once make such changes as necessary, any increase or decrease of cost resulting from such changes to be adjusted in manner provided in above Article 18 entitled "Changes in the Work".

23. RIGHT OF DEPARTMENT TO TERMINATE CONTRACT

A. In event that any provisions of this Contract are violated by Contractor or by any subcontractors, County may serve written notice upon Contractor and Surety of its intention to terminate Contract, such notice to contain reasons for such intention to terminate Contract, and unless within ten (10) business days after serving of such notice upon Contractor, such violation or delay shall cease and satisfactory arrangement or correction be made, Contract shall, upon expiration of said ten (10) business days, cease and terminate.

B. In event of any such termination, County shall immediately serve notice thereof upon Surety and Contractor, and Surety shall have right to take over and perform Contract subject to County's approval; provided, however, that if Surety does not commence performance thereof within ten (10) business days from date of mailing to such Surety of notice of termination, County may take over the Work and prosecute same to completion by contract, or by force account, at expense of Contractor; Contractor and Surety shall be liable to County for any excess cost occasioned County thereby, and in such event County may take possession of and utilize in completing the Work, such materials and equipment as may be on the Work site and therefore necessary.

24. CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES

A. Contractor shall be responsible for Construction Schedule and coordination. Immediately after execution and delivery of Contract and before making first payment, Contractor shall notify all subcontractors to furnish all required information to develop Construction Schedule. Contractor and all subcontractors associated with the Work shall furnish following information from each Division of Specifications:
   1. List of construction activities;
   2. Start, finish and time required for completion of each activity;
   3. Sequential relationships between activities;
   4. Identify all long lead-time items, key events, meetings or activities such as required submittals, fabrication and delivery, procurement of materials, installation and testing;
   5. Weekly definition of extent of work and areas of activity for each trade or Subcontract; and
   6. Other information as determined by Public Works Project Manager.

B. In addition to above requested items, Contractor shall request delivery dates for all County-furnished equipment, materials or labor. This shall include any work handled by Department under separate contracts such as asbestos abatement, air and water balancing, etc. Indicate on Construction Schedule these associated delivery and installation dates.

C. Progress Reporting:

1. Contractor shall update and publish Construction Schedule on monthly basis. Revisions to Schedule shall be by Contractor and made in same detail as original Schedule and accompanied by explanation of reasons for revision; and shall be subject to approval by Department.
2. Failure of Contractor to keep Schedule in updated format shall result in County hiring firm specializing in construction schedule development and deducting those costs associated with updating process from payments due Contractor.
3. Contractor shall submit show actual percentage of each activity completed, estimated future progress, and anticipated completion time.

D. Responsibility for timely completion requires:
   1. Contractor and subcontractors understand that performance of each is interdependent upon performance of others.
   2. Whenever it becomes apparent from current schedule, that phasing or progress completion dates will not be met, Contractor must take some or all following actions at no additional cost to County:
      a) Increase construction labor in such quantities and crafts as will eliminate backlog of work.
      b) Increase number of working hours per shift, shifts per working day, working days per week, amount of construction equipment, or any combination of foregoing to eliminate backlog of work.
      c) Reschedule work (yet remain in conformance with Drawings and Specifications).
   3. Prior to proceeding with any of above actions, Contractor shall notify Public Works Project Manager.

E. Maintain current Construction Schedule at all times. Revise Construction Schedule in same detail as original and accompany with explanation of reasons for revision. Schedule shall be subject to approval by Architect / Engineer and Public Works Project Manager.

25. PAYMENTS TO CONTRACTOR

A. Contractor shall provide:
   1. Detailed estimate giving complete breakdown of contract price by Specification Division; and
   2. Periodic itemized estimates of work done for purpose of making partial payments thereon.

B. Submit these estimates for approval first to Architect / Engineer, then to Public Works Project Manager. Costs employed in making up any of these schedules are for determining basis of partial payments and not considered as fixing basis for additions to or deductions from Contract price.

C. County will make partial payments to Contractor for value, proportionate to amount of Contract, of all labor and material incorporated in the Work during preceding calendar month upon receipt of Application and Certificate for Payment form from Architect / Engineer and approval of Department.

D. Contractor shall submit for approval first to Architect / Engineer, and then to Public Works Project Manager all Application and Certificate for Payment forms. If requested, support Application and Certificate for Payment with such additional evidence as may be required, showing Contractor's right to payment claimed.

E. Application and Certificate for Payment for preparatory work and materials delivered and suitably stored at site to be incorporated into the Work at some future period, will be given due consideration. Requesting payment for materials stored off site, may be rejected, however, if deemed essential for reasons of job progress, protection, or other sufficient cause, requests will be considered, conditional upon submission by Contractor of bills of sale, photographs and such other procedures as will adequately protect County's interest such as storage in bonded warehouse with adequate coverage. If there is any error in payment, Contractor is obligated to notify Department immediately, but no longer than ten (10) business days from receipt of payment.

F. Payments by County will be due within forty-five (45) business days after receipt by Department of Application and Certificate for Payment.

G. County will retain five percent (5%) of each Application and Certificate for Payment until final completion and acceptance of all the Work covered by Contract. However, any time after fifty percent (50%) of the Work has been furnished and installed at site, County will make remaining payments in full if Architect / Engineer and Public Works Project Manager find that progress of the Work corresponds with Construction Schedule. If Architect / Engineer and Public Works Project Manager find that progress of the Work does not correspond with Construction Schedule, County may retain up to ten percent (10%) of each Application and Certificate for Payment for the Work completed.

H. All material and work covered by partial payments made shall become sole property of County, but this provision shall not be construed as relieving Contractor from sole responsibility for care and protection of materials and work upon which payments have been made, or restoration of any damaged work, or as waiver of right of County to require fulfillment of all of terms of Contract.

I. County will make final payment within sixty (60) calendar days after final completion of the Work, and will constitute acceptance thereof.

J. County may make payment in full, including retained percentages and less authorized deductions, upon completion and acceptance of each Division where price is stated separately in Contract.

K. Every contractor engaged in performance of any contract for Department of Administration - Public Works Engineering Division shall submit to this Department, as requested and with final application for payment for work under said contract, affidavit(s) as required to prove that all debts and claims against this Work are paid in full or otherwise satisfied, and give final evidence of release of all liens against the Work and County.

26. WITHHOLDING OF PAYMENTS

A. County, after having served written notice on said Contractor, may either pay directly any unpaid bills of which Department has written notice, or withhold from Contractor's unpaid compensation sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged; whereupon, payment to Contractor shall be resumed in accordance with terms of this Contract, but in no event shall these provisions be construed to impose any obligations upon County to either Contractor or Contractor's Surety.

B. In paying any unpaid bills of Contractor, County shall be deemed agent of Contractor, and any payment so made by County, shall be considered as payment made under Contract by

County to Contractor and County shall not be liable to Contractor for any such payment made in good faith.

C. Contractor shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives from all claims growing out of lawful demands of subcontractors, laborers, workers, mechanics, material men, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in performance of this Contract.

D. At Department's request, Contractor shall furnish satisfactory evidence that all obligations of nature designated above have been paid, discharged or waived.

27. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

A. Making of final payment shall constitute waiver of all claims by County except those arising from:
   1. Unsettled lien;
   2. Faulty or defective work appearing after substantial completion;
   3. Failure of the Work to comply with requirements of Construction Documents; or
   4. Terms of any special guarantees required by Construction Documents.

B. Acceptance of final payment shall constitute waiver of all claims by Contractor.

28. PAYMENTS BY CONTRACTOR

A. Contractor shall pay following not later than fifth (5^{th}) business day following each payment received from County:
   1. All transportation and utility services rendered;
   2. All materials, tools, and other expendable equipment that have been delivered at site of the Work to extent of ninety percent (90%) of cost thereof, and balance of cost thereof when said balance is paid to Contractor; and
   3. Each subcontractor, respective amount allowed Contractor because of work performed by subcontractor to extent of subcontractor's interest therein.

29. CONTRACT SECURITY

A. Contractor shall furnish Performance and Payment Bonds in amount at least equal to one hundred percent (100%) of Contract price as security for faithful performance of this Contract and payment of all persons performing labor on project under this Contract and furnishing materials in connection with this Contract.

B. Sample Performance and Payment Bonds that Contractor will be required to execute is bound into these Construction Documents. Before construction Contract is consummated, completed Performance and Payment Bonds must be approved by Department.

30. ASSIGNMENTS

A. Contractor shall not assign whole or any part of this Contract or any moneys due or to become due hereunder without written consent of Department. In case Contractor assigns all or any part of any moneys due or to become due under this Contract, instrument of assignment shall contain clause substantially to effect that it is agreed that right of assignee in and to any moneys due or to become due to Contractor shall be subject to prior claims of all

persons, firms and corporations for services rendered or materials supplied for performance of the Work called for in this Contract.

31. MUTUAL RESPONSIBILITY OF CONTRACTORS

A. If, through acts of neglect on part of Contractor or any subcontractor shall suffer loss or damage on the Work, Contractor agrees to settle with such subcontractor by agreement or arbitration if such other subcontractor will so settle. If such subcontractor shall assert any claim against County on account of any damage alleged to have been sustained, Department shall notify Contractor, who shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives against any such claim.

32. SEPARATE CONTRACTS

A. Department may award other contracts for the Work and all Contractors shall fully cooperate with each other and carefully adjust their work to that provided under other contracts as may be directed by Department. No Contractor shall commit or permit any act that will interfere with performance of the Work by any other Contractor.

B. Contractor shall coordinate the Work with those of other Contractors. Cooperation will be required in arrangement for storage of materials and in detailed execution of the Work. Contractor, including subcontractors, shall keep informed of progress and detail work of others and shall notify Architect / Engineer or Department immediately of lack of progress or defective workmanship on part of others. Failure of Contractor to keep informed of the Work progressing on site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by Contractor of status of the Work as being satisfactory for proper coordination with Contractor's own work.

33. SUBCONTRACTS

A. Contractor may use services of specialty subcontractors on those parts of the Work that, under normal contracting practices, are performed by specialty subcontractors.

B. Contractor shall not award any work to any subcontractor without prior approval of Department. Qualifications of subcontractors shall be same as qualifications of Contractor. Request for subcontractor approval shall be submitted to Department fifteen (15) business days before start of subcontractor's work. If subcontractors are changed or added, Contractor shall notify Department in writing.

C. Contractor shall be as fully responsible to County for acts and omissions of subcontractors, and of persons either directly or indirectly employed by them, as Contractor is for acts and omissions of persons directly employed by Contractor.

D. Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to Contractor by terms of General Conditions of Contract and other Construction Documents insofar as applicable to work of subcontractors and to give Contractor same power as regards terminating any subcontract that Department may exercise over Contractor under any provision of Construction Documents.

E. Nothing contained in this Contract shall create any contractual relation between any subcontractor and County.

F. Contractor shall insert in all subcontracts, Articles 26, 33, 43 and 45, respectively entitled: "Withholding of Payments", "Subcontracts", "Affirmative Action Provision and Minority / Women / Disadvantaged Business Enterprises", and "Minimum Wages", and shall further require all subcontractors to incorporate physically these same Articles in all subcontracts.

34. PUBLIC WORKS PROJECT MANAGER'S AUTHORITY

A. Public Works Project Manager shall:
   1. Administer and ensure compliance with Construction Documents;
   2. Provide responsible on-site observations of construction and have authority to request work and to stop work whenever necessary to insure proper enforcement of Construction Documents;
   3. Convene and chair project meetings and foreman's coordination meetings when necessary to coordinate resolution of conflicts between Contractors, Architects, Engineers, Consultants, and Department; and
   4. Check and inspect material, equipment and installation procedures of all trades for proper workmanship and for compliance with Drawings, Specifications and Shop Drawings, permit no material on project site that is not satisfactory and reject work not in compliance with Construction Documents.

35. CONSULTANT'S AUTHORITY

A. Architect / Engineer is retained by, and is responsible to Department acting for County.

B. Architect / Engineer shall determine amount, quality, acceptability, and fitness of several kinds of work and materials that are provided under this Contract and shall decide all questions that may arise in relation to said work and construction thereof.

C. Architect / Engineer shall decide meaning and intent of any portion of Specifications and of any Drawings where they may be found obscure or be in dispute.

D. Architect / Engineer shall provide responsible observation of construction. Architect / Engineer has authority to stop the Work whenever such stoppage may be necessary to insure proper execution of Construction Documents.

E. Architect / Engineer shall be interpreter of conditions of Construction Documents and judge of its performance.

F. Within reasonable time, Architect / Engineer shall make decisions on all matters relating to progress of the Work or interpretation of Construction Documents.

G. Architect / Engineer's decisions are subject to review by Public Works Project Manager.

36. STATED ALLOWANCES

A. Stated allowances enumerated in Instructions to Bidders shall cover net cost of materials or equipment, and all applicable taxes. Contractor's cost of delivery and unloading at site, handling costs on site, labor, installation costs, overhead, profit and any other incidental costs shall be included in Contractor's bid, but not as part of cash allowance.

B. Department will solicit at least two (2) bids on materials or equipment for which allowance is stated and select on basis of lowest qualified responsible bid. Contractor will then be instructed to purchase "Allowed Materials". If actual price for purchasing "Allowed Materials", including taxes, is more or less than "Cash Allowance", Contract price shall be adjusted accordingly. Adjustment in Contract price shall not contain any cost items excluded from cash allowance.

37. ESTIMATES OF QUANTITIES

A. Whenever estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of Construction Documents, they are given for use in comparing bids and right is especially reserved to increase or diminish them as they may be deemed reasonably necessary or desirable by Department to complete the Work included in this Contract, and cost for such increase or diminution shall be adjusted in manner provided for in General Conditions of Contract Article 18 entitled "Changes in the Work".

38. LANDS AND RIGHTS-OF-WAY

A. Prior to start of construction, County shall furnish all land and rights-of-way necessary for carrying out and completion of the Work to be performed under this Contract.

39. GENERAL GUARANTEE

A. Neither final certificate of payment nor any provision in Construction Documents nor partial or entire occupancy of premises by County shall constitute acceptance of work not done in accordance with Construction Documents or relieve Contractor of liability in respect to any expressed warranties or responsibility for faulty materials or workmanship.
   1. In no event shall making of any payment required by Contract constitute or be construed as waiver by County of any breach of covenants of Contract or waiver of any default of Contractor and making of any such payment by County while any such default or breach shall exist shall in no way impair or prejudice right of County with respect to recovery of damages or other remedy as result of such breach or default.

B. Contractor shall remedy and make good all defective workmanship and materials and pay for any damage to other work resulting there from, which appear within period of one (1) year from date of substantial completion, providing such defects are not clearly due to abuse or misuse by County. Department will give notice of observed defects with reasonable promptness.

C. Guarantee on work executed after certified date of substantial completion will begin on date when such work is inspected and approved by Architect / Engineer's and Public Works Project Manager.

D. Where guarantees or warrantees are required in sections of Specifications for periods in excess of one (1) year, such longer terms shall apply; however, Contractor's Performance and Payment Bonds shall not apply to any guarantee or warranty period in excess of one (1) year.

40. CONFLICTING CONDITIONS

A. Any provision in any of Construction Documents which may be in conflict or inconsistent with any Articles in these General Conditions of Contract or Supplementary Conditions shall be void to extent of such conflict or inconsistency.

B. In case of ambiguity or conflict between Drawings and Specifications, Specifications shall govern.

C. Printed dimensions shall be followed in preference to measurements by scale. Large-scale drawings take precedence over small-scale drawings. Dimensions on Drawings and details are subject to field measurements of adjacent work.

41. NOTICE AND SERVICE THEREOF

A. Any notice to Contractor from Department relative to any part of this Contract shall be in writing and considered delivered and service thereof completed, when said notice is posted, by certified or registered mail, to Contractor at Contractor's last given address, or delivered in person to said Contractor, or Contractor's authorized representative on the Work.

42. PROTECTION OF LIVES AND HEALTH

A. In order to protect lives and health of Contractor's employees under Contract, Contractor shall comply with all pertinent provisions of Wisconsin Administrative Code, Rules of Department of Commerce, relating to Safety and Health.

B. Contractor alone shall be responsible for safety, efficiency and adequacy of Contractor's tools, equipment and methods, and for any damage that may result from their failure or their improper construction, maintenance or operation.

43. AFFIRMATIVE ACTION PROVISION AND MINORITY / WOMEN / DISADVANTAGED BUSINESS ENTERPRISES

A. Affirmative Action Provisions.
   1. During term of their Contract, Contractor agrees not to discriminate on basis of race, religion, color, sex, handicap, age, sexual preference, marital status, physical appearance, or national origin against any person, whether recipient of services (actual or potential), employee, or applicant for employment. Such equal opportunity shall include but not be limited to following: employment, upgrading, demotion, transfer, recruitment, advertising, layoff, termination, training, rates of pay, and any other form of compensation or level of service(s). Contractor agrees to post in conspicuous places, these affirmative action standards to be visible to all employees, service recipients and applicants for this paragraph. Listing of prohibited bases for discrimination shall not be construed to amend in any fashion state or federal law setting forth additional bases and exceptions shall be permitted only to extent allowable in state or federal law.
   2. Contractor is subject to this Article only if Contractor has twenty (20) or more employees and receives $20,000.00 or more in annual aggregate contracts with County. Contractor shall file and Affirmative Action Plan with Dane County Contract Compliance Specialist in accord with Chapter 19 of Dane County Code of Ordinances. Such plan must be filed within fifteen (15) business days of effective date of this Contract and failure to do so by said date shall constitute ground for immediate termination of Contract by County. Contractor shall also, during term of this Contract, provide copies of all announcements of employment opportunities to County's Office of Equity & Inclusion, and shall report annually number of persons, by race, sex and handicap status, who apply for employment, and, similarly classified, number hired and number rejected.

3. Contact Dane County Contract Compliance Specialist at Dane County Office of Equity & Inclusion, 210 Martin Luther King, Jr. Blvd., Room 356, Madison, WI 53703, 608/266-4192.
4. In all solicitations for employment placed on Contractor's behalf during term of this Contract, Contractor shall include statement to affect Contractor is "Equal Opportunity Employer". Contractor agrees to furnish all information and reports required by County's Contract Compliance Specialist as same relate to affirmative action and nondiscrimination, which may include any books, records, or accounts deemed appropriate to determine compliance with Chapter 19, Dane County Code of Ordinances, and provision of this Contract.

B. Minority / Women / Disadvantaged / Emerging Small Business Enterprises.
1. Chapter 19.508 of Dane County Code of Ordinances is official policy of Dane County regarding utilization of, to fullest extent of, Minority Business Enterprises (MBEs), Women Business Enterprises (WBEs) Disadvantage Business Enterprises (DBEs) and Emerging Small Business Enterprises (ESBEs).
2. Contractor may utilize MBEs / WBEs / DBEs / ESBEs as subcontractors or suppliers. List of subcontractors will be required of low bidder as stated in this Contract. List shall indicate which are MBEs / WBEs / DBEs / ESBEs and percentage of subcontract awarded, shown as percentage of total dollar amount of bid.

44. COMPLIANCE WITH FAIR LABOR STANDARDS

A. During term of this Contract, Contractor shall report to County Contract Compliance Specialist, within ten (10) business days, any allegations to, or findings by National Labor Relations Board (NLRB) or Wisconsin Employment Relations Commission (WERC) that Contractor has violated statute or regulation regarding labor standards or relations. If investigation by Contract Compliance Specialist results in final determination that matter adversely affects Contractor's responsibilities under this Contract, and which recommends termination, suspension or cancellation of this Contract, County may take such action.

B. Contractor may appeal any adverse finding by Contract Compliance Specialist as set forth in Dane County Ordinance 25.015(11)(c) through (e).

C. Contractor shall post this statement in prominent place visible to employees: "As condition of receiving and maintaining contract with Dane County, this employer shall comply with federal, state and all other applicable laws prohibiting retaliation or union organizing."

45. USE AND OCCUPANCY PRIOR TO ACCEPTANCE

A. Contractor agrees to use and occupancy of portion or unit of the Work before formal acceptance by Department, provided Department:
1. Secures written consent of Contractor; except when in opinion of Public Works Project Manager, Contractor is chargeable with unwarranted delay in final cleanup of punch list items or other Contract requirements.
2. Secures endorsement from insurance carrier and consent of Surety permitting occupancy of building or use of the Work during remaining period of construction, or, secures consent of Surety.
3. Assumes all costs and maintenance of heat, electricity and water.
4. Accepts all work completed within that portion or unit of the Work to be occupied, at time of occupancy.

46. CLAIMS

A. No claim may be made until Department's Public Works Director has reviewed Architect / Engineer's decision as provided for in Article 35 of General Conditions of Contract. If any claim remains unresolved after such review by Department's Public Works Director, the claim may be filed under Wisconsin Statute 893.80. Work shall progress during period of any dispute or claim. Unless specifically agreed between parties, venue will be in Dane County, Wisconsin.

47. ANTITRUST AGREEMENT

A. Contractor and County recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by County. Therefore, Contractor hereby assigns to County any and all claims for such overcharges as to goods and materials purchased in connection with this Contract, except as to overcharges which result from antitrust violations commencing after price is established under this Contract and any change order thereto.

48. INSURANCE

A. Contractor Carried Insurance:
   1. Contractor shall not commence work under this Contract until Contractor has obtained all insurance required under this Article and has provided evidence of such insurance to Risk Manager, 425 City-County Building, 210 Martin Luther King Jr. Blvd., Madison, WI 53703. Contractor shall not allow any subcontractor to commence work until insurance required of subcontractor has been so obtained and approved. Company providing insurance must be licensed to do business in Wisconsin.
   2. Worker's Compensation Insurance:
      a) Contractor shall procure and shall maintain during life of this Contract, Worker's Compensation Insurance as required by statute for all of Contractor's employees engaged in work at site of project under this Contract and, in case of any such work sublet, Contractor shall require subcontractor similarly to provide Worker's Compensation Insurance for all of latter's employees to be engaged in such work unless such employees are covered by protection afforded by Contractor's Worker's Compensation Insurance.
      b) If any claim of employees engaged in hazardous work on project under this Contract is not protected under Worker's Compensation Statute, Contractor shall provide and shall cause each subcontractor to provide adequate Employer's Liability Insurance for protection of such of Contractor's employees as are not otherwise protected.
   3. Contractor's Public Liability and Property Damage Insurance:
      a) Contractor shall procure and maintain during life of this Contract, Contractor's Public Liability Insurance and Contractor's Property Damage Insurance in amount not less than $1,000,000 bodily injury, including accidental death, to any one person, and subject to same limit for each person, in amount not less than $1,000,000 on account of one accident, and Contractor's Property Damage Insurance in amount not less then $1,000,000 or combined single limit of at least $1,000,000 with excess coverage over and above general liability in amount not less than $5,000,000. Contractor shall add "Dane County" as additional insured for each project.
      b) Contractor's Public Liability and Property Damage Insurance shall include Products, Completed Operation, and Contractual Liability under Insurance Contract. "Contractor shall in all instances save, defend, indemnify and hold harmless County and Architect / Engineer against all claims, demands, liabilities, damages or any other costs which may accrue in prosecution of the Work and that Contractor will save, defend, indemnify and hold harmless County and Architect / Engineer from all

damages caused by or as result of Contractor's operations" and each shall be listed as additional insured on Contractor's and subcontractors' insurance policies.

c) Obligations of Contractor under Article 50.A.2.b) shall not extend to liability of Architect / Engineer, agents or employees thereof, arising out of:
   1) Preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications; or
   2) Giving of or failure to give directions or instructions by Architect / Engineer, agents or employees thereof provided such giving or failure to give is primary cause of injury or damage.

d) Contractor shall procure and shall maintain during life of this Contract, Comprehensive Automobile Liability Insurance covering owned, non-owned and hired automobiles for limits of not less than $1,000,000 each accident single limit, bodily injury and property damage combined with excess coverage over and above general liability in amount not less than $5,000,000.

e) Contractor shall either:
   1) Require each subcontractor to procure and to maintain during life of subcontract, subcontractor's Public Liability Property Damage Insurance, and Comprehensive Automobile Liability Insurance of type and in same amount specified in preceding paragraphs; or
   2) Insure activities of subcontractors in Contractor's own policy.

4. Scope of Insurance and Special Hazards: Insurance required under Article 50.A.2 & 50.A.3. hereof shall provide adequate protection for Contractor and subcontractors, respectively, against damage claims which may arise from operations under this Contract, whether such operation be by insured or by anyone directly or indirectly employed by insured and also against any of special hazards which may be encountered in performance of this Contract as enumerated in Supplementary Conditions.
5. Proof of Carriage of Insurance: Contractor shall furnish Risk Manager with certificates showing type, amount, class of operations covered, effective dates, dates of expiration of policies and "Dane County" listed as additional insured. Such certificates shall also contain (substantially) following statement: "Insurance covered by this certificate will not be canceled or materially altered, except after ten (10) business days written notice has been received by Risk Manager."

B. Builder's Risk:
   1. County shall provide Builder's Risk insurance coverage for its insurable interests in construction or renovation projects with completed value of $1,000,000 or less. Therefore, if project completed value is more than $1,000,000, Contractor shall obtain and maintain in force, at its own expense, Builder's Risk Insurance on all risks for amount equal to full completed value of covered structure or replacement value of alterations or additions. Any deductible shall not exceed $25,000 for each loss. Policy shall include occupancy clause and list Dane County as loss payee.

C. Indemnification / Hold Harmless:
   1. Contractor shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives from and against all claims, damages, losses and expenses including attorneys' fees arising out of or resulting from performance of the Work, provided that any such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, and is caused in whole or in part by any act or omission of Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by part indemnified hereunder.

2. In any and all claims against Dane County, its boards, commissions, agencies, officers, employees and representatives or by any employee of Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, indemnification obligation under this Contract shall not be limited in any way by any limitation on amount or type of damages, compensation or benefits payable by or for Contractor or any subcontractor under worker's compensation acts, disability benefits or other employee benefit acts.
3. Obligations of Contractor under this Contract shall not extend to liability of Architect / Engineer, its agents or employees arising out of:
   a) Preparation or approval of maps, drawings, opinion, reports, surveys, change orders, designs or specifications; or
   b) Giving of or failure to give directions or instruction by Architect / Engineer, its agents or employees provided such giving or failure to give is primary cause of injury or damage.
4. Dane County shall not be liable to Contractor for damages or delays resulting from work by third parties or by injunctions or other restraining orders obtained by third parties.

49. WISCONSIN LAW CONTROLLING

A. It is expressly understood and agreed to by parties hereto that in event of any disagreement or controversy between parties, Wisconsin law shall be controlling.

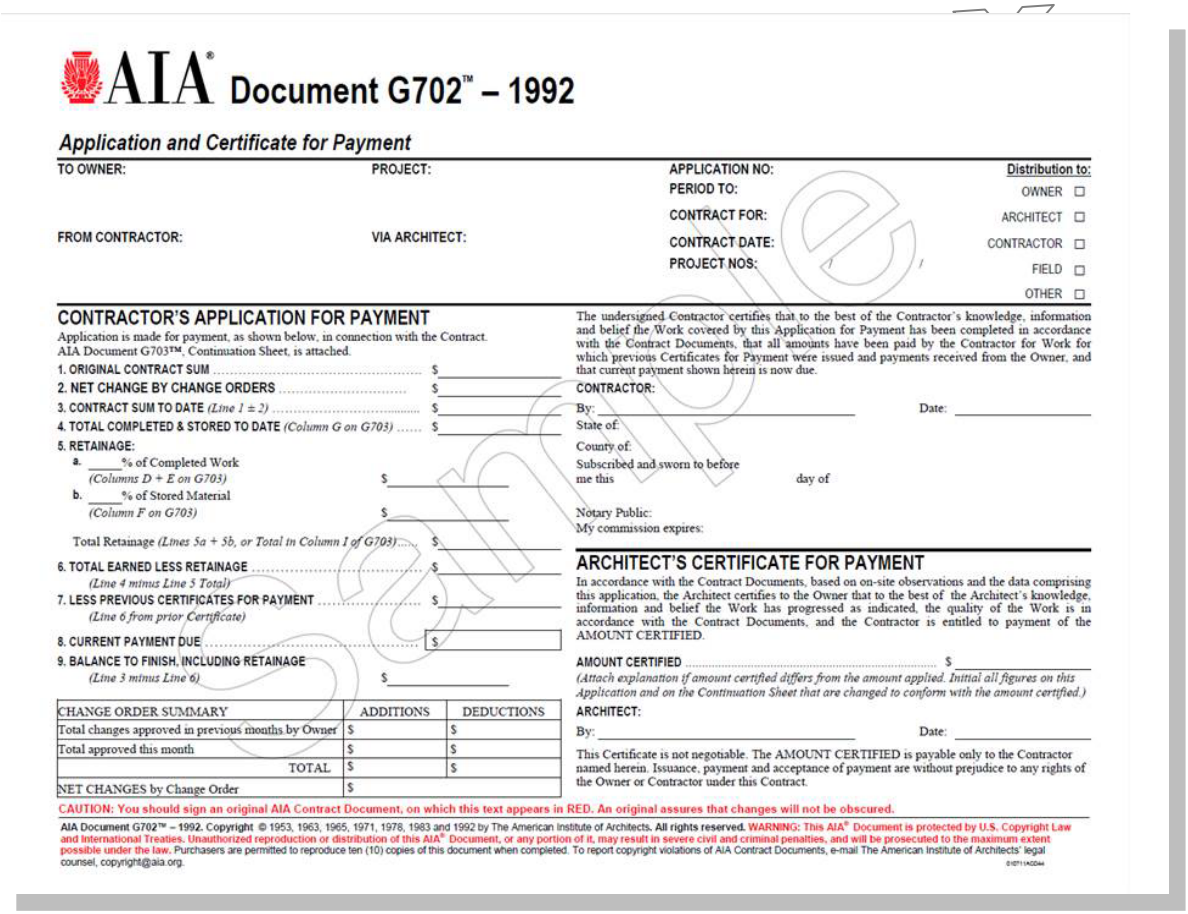
END OF SECTION

SECTION 00 73 00

SUPPLEMENTARY CONDITIONS

1. APPLICATION & CERTIFICATE FOR PAYMENT

A. Every contractor engaged in performance of any contract for Public Works Engineering Division shall submit partial and final Application & Certificate for Payment for work under said contract. Form shall provide similar information as shown on AIA G702™ and G703™ forms (samples shown below). Forms shall be submitted to Project Manager for approval.



AIA® Document G702™ – 1992

Application and Certificate for Payment

TO OWNER: PROJECT: APPLICATION NO: Distribution to:
PERIOD TO: OWNER ☐
CONTRACT FOR: ARCHITECT ☐
FROM CONTRACTOR: VIA ARCHITECT: CONTRACT DATE: CONTRACTOR ☐
PROJECT NOS: / / FIELD ☐
OTHER ☐

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703™, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM ..... $
2. NET CHANGE BY CHANGE ORDERS ..... $
3. CONTRACT SUM TO DATE *(Line 1 ± 2)* ..... $
4. TOTAL COMPLETED & STORED TO DATE *(Column G on G703)* ..... $
5. RETAINAGE:
   a. ____% of Completed Work *(Columns D + E on G703)* $
   b. ____% of Stored Material *(Column F on G703)* $
   Total Retainage *(Lines 5a + 5b, or Total in Column I of G703)* ..... $
6. TOTAL EARNED LESS RETAINAGE ..... $ *(Line 4 minus Line 5 Total)*
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT ..... $ *(Line 6 from prior Certificate)*
8. CURRENT PAYMENT DUE ..... $
9. BALANCE TO FINISH, INCLUDING RETAINAGE *(Line 3 minus Line 6)* $

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$	$
Total approved this month	$	$
TOTAL	$	$
NET CHANGES by Change Order	$	

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

CONTRACTOR:
By: Date:
State of:
County of:
Subscribed and sworn to before me this day of
Notary Public:
My commission expires:

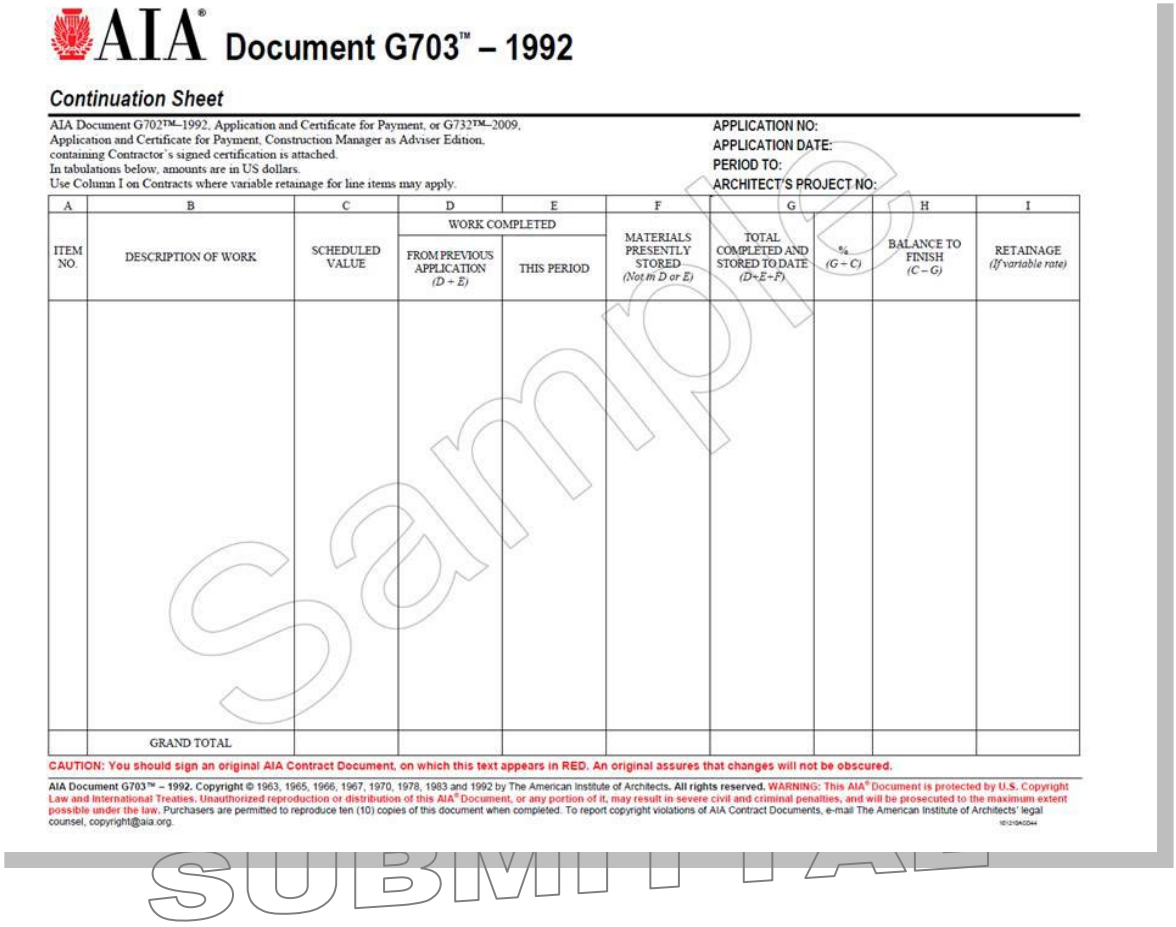
ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... $
(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)
ARCHITECT:
By: Date:

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.



AIA® Document G703™ – 1992

Continuation Sheet

AIA Document G702™–1992, Application and Certificate for Payment, or G732™–2009, Application and Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.
In tabulations below, amounts are in US dollars.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO:
APPLICATION DATE:
PERIOD TO:
ARCHITECT'S PROJECT NO:

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED: FROM PREVIOUS APPLICATION (D + E)	WORK COMPLETED: THIS PERIOD	MATERIALS PRESENTLY STORED (Not in D or E)	TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)	BALANCE TO FINISH (C – G)	RETAINAGE (If variable rate)
	GRAND TOTAL								

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

2. INSURANCE

A. **Contractor Carried Insurance.** In order to protect itself and the County, Contractor shall not commence work under this Contract until obtaining all required insurance and the County has approved such insurance. Contractor shall not allow any subcontractor to commence work on subcontract until insurance required of subcontractor has been so obtained and approved.

END OF SECTION

SECTION 00 73 00

BEST VALUE CONTRACTING

1. CONTRACTORS / LICENSURE APPLICANTS

The Dane County Public Works Engineering Division requires contractors & subcontractors to be a Best Value Contractor (BVC) before being hired. Contractor & subcontractor application documents should be turned in immediately. Contractor approval or exemption must be complete prior to Bid Due Date / Time. All subcontractors must also be approved or prove their exemption ten (10) business or more days before performing any work under a County contract. Complete & properly execute this document, along with the necessary attachments and additional information that the County requires for the protection and welfare of the public in the performance of a County contract.

Contractors or subcontractors of any tier who attain qualification status will retain that status for a period of three (3) years from the date of qualification. Contractors shall notify the Dane County Public Works Engineering Division within fifteen (15) days of any changes to its business or operations that are relevant to the application or status. Failure to do so could result in suspension, revocation of the contractor's qualification, debarment from County contracts for up to three (3) years and / or other sanctions available under the law.

No contracts will be awarded for construction work performed on Dane County projects unless the contractor is currently approved as a Wisconsin Trade Trainer or has applied for approval as an Apprenticeship Trade Trainer to the Wisconsin Department of Workforce Development and agrees to an acceptable apprenticeship program. If you are not currently approved as a Wisconsin Trade Trainer, or have not applied for approval as an Apprenticeship Trade Trainer, please contact the Department of Workforce Development - Bureau of Apprenticeship Standards at 608/266-3133 or visit their web site at: https://dwd.wisconsin.gov/apprenticeship/.

Fill out the BVC Application at the Public Works Engineering Division web site (publicworks.countyofdane.com/bvc). This document is in the RFB for reference only. The following page shows what the questions are on the application.

2. EXEMPTIONS TO QUALIFICATION

Contractors performing work that does not apply to an apprenticeable trade, as outlined in Item 4. Apprenticeable Trades, is the only reason for claiming an exemption if not an active Wisconsin Trades Trainer. See Question 18A.

3. APPLICATION QUESTIONS

NO.	PROOF OF RESPONSIBILITY	CHECK IF APPLICABLE
1	Does your firm acknowledge that in doing work under any County Public Works Contract, it will be required to use as subcontractors only those contractors that are also qualified with the County or become so ten (10) or more days before beginning any work?	Yes: ☐ No: ☐
2	Does your firm possesses all technical qualifications and resources, including equipment, personnel and financial resources, necessary to perform the work required for any project or obtain the same through the use of responsible, qualified subcontractors?	Yes: ☐ No: ☐
3	Will your firm possess all valid, effective licenses, registrations or certificates required by federal, state, county, or local law, which are necessary for the type of work to be performed including, but not limited to, those for any type of trade work or specialty work?	Yes: ☐ No: ☐

4	Will your firm meet all bonding requirements as required by applicable law or contract specifications?	Yes: ☐ No: ☐
5	Will your firm meet all insurance requirements as required by applicable law or specifications, including general liability insurance, workers compensation insurance and unemployment insurance requirements?	Yes: ☐ No: ☐
6	Will your firm maintain a substance abuse policy for employees hired for Public Works contracts that comply with Wis. Stats. Sec. 103.503?	Yes: ☐ No: ☐
7	Will your employees who will perform work on a Public Works project all be covered under a current workers compensation policy and be properly classified under such policy?	Yes: ☐ No: ☐
8	Will your employees who will perform work on a Public Works project have the opportunity to enroll in minimum essential coverage and not be subject to an enrollment period of more than 60 days per the federal Affordable Care Act, Sec. 1513?	Yes: ☐ No: ☐
9	Will your firm fully abide by the equal opportunity and affirmative action requirements of all applicable laws, including County ordinances?	Yes: ☐ No: ☐
10	Has your firm been the subject of any order or judgement from any State or Federal Agency or court concerning employment practice, including but not limited to: classification of employees under state unemployment or workers compensation laws; minimum wage, overtime pay, recordkeeping, and child labor standards imposed by federal or state law; and employment discrimination or unfair labor practices prohibited by federal or state law. (Attach copies of any order or judgement)	Yes: ☐ No: ☐ If Yes, attach details.
11	Is your firm authorized or registered to transact business in the state by the Department of Financial Institutions in compliance with Wis. Stat. Chaps. 178, 179, 180, 181, or 183?	Yes: ☐ No: ☐ If Yes, attach details.
12	In the past three (3) years, has your firm had control or has another corporation, partnership or other business entity operating in the construction industry controlled it? If so, attach a statement explaining the nature of the firm relationship.	Yes: ☐ No: ☐ If Yes, attach details.
13	In the past three (3) years, has your firm had any type of business, contracting or trade license, certification or registration revoked or suspended?	Yes: ☐ No: ☐ If Yes, attach details.
14	In the past three (3) years, has your firm been debarred by any federal, state or local government agency?	Yes: ☐ No: ☐ If Yes, attach details.
15	In the past three (3) years, has your firm defaulted or failed to complete any contract?	Yes: ☐ No: ☐ If Yes, attach details.
16	In the past three (3) years, has your firm committed a willful violation of federal, state or local government safety laws as determined by a final decision of a court or government agency authority.	Yes: ☐ No: ☐ If Yes, attach details.
17	In the past three (3) years, has your firm been in violation of any law relating to your contracting business where the penalty for such violation resulted in the imposition of a penalty greater than $10,000?	Yes: ☐ No: ☐ If Yes, attach details.
18	Does the Wisconsin Bureau of Apprenticeship Standards determine your firm an active Wisconsin Trade Trainer as?	Yes: ☐ No: ☐ If Yes, attach details.

18A	Is your firm claiming an exemption to qualification?	Yes: ☐ No: ☐ If Yes, attach details.
19	Has Contractor been in business less than one year?	Yes: ☐ No: ☐

4. APPRENTICEABLE TRADES:

- Bricklayer
- Boilermaker
- Carpenter
- Cement Mason (Concrete Finisher)
- Cement Mason (Heavy Highway)
- Construction Craft Laborer
- Data Communications Installer
- Electrician
- Elevator Mechanic / Technician
- Environmental Systems Technician / HVAC Service Technician / HVAC Install & Service
- Glazier
- Heavy Equipment Operator / Operating Engineer
- Insulation Worker (Heat & Frost)
- Iron Worker (Assembler, Metal Buildings)
- Painter / Decorator
- Plasterer
- Plumber
- Roofer / Waterproofer
- Sheet Metal Worker
- Sprinkler Fitter
- Steamfitter (Service & Refrigeration)
- Taper & Finisher
- Telecommunications (Voice, Data & Video) Installer / Technician
- Tile Setter

END OF SECTION

SECTION 00 73 11

FAIR LABOR PRACTICES CERTIFICATION

The undersigned, for and on behalf of the BIDDER, APPLICANT or PROPOSER named herein, certifies as follows:

A. That he or she is an officer or duly authorized agent of the above-referenced BIDDER, APPLICANT or PROPOSER, which has a submitted a bid, application or proposal for a contract or agreement with the county of Dane.

B. That BIDDER, APPLICANT or PROPOSER has (check one):

_____ not been found by the National Labor Relations Board ("NLRB") or the Wisconsin Employment Relations Commission ("WERC") to have violated any statute or regulation regarding labor standards or relations in the seven years prior to the signature date of this Certification.

_____ been found by the National Labor Relations Board ("NLRB") or the Wisconsin Employment Relations Commission ("WERC") to have violated any statute or regulation regarding labor standards or relations in the seven years prior to the signature date of this Certification.

_____ _____

Officer or Authorized Agent Signature Date

_____

Printed or Typed Name and Title

_____

Printed or Typed Business Name

NOTE: You can find information regarding the violations described above at: www.nlrb.gov and werc.wi.gov.

For reference, Dane County Ordinance 25.09 is as follows:

(1) BIDDER RESPONSIBILITY. (a) Any bid, application or proposal for any contract with the county, including public works contracts regulated under chapter 40, shall include a certification indicating whether the bidder has been found by the National Labor Relations Board (NLRB) or the Wisconsin Employment Relations Committee (WERC) to have violated any statute or regulation regarding labor standards or relations within the last seven years. The Controller shall investigate any such finding and make a recommendation to the committee, which shall determine whether the conduct resulting in the finding affects the bidder's responsibility to perform the contract.

If you indicated that the NLRB or WERC have found you to have such a violation, you must include copies of any relevant information regarding such violation with your proposal, bid or application.

Include this completed Certification with your bid, application or proposal.

END OF SECTION

SECTION 01 00 00

GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Summary
2. Summary of the Work
3. Contractor Use of Premises
4. Applications for Payment
5. Change Procedures
6. Alternates
7. Coordination
8. Cutting and Patching
9. Conferences
10. Progress Meetings
11. Job Site Administration
12. Submittal Procedures
13. Proposed Products List
14. Shop Drawings
15. Product Data
16. Samples
17. Manufacturers' Instructions
18. Manufacturers' Certificates
19. Quality Assurance / Quality Control of Installation
20. References
21. Interior Enclosures
22. Protection of Installed Work
23. Parking
24. Staging Areas
25. Occupancy During Construction and Conduct of Work
26. Protection
27. Progress Cleaning
28. Products
29. Transportation, Handling, Storage and Protection
30. Product Options
31. Substitutions
32. Starting Systems
33. Demonstration and Instructions
34. Contract Closeout Procedures
35. Final Cleaning
36. Adjusting
37. Operation and Maintenance Data
38. Spare Parts and Maintenance Materials
39. As-Built and Record Drawings and Specifications

1.2 SUMMARY OF THE WORK

A. Project Description: Perform the Work as specified and detailed in Construction Documents package. Contractor to provide electrical upgrades at Pavilions 1 & 2 to improve electrical service for exhibitors during livestock events.

B. Work by Owner: Not applicable.

C. Permits: All Permits to be provided by Contractor.

1.3 CONTRACTOR USE OF PREMISES

A. Coordinate utility outages and shutdowns with Owner.

B. Contractors or Subcontractors shall not visit the site if they are or have recently been ill.

1.4 APPLICATIONS FOR PAYMENT

A. Submit each Application for Payment on AIA G702™ and G703™ forms or approved contractors invoice form. Contractor shall have these forms notarized and signed.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Payment Period: Monthly

D. Submit Applications for Payment to Public Works Project Manager for approval & processing for payment.

1.5 CHANGE PROCEDURES

A. Contractor's costs for Products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from contingency allowance.

B. Change Order Forms: Dane County Contract Change Order, Form 014-32-20 (latest issue).

1.6 ALTERNATES

A. Owner shall review and accept or reject alternates quoted on Bid Form.

B. Coordinate related work and modify surrounding work as required.

C. Schedule of Alternates: there are no alternates proposed for this project.

1.7 COORDINATION

A. Coordinate scheduling, submittals, and work of various sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify utility requirement characteristics of operating equipment are compatible with building utilities.

C. Coordinate space requirements and installation of mechanical and electrical work indicated diagrammatically on Drawings.

D. Refer to Drawings for recommended work sequence and duration.

E. Contractor shall provide Public Works Project Manager with work plan that ensures the Work's completion within required time & schedule.

F. Public Works Project Manager may choose to photograph or videotape site or workers as the Work progresses.

1.8 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching new work; restore work with new Products.

B. Submit written request in advance of cutting or altering structural or building enclosure elements.

C. Fit work tight to adjacent elements. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

D. Refinish surfaces to match adjacent finishes.

1.9 CONFERENCES

A. Project shall have pre-bid conference; see Instructions to Bidders.

B. Owner will schedule preconstruction conference after Award of Contract for all affected parties.

C. Contractor shall submit Construction Schedule at pre-construction meeting.

D. When required in individual Specification section, convene pre-installation conference at project site prior to commencing work of Section.

1.10 PROGRESS MEETINGS

A. Day & time of progress meetings to be determined at pre-construction meeting.

B. Owner shall schedule and administer meetings throughout progress of the Work at minimum of one (1) per week.

C. Owner shall preside at meetings, record minutes, and distribute copies within two (2) business days to those affected by decisions made.

D. Attendance at progress meetings by General Contractor, subcontractors, or their authorized representative, is mandatory.

E. Contractors shall give verbal reports of progress on the Work, discuss schedule for upcoming period and present all conflicts, discrepancies or other difficulties for resolution.

1.11 JOB SITE ADMINISTRATION

A. Contractor shall have project superintendent on site minimum of four (4) hours per week during progress of the Work.

B. Contractor shall not change their project superintendent or project manager for duration of the Work without written permission of Public Works Project Manager.

C. Architect / Engineer shall have representative on site regularly during progress of the Work.

1.12 SUBMITTAL PROCEDURES

A. Submittal form to identify Project, Contractor, Subcontractor or supplier and pertinent Construction Documents references.

B. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction work, and coordination of information is in accordance with requirements of the Work and Construction Documents.

C. Identify variations from Construction Documents and Product or system limitations that may be detrimental to successful performance of completing the Work.

D. Revise and resubmit submittals as required; identify all changes made since previous submittal.

1.13 PROPOSED PRODUCTS LIST

A. Within fifteen (15) business days after date of Award of Contract, submit complete list of major Products proposed for use, with name of manufacturer, trade name, and model number of each Product.

1.14 SHOP DRAWINGS

A. Submit number of copies that Contractor & Architect / Engineer require, plus one (1) copy for Public Works Project Manager to retain.

1.15 PRODUCT DATA

A. Submit number of copies that Contractor requires, plus one (1) copy for Public Works Project Manager to retain.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to this Project.

1.16 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of Product.

B. Submit samples of finishes from full range of manufacturers' standard colors, textures, and patterns for Public Works Project Manager's & Architect / Engineer’s selection.

1.17 MANUFACTURERS' INSTRUCTIONS

A. When specified in individual Specification sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

1.18 MANUFACTURERS' CERTIFICATES

A. When specified in individual Specification sections, submit manufacturers' certificate to Public Works Project Manager for review, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

1.19 QUALITY ASSURANCE / QUALITY CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply fully with manufacturers' instructions.

C. Comply with specified standards as minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.20 REFERENCES

A. Conform to reference standard by date of issue current as of date for receiving bids.

B. Should specified reference standard conflict with Construction Documents, request clarification from Public Works Project Manager before proceeding.

1.21 INTERIOR ENCLOSURES

A. Provide temporary partitions as required to separate work areas from Owner occupied areas, to prevent distribution of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment.

1.22 PROTECTION OF INSTALLED WORK

A. Protect installed work and provide special protection where specified in individual Specification sections.

1.23 PARKING

A. Arrange for temporary parking areas to accommodate construction personnel. Parking shall be available at the Work site.

B. All Contractors and their employees shall cooperate with General Contractor and others in parking of vehicles to avoid interference with normal operations and construction activities.

C. Do not obstruct existing service drives and parking lots with equipment, materials and / or vehicles. Keep accessible for Owner's use at all times.

1.24 STAGING AREAS

A. Coordinate staging areas with Public Works Project Manager prior to starting the Work.

B. On-site space for use as staging areas and storage of materials is limited and will be apportioned among various Contractors as their needs dictate with due regard for storage requirements of each Contractor. Each Contractor shall be responsible for safety of equipment and materials that are stored on site.

1.25 OCCUPANCY DURING CONSTRUCTION AND CONDUCT OF WORK

A. At all times Contractor shall provide approved, safe walkways and facility entrances for use by Owner, employees and public.

B. Contractor shall provide adequate protection for all parts of facility, its contents and occupants wherever the Work under this Contract is to be performed.

C. Each Contractor shall arrange with Owner to make necessary alterations, do new work, make connections to all utilities, etc., and at such times as will not cause interruption of utility services to facility. Contractor doing this work shall protect, cap, cut off and / or replace and relocate existing pipes, electrical work and other active utilities encountered which may interfere with new construction work.

D. New work in extension of existing work shall correspond in all respects with that to which it connects or similar existing work unless otherwise indicated or specified.
   1. Existing work shall be cut, altered, removed or replaced as necessary for performance of Contract obligations.
   2. Work remaining in place, damaged or defaced by reason of work done under this Contract shall be restored equal to its condition at time of Award of Contract.
   3. If removal of work exposes discolored or unfinished surfaces or work out of alignment, such surfaces shall be refinished or materials replaced as necessary to make continuous work uniform and harmonious.

E. Contractor is not responsible for providing & maintaining temporary toilet facilities.

F. Owner reserves right at any time to dismiss from premises any Contractor or construction personnel that do not uphold requirements of this Section.

G. Owner shall not be held liable for any lost time, wages, or impacts to construction schedule by any Contractor or construction personnel dismissed for failure to uphold requirements of this Section.

1.26 PROTECTION

A. Contractor shall provide and maintain barricades & signage to prohibit public access to construction site.

B. Contractor shall provide and maintain guard lights at all barricades, railings, obstructions in streets, roads or sidewalks and at all trenches adjacent to public walks or roads.

1.27 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

1.28 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components specifically identified for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically identified or allowed by Construction Documents.

1.29 TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

A. Transport, handle, store and protect Products in accordance with manufacturer's instructions.

1.30 PRODUCT OPTIONS

A. Where definite material is specified, it is not intentional to discriminate against "equal" product made by another manufacturer. Intention is to set definite standard of material quality. Should bidder choose to bid materials other than those specified, bidder shall submit said materials specifications to Public Works Project Manager for approval.

B. Products and materials that are not specified, but have been approved for use by Public Works Project Manager shall be identified in addenda to all bidding contractors.

Requests for material or product substitutions submitted after Bid Due Date may be considered. Owner reserves right to approve or reject substitutions based on Specification requirements and intended use.

1.31 SUBSTITUTIONS

A. Public Works Project Manager shall consider requests for Substitutions only up to seven (7) business days prior to date of Bid Due Date.

B. Document each request with complete data substantiating compliance of proposed Substitution with Construction Documents.

C. Limit each request to one (1) proposed Substitution for Public Works Project Manager’s consideration.

D. Substitutions shall not change contract price established at Bid Due Date.

1.32 STARTING SYSTEMS

A. Provide written notification prior to start-up of each equipment item or system.

B. Ensure that each piece of equipment or system is ready for operation.

C. Execute start-up under supervision of responsible persons in accordance with manufacturers' instructions.

D. Submit written report that equipment or system has been properly installed and is functioning correctly.

1.33 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Products to Owner's personnel prior to date of final inspection.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at designated location.

C. Owner may choose to photograph or videotape demonstration session; demonstration and demonstrator shall be to level of satisfaction of Owner.

1.34 CONTRACT CLOSEOUT PROCEDURES

A. Submit written certification that Construction Documents have been reviewed, the Work has been inspected, and the Work is complete in accordance with Construction Documents and ready for Public Works Project Manager's inspection.

B. Submit final Application for Payment identifying total adjusted Contract Sum / Price, previous payments, and amount remaining due.

1.35 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean interior and exterior surfaces exposed to view.

C. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.36 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.37 OPERATION AND MAINTENANCE MANUAL

A. Provide two (2) bound, hard-copy operation and maintenance manuals that include all systems, materials, products, equipment, mechanical and electrical equipment and systems supplied and installed in the Work. Provide electronic version of operation and maintenance manual also.

1.38 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide Products, spare parts, maintenance and extra materials in quantities specified in individual Specification Sections.

B. Deliver to the Work site and place in location as directed.

1.39 AS-BUILT AND RECORD DRAWINGS AND SPECIFICATIONS

A. Contractor-produced Drawings and Specifications shall remain property of Contractor whether Project for which they are made is executed or not. Contractor shall furnish Architect / Engineer with original marked up redlines of Construction Documents' drawings and specifications that shall include all Addendums, Change Orders, Construction Bulletins, Field Directives, on-site changes, field corrections, etc. These are project As-Built Drawings & Specifications.

B. Architect / Engineer shall update original Construction Documents to include all Addendums & any other changes including those provided by Contractor in As-Built

Drawings & Specifications. These updates are project Record Drawings & Specifications.

C. Architect / Engineer shall furnish Public Works Project Manager with Record Drawings as detailed in Professional Services Agreement.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT, DISPOSAL & RECYCLING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Summary
2. Waste Management Goals
3. Construction and / or Demolition Waste Management
4. Waste Management Plan
5. Reuse
6. Recycling
7. Materials Sorting and Storage On Site
8. Lists of Recycling Facilities Processors and Haulers
9. Waste Management Plan Form

B. Related Sections:
1. Section 01 00 00 - General Requirements

1.2 WASTE MANAGEMENT GOALS

A. Dane County requires that as many waste materials as possible produced as result of this project be salvaged, reused or recycled in order to minimize impact of construction waste on landfills and to minimize expenditure of energy and cost in fabricating new materials. Additional information may be found in Dane County Green Building Policy, Resolution 299, 1999-2000.

1.3 CONSTRUCTION AND / OR DEMOLITION WASTE MANAGEMENT

A. All construction and demolition waste suitable for recycling may go to Dane County Construction & Demolition Recycling Facility located at 7102 US Hwy 12, Madison, located across from Yahara Hills Golf Course. This facility can receive mixed loads of construction and demolition waste. For complete list of acceptable materials, see landfill.countyofdane.com/services/construction.

B. Dane County Landfill, also at 7102 US Hwy 12, Madison, must receive all other waste from this project. landfill.countyofdane.com/services/landfill.

1.4 WASTE MANAGEMENT PLAN

A. Contractor shall develop Waste Management Plan (WMP) for this project. Contact the Dane County Special Projects & Materials Manager with questions. Outlined in RECYCLING section of this specification are examples of materials that can be recycled or reused as well as recommendations for waste sorting methods.

B. Contractor shall complete WMP and include cost of recycling / reuse in Bid. Submit WMP to Public Works Project Manager within fifteen (15) business days of Bid Due date. Copy of blank WMP form is in this Section. Submittal shall include cover letter and WMP form with:

1. Information on:
    a. Types of waste materials produced as result of work performed on site;
    b. Estimated quantities of waste produced;
    c. Identification of materials with potential to be recycled or reused;
    d. How materials will be recycled or reused;
    e. On-site storage and separation requirements (on site containers);
    f. Transportation methods; and
    g. Destinations.

1.5 REUSE

A. Contractors and subcontractors are encouraged to reuse as many waste materials as possible. Investigate salvage for materials not reusable on site.

1.6 RECYCLING

A. These materials may be recycled at Dane County Construction & Demolition Recycling Facility:
    1. Wood.
    2. Wood Pallets.
    3. PVC Plastic (pipe, siding, etc.).
    4. Asphalt & Concrete.
    5. Bricks & Masonry.
    6. Vinyl Siding.
    7. Cardboard.
    8. Metal.
    9. Unpainted Gypsum Drywall.
    10. Shingles.

B. These materials can be recycled elsewhere in Dane County area:
    1. Fluorescent Lamps.
    2. Foam Insulation & Packaging (extruded and expanded).
    3. Carpet Padding.
    4. Barrels & Drums.

C. All materials must be recycled at WDNR permitted waste processing facilities that adhere to all State Statutes.

1.7 MATERIALS SORTING AND STORAGE ON SITE

A. Contractor shall provide separate containers for recyclable materials. Number of containers will be dependent upon project and site conditions.

B. Contractor shall provide on-site locations for subcontractors supplied recycling containers to help facilitate recycling.

C. Dane County allows mixed loads of recycled materials only per instructions at landfill.countyofdane.com/services/construction.

1.8 LISTS OF RECYCLING FACILITIES PROCESSORS AND HAULERS

A. Refer to landfill.countyofdane.com/services/construction for information on Dane County Construction & Demolition Recycling Facility.

B. Web site landfill.countyofdane.com/recycle-locations lists current information for Dane County Recycling Markets. Contractors can also contact Allison Rathsack, 608/266-4990, or local city, village, town recycling staff listed at site landfill.countyofdane.com/resources/local-contacts. Statewide listings of recycling / reuse markets are available from UW Extension at uwgb.edu/solid-hazardous-waste-education-center/.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

WASTE MANAGEMENT PLAN FORM

Contractor Name: _____

Address: _____

_____

Phone No.: _____ Recycling Coordinator: _____

MATERIAL	ESTIMATED QUANTITY	DISPOSAL METHOD (CHECK ONE)	RECYCLING / REUSE COMPANY OR DISPOSAL SITE
Salvaged & reused building materials	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Wood	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Wood Pallets	_____ units	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
PVC Plastic	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Asphalt & Concrete	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Bricks & Masonry	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Vinyl Siding	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Cardboard	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Metals	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Unpainted Gypsum / Drywall	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Shingles	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Fluorescent Lamps	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Foam Insulation	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Carpet Padding	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Barrels & Drums	_____ units	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Glass	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____

WASTE MANAGEMENT PLAN FORM

Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____

SECTION 26 05 00
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

The electrical work included in all other divisions is the responsibility of the contractor performing the division 26 work unless noted otherwise.

PROJECT OVERVIEW
Electrical upgrades to the Dane County Alliant Energy Center Pavilions #1 & #2

SCOPE
The work under this section includes basic electrical requirements, which are applicable to all Division 26 sections. 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. Included are the following topics:

PART 1 - GENERAL
- Project Overview
- Scope
- Related Work
- Reference Standards
- Regulatory Requirements
- Quality Assurance
- Continuity of Existing Services and Systems
- Protection of Finished Surfaces
- Approved Electrical Testing Laboratories
- Sleeves and Openings
- Sealing and Fire Stopping
- Alliant Energy Center Furnished Equipment
- Intent
- Omissions
- Submittals
- Project/Site Conditions
- Work Sequence and Scheduling
- Work by Other Trades
- Offsite Storage
- Salvage Materials
- Certificates and Inspections
- Operating and Maintenance Data
- Record Drawings

PART 2 - PRODUCTS
- Access Panels and Doors
- Identification
- Sealing and Fire Stopping

PART 3 - EXECUTION
- Excavation and Backfill
- Concrete Work
- Cutting and Patching
- Building Access
- Equipment Access
- Coordination
- Sleeves and Openings
- Sealing and Fire Stopping
- Housekeeping and Clean Up
- AEC Training

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

Section 07 84 00 – Fire Stopping

REFERENCE STANDARDS
Abbreviations of standards organizations referenced in this, and other sections are as follows:

ANSI American National Standards Institute
ASTM American Society for Testing and Materials
EPA Environmental Protection Agency
ETL Electrical Testing Laboratories, Inc.
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
NEMA National Electrical Manufacturers Association
NESC National Electrical Safety Code
NFPA National Fire Protection Association
NRTL Nationally Recognized Testing Laboratory
UL Underwriters Laboratories Inc.
DSPS Wisconsin Department of Safety and Professional Services

REGULATORY REQUIREMENTS
All work and materials are to conform in every detail to applicable rules and requirements of the Wisconsin State Electrical Code (SPS 316), the National Electrical Code (NFPA 70), other applicable National Fire Protection Association codes, the National Electrical Safety Code, and present manufacturing standards (including NEMA).

All Division 26 work shall be done under the direction of a currently licensed State of Wisconsin Master Electrician.

QUALITY ASSURANCE
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.

Manufacturer references used herein are intended to establish a level of quality and performance requirements unless more explicit restrictions are stated to apply.

All materials shall be listed by and shall bear the label of an approved Nationally Recognized Testing Laboratory (NRTL) as identified by the United States Occupational Safety and Health Administration (OSHA), per the OSHA Nationally Recognized Testing Laboratory Program. If none of the approved electrical testing laboratories has published standards for a particular item, then other national independent testing standards, if available, applicable, and approved by AEC, 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.

CONTINUITY OF EXISTING SERVICES AND SYSTEMS
No outages shall be permitted on existing systems except at the time and during the interval specified by the user agency and by the Allient Energy Center (AEC) Project Representative. The institution may require written approval. Any outage must be scheduled when the interruption causes the least interference with normal institutional 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.

This Contractor shall restore any circuit interrupted as a result of this work to proper operation as soon as possible. Note that institutional operations are on a seven-day week schedule.

PROTECTION OF FINISHED SURFACES
Furnish one can of touch-up paint for each different color factory finish furnished by the Contractor. Deliver touch-up paint with other "loose and detachable parts" as covered in the General Requirements.

APPROVED ELECTRICAL TESTING LABORATORIES
The following laboratories are approved for providing electrical product safety testing, listing and labeling services as required in these specifications:

A Nationally Recognized Testing Laboratory (NRTL) as identified by the United States Occupational Safety and Health Administration (OSHA), per the OSHA Nationally Recognized Testing Laboratory Program.

SLEEVES AND OPENINGS

Refer to Division 1, General Requirements, Sleeves and Openings.

SEALING AND FIRE STOPPING
Sealing and fire stopping of sleeves/openings between conduits, cable trays, wireways, troughs, cable bus, busduct, etc. and the sleeve, structural or partition opening shall be the responsibility of the contractor whose work penetrates the opening. Provide all fire stopping of fire rated penetrations and sealing of smoke rated penetrations in compliance with section 07 84 00 Fire Stopping.

ALLIANT ENERGY CENTER (AEC) FURNISHED EQUIPMENT
AEC will be furnishing some equipment that will have to be received, stored, installed, and/or which will need final connections for the completed project. Refer to drawings for AEC furnished items.

INTENT
The Contractor shall furnish and install all the necessary materials, apparatus, and devices to complete the electrical equipment and systems installation herein specified, except such parts as are specifically exempted herein.

If an item is either called for in the specifications or shown on the plans, it shall be considered sufficient for the inclusion of said item in this contract. If a conflict exists within the Specifications or exists within the Drawings, the Contractor shall furnish the item, system, or workmanship, which is the highest quality, largest, or most closely fits the AEC's intent (as determined by the AEC Project Manager). Refer to the General Conditions of the Contract for further clarification.

It must be understood that the details and drawings are diagrammatic. The Contractor shall verify all dimensions at the site and be responsible for their accuracy.

All sizes as given are minimum except as noted.

Materials and labor shall be new (unless noted or stated otherwise), first class, and workmanlike, and shall be subject at all times to the AEC's and/or A/E's inspections, tests and approval from the commencement until the acceptance of the completed work.

Whenever a particular manufacturer's product is named, it is intended to establish a level of quality and performance requirements unless more explicit restrictions are stated to apply.

OMISSIONS
No later than ten (10) days before bid opening, the Contractor shall call the attention of the AEC to any materials or apparatus the Contractor believes to be inadequate and to any necessary items of work omitted.

SUBMITTALS
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 and/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.

On request from the AEC and/or the A/E, the successful bidder shall furnish additional drawings, illustrations, catalog data, performance characteristics, etc.

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.

The submittals must be approved before fabrication is authorized.

Submit sufficient quantities of submittals to allow the following distribution:

Operating and Maintenance Manuals	2 copies
User agency	1 copy
A/E	1 copy
AEC Field Office	1 copy

PROJECT/SITE CONDITIONS

Install Work in locations shown on drawings, unless prevented by project conditions.

Prepare drawings showing proposed rearrangement of work to meet project conditions, including changes to work specified in other sections. Obtain permission of AEC and A/E before proceeding.

Tools, materials and equipment shall be confined to areas designated by the drawings

WORK SEQUENCE AND SCHEDULING
Install work in phases to accommodate user agency's occupancy requirements. During the construction period coordinate electrical schedule and operations with AEC's Construction Representative.

WORK BY OTHER TRADES
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.

Electrical details on drawings for equipment to be provided by others are 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.

OFFSITE STORAGE
Prior approval by AEC and the A/E will be needed. The contractor shall submit Storage Agreement Form DOA-4528 to AEC for consideration of off-site materials storage. In general, building wire, conduit, fittings and similar rough-in material will not be accepted for off-site storage. No material will be accepted for off-site storage unless shop drawings for the material have been approved.

SALVAGE MATERIALS
No materials removed from this project shall be reused unless specifically noted otherwise. All materials removed shall become the property of and shall be disposed of by the Contractor.

CERTIFICATES AND INSPECTIONS

Obtain and pay for all required installation inspections, except those provided by the AEC, in accordance with the Wisconsin Administrative Code. Deliver originals of these certificates to the AEC's Project Representative.

The Electrical Contractor is responsible for coordination of electrical inspections. Prior to the start of significant on-site electrical work, the contractor shall schedule a pre-installation meeting with the Electrical Inspector to discuss the inspection requirements and review the contract requirements (also see Article 15 of the General Conditions). The Electrical Contractor shall be present when the Electrical Inspector conducts the electrical inspections.

OPERATION AND MAINTENANCE DATA
All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

In addition to the general content specified under GENERAL REQUIREMENTS supply the following additional documentation:

1. Manufacturer’s wiring diagrams for electrically powered equipment.
2. All required passwords to gain local access to equipment and controllers.

RECORD DRAWINGS
The Contractor shall maintain at least one copy each of the specifications and drawings on the job site at all times.

The AEC or the A/E will provide the Contractor with a suitable set of contract drawings on which daily records of changes and deviations from contract shall be recorded. Dimensions and elevations on the record drawings shall locate all buried or concealed piping, conduit, or similar items.

The daily record of changes shall be the responsibility of Contractor's field superintendent. No arbitrary mark-ups will be permitted.

At completion of the project, the Contractor shall submit the marked-up record drawings to the Architect/Engineer prior to final payment.

PART 2 - PRODUCTS

ACCESS PANELS AND DOORS

Lay-in Ceilings:
Removable lay-in ceiling tiles in 2 x 2 foot or 2 x 4 foot configuration provided under other divisions are sufficient; no additional access provisions are required unless specifically indicated.

Concealed Spline Ceilings:
Removable sections of ceiling tile held in position with metal slats or tabs compatible with the ceiling system used will be provided under other divisions.

Metal Pan Ceilings:
Removable sections of ceiling tile held in position by pressure fit will be provided under other divisions.

Plaster Walls and Ceilings, Concealed Cavities:
16-gauge frame with not less than a 20-gauge hinged door panel, prime coated steel for general applications, stainless steel for use in toilets, showers and similar wet areas, concealed hinges, screwdriver operated cam latch for general application, key lock for use in public areas, UL listed for use in fire rated partitions if required by the application. Use the largest size access opening possible, consistent with the space and the equipment needing service; minimum size 20" x 30".

IDENTIFICATION
See Electrical section 26 05 53 – Identification for Electrical Systems.

SEALING AND FIRE STOPPING
FIRE AND/OR SMOKE RATED PENETRATIONS:
Provide all fire stopping of fire rated penetrations and sealing of smoke rated penetrations in compliance with section 07 84 00 "Fire Stopping".

NON-RATED PENETRATIONS:

Conduit Penetrations Below Grade:
In exterior wall openings below grade, use a modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the uninsulated conduit and the cored opening or water-stop type wall sleeve.

Conduit and Cable Tray Penetrations Above Grade:
At through-wall conduit and cable tray penetrations of non-rated interior and exterior walls, and floors, use urethane caulk in annular space between conduit and sleeve, or the core drilled opening.

PART 3 - EXECUTION

EXCAVATION AND BACKFILL

Perform all excavation and backfill work to accomplish indicated electrical systems installation unless noted otherwise.

CONCRETE WORK
The Division 3 Contractor will perform all cast-in-place concrete unless noted otherwise elsewhere. Provide all layout drawings, anchor bolts, metal shapes, and/or templates required to be cast into concrete or used to form concrete for the support of electrical equipment.

CUTTING AND PATCHING
Refer to Division 1, General Requirements, Cutting and Patching.

BUILDING ACCESS
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.

EQUIPMENT ACCESS
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 plaster or drywall walls or ceilings, furnish the access doors to the General Contractor and reimburse the General Contractor for installation of those access doors.

COORDINATION
The Contractor shall cooperate with other trades and AEC 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 to the AEC, provided such decision is reached prior to actual installation. The Contractor shall check location of electrical outlets with respect to other installations before installing.

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.

Coordinate all work with other contractors prior to installation. Any installed work that is not coordinated and that interferes with other contractor's work shall be removed or relocated at the installing contractor's expense.

Coordinate all equipment requirements with the other trades and the Owner. Review the complete set of drawings and specifications to determine the extent of all wiring, starters, devices, etc. required in the project.

Coordinate the available fault current rating requirements. All equipment, including control panels and internal components shall be rated to interrupt the available fault current.

SLEEVES AND OPENINGS
Conduit penetrations in new poured concrete horizontal construction requiring F and T rating: Form opening using hole form or core drill opening. Alternatively provide cast in place fire stopping devices/sleeves.

Conduit penetrations in new poured concrete horizontal construction requiring F rating but no T rating: Same as conduit penetrations in new poured concrete construction requiring F and T ratings except that schedule 40 steel pipe sleeves may also be used.

Conduit penetrations in new poured concrete horizontal construction that do not require F or T ratings: Provide schedule 40 steel pipe sleeve, form opening using hole form or core drill opening.

Conduit penetrations in existing concrete floors: Core drill openings.

Conduit penetrations through existing floors located in food service areas that do not require a T rating: Core drill sleeve opening large enough to insert schedule 40 sleeve, extend sleeve 2 inches above the floor and grout area around sleeve with hydraulic setting, non-shrink grout.

Where penetrating conduit weight is supported by floor, provide manufactured product or structural bearing collar designed to carry load.

SEALING AND FIRE STOPPING
FIRE AND/OR SMOKE RATED PENETRATIONS:
Provide all fire stopping of fire rated penetrations and sealing of smoke rated penetrations in compliance with section 07 84 00 Fire Stopping.

NON-RATED PENETRATIONS:
In exterior wall openings below grade, assemble rubber links of mechanical seal to the proper size for the conduit and tighten in place, in accordance with the manufacturer's instructions. Install so that the bolts used to tighten the seal are accessible from the interior of the building or vault.

At all interior and exterior walls, through-wall conduit penetrations are required to be sealed. Apply sealant to both sides of the penetration in such a manner that the annular space between the sleeve or cored opening and the conduit is completely blocked.

PENETRATIONS SUBJECT TO WATER INTRUSION:
For penetrations (both rated and non-rated) in floors subject to water intrusion or in rooms housing electrical equipment (but not within walls) provide one of the following:

- Conduit penetration where steel pipe sleeve is used extend steel sleeve 2” above the floor.
- Conduit penetration where cast in place fire stopping device/sleeve is used, extend device/sleeve 2” above the floor (provided it meets the device’s UL listing).

- Conduit penetration where there is no steel sleeve or cast in place fire stopping device/sleeve, provide 2”x 2” x 1/8” galvanized steel angles fastened to floor surrounding the penetration or group of penetrations to prevent water from getting to penetration. Provide urethane caulk between angles and floor and fasten angles to floor minimum 8” on center. Seal corners watertight with urethane caulk.

Floors subject to water intrusion or rooms housing electrical equipment include the following locations:

- Food Service/Kitchen Areas
- Restrooms
- Janitor Rooms w/ Sinks
- Mechanical/Plumbing Equipment Rooms
- Chemical/Hazardous Waste Storage
- Maintenance/Industrial Shops
- Vehicle Storage and Parking Ramps
- Data/Telecommunications Rooms
- Electrical Equipment Rooms

Provide waterproof caulk sealant top coating on fire stopping system (or other approved means to protect the fire stopping system from water) in areas subject to wash down such as Food Service and Dish Washing Areas.

HOUSEKEEPING AND CLEAN UP

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, this Contractor shall remove all tools, excess material and equipment, etc., from the site.

AEC TRAINING

All training provided for agency shall comply with the format, general content requirements and submission guidelines specified under Section 01 91 01 or 01 91 02.

Contractor to provide factory authorized representative and/or field personnel knowledgeable with the operations, maintenance and troubleshooting of the system and/or components defined within this section for a minimum period of 4 hours.

END OF SECTION

SECTION 26 05 02
ELECTRICAL DEMOLITION FOR REMODELING

PART 1 - GENERAL

SCOPE
The work under this section includes demolition of selected electrical items as noted on the drawings. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work

PART 2 - PRODUCTS
- Materials and Equipment

PART 3 - EXECUTION
- Examination
- Preparation
- Demolition and Extension of the Existing Electrical Work

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

PART 2 - PRODUCTS

MATERIALS AND EQUIPMENT
Materials and equipment for patching and extending work as specified in the individual Sections.

PART 3 - EXECUTION

EXAMINATION
Verify field measurements and circuiting arrangements as shown on Drawings.

Verify that abandoned wiring and equipment serve only abandoned facilities.

Beginning of demolition means installer accepts existing conditions.

PREPARATION
Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

Coordinate utility service outages with the AEC Field Representative, and Architect/Engineer. Also, if applicable, coordinate utility service outages with the local Utility Company.

Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations and follow the safe working practice requirements of NFPA 70E.

Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from the AEC Field Representative at least 48 hours before partially or completely disabling system. Minimize outage duration. If required, make temporary connections to maintain service in areas adjacent to work area.

Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Obtain permission from the AEC Field Representative and local Authority Having Jurisdiction at least 48 hours before partially or completely disabling system. Minimize outage duration. If required, make temporary connections to maintain service in areas adjacent to work area.

Existing Communication/Data System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from the AEC requirements of these specifications. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

Remove abandoned wiring to source of supply.

Remove exposed abandoned conduit and abandoned conduit above accessible ceiling finishes, unless noted otherwise on drawings. Cut conduit flush with walls and floors, and patch surfaces. If certain conduits and boxes are abandoned but not scheduled for removal, they shall be shown on the "As Built Drawings".

Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit and wiring servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.

Disconnect and remove abandoned panelboards and distribution equipment.

Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

Provide revised typed circuit directory in panelboards that have circuits removed.

Repair adjacent construction and finishes damaged during demolition and extension work.

Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

Provide supplemental support for conduits that are routed through demolition area, and are to remain. Supplemental support shall be added so that the conduit meets the support requirements of electrical specification section 26 05 33.

END OF SECTION

SECTION 26 05 04
CLEANING, INSPECTION, AND TESTING OF ELECTRICAL EQUIPMENT

PART 1 - GENERAL

SCOPE
The work under this section includes the required cleaning, inspection, adjustment, maintenance and testing of electrical equipment, as specified herein. This applies only to new electrical and existing electrical equipment being furnished, modified, worked on or serviced by this contractor for this project. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work

PART 2 - PRODUCTS
- Not Used

PART 3 - EXECUTION
- General Inspection and Cleaning of All Electrical Equipment
- Grounding Systems
- Dry Type Transformers
- Lightning Arresters/Surge Suppression
- Metering and Instrumentation
- Mechanical and Electrical Interlock System
- Ground Fault Systems
- Switchboards (Low voltage)
- Panelboards
- Motor Starters and Motor Control Centers
- Cables
- Light Fixtures
- Occupancy Sensors
- Battery Pack Emergency Lighting

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

GENERAL INSPECTION AND CLEANING OF ALL ELECTRICAL EQUIPMENT
Inspect for physical damage and abnormal mechanical and electrical conditions.

Any item found to be out of tolerance, or in any other way defective as a result of the required inspection or testing, shall be reported to the AEC. Procedure for repair and/or replacement will be outlined. After appropriate corrective action is completed the item shall be re-tested.

Compare equipment nameplate information with the latest single line diagram and report any discrepancies.

Verify proper auxiliary device operation and indicators.

Check tightness of accessible bolted electrical joints. Use torque wrench method.

Make a close examination of equipment and remove any shipping brackets, insulation, packing, etc. that may not have been removed during original installation.

Make a close examination of equipment and remove any dirt or other forms of debris that may have collected in existing equipment or in new equipment during installation.

Clean All Equipment:
Vacuum inside of panelboards, switchboards, switchgear, transformer core and coils, bus ducts, MCC's, and the exterior of all Communications and Electronic Safety and Security hardware and equipment.

Loosen attached particles and vacuum them away.
Wipe all insulators with a clean, dry, lint free rag.
Clean insulator grooves.
Re-vacuum inside surfaces as directed by the AEC Construction Representative or Inspector

Inspect equipment anchorage.

Inspect equipment and bus alignment.

Check all heater elements for operation and control.

Lubricate nonelectrical equipment per manufacturer's recommendations.

GROUNDING SYSTEMS
Inspect the ground system for adequate termination at all devices.

DRY TYPE TRANSFORMERS
Test and adjust the cooling fans, controls and alarm functions.

Vacuum clean the transformer enclosure.

Measure secondary voltage phase-to-phase and phase-to-ground after final energization and prior to loading.

Verify and/or connect transformer "XO" to ground, load side of "WYE" systems.

LIGHTNING ARRESTERS/SURGE SUPPRESSION
Inspect for physical damage such as chipped or fractured porcelain. Wipe clean.

Perform a ground continuity test to grounding system.

Verify the proper mounting and adequate clearance.

Verify the voltage of the units with system one line diagram. Report any discrepancies.

Verify the electronic surge protection device is connected properly and status lights are normal.

METERING AND INSTRUMENTATION
Examine all devices for broken parts, damage and wire connection tightness.

Verify the electronic meter is connected properly and displaying proper voltage and power quantities.

Inspect nameplate information for compatibility with one-line drawings.

Verify the instrument transformer connections with the system requirements.

Verify tightness of all bolted connections and assure adequate clearances exist from primary circuits to secondary circuit wiring and to grounds.

Verify that all required grounding and shorting connections exist and that those connections make good contact; i.e. sufficient surface area, good cleanliness, and proper pressure.

Verify proper primary and secondary fuses and required sizes.

MECHANICAL AND ELECTRICAL INTERLOCK SYSTEM
Physically test each system to insure proper function, operation and sequencing.

Closure attempt shall be made on locked open devices.

Opening attempt shall be made on locked closed devices.

Key exchange shall be made with devices operated in off normal positions.

GROUND FAULT SYSTEMS
Inspect for physical damage.

Inspect the neutral main bonding connection to assure:

Zero sequence system is grounded upstream of sensor.
Ground strap systems are grounded downstream from the sensing device.
Ground connection is made ahead of the neutral disconnect link.

SWITCHBOARDS (LOW VOLTAGE)

Visual and Mechanical Inspection:

Inspect for physical, electrical and mechanical conditions. Re-torque all bolted connections.

Compare equipment nameplate information with latest single line diagram and report discrepancies.

Inspect for proper alignment, anchorage and grounding

All doors, panels and sections shall be inspected for paint, dents, scratches, and fit.

Vacuum clean the switchboard enclosure.

All active components shall be exercised and cleaned where possible.

All indicating devices shall be inspected for proper operation.

PANELBOARDS

Torque all the connections per the manufacturers spec. Verify phase wires, color coding, separate neutral and mechanical bonding. Verify circuit breaker operation. Verify the directory.

Vacuum clean the panelboard enclosure.

MOTOR STARTERS AND MOTOR CONTROL CENTERS

Verify the control circuits. Confirm the fusing and the grounding of the control transformers. Torque all of the connections. Confirm the overload elements and the circuit breakers (fuse) for proper sizing. Verify all grounding. Operate and test each motor starter for proper operation.

CABLES

600 Volt cable:

Visually inspect cables, lugs, connectors and all other components for physical damage and proper connections.
Check all cable connectors for tightness (with a torque wrench) and clearances. Torque test conductor terminations to manufacturer's recommendations.
Perform a 1000 Vdc megger test on all secondary cables from the substation transformers to the secondary switchboards and on all switchboard feeders.

LIGHT FIXTURES

Check the bonding and proper lamping. Verify that recessed fixtures are installed with hold down clips. Confirm operation of the fixture with the proper switch or sensor.

OCCUPANCY SENSORS

Confirm operation of the sensor per the manufacturer’s specification.

BATTERY PACK EMERGENCY LIGHTING

Verify the operation per the manufacturers spec and run all of the diagnostic steps. Confirm proper grounding and location.

COMMUNICATIONS AND ELECTRONIC SAFETY AND SECURITY

At equipment rooms:

Check all cable and connectors for proper installation and support.
Visually inspect cables, lugs, connectors and all other components for physical damage and proper connections.
Confirm cable bends to comply with manufacturer's minimum allowable bending radii.
Inspect for proper shield grounding, cable support and termination.
Confirm all dust caps and blank panels are in place.

Wipe down all equipment racks and cabinets, enclosures, cable supports, cable organizers, termination hardware and related items.

Coordinate cleaning schedule to provide a secure, dust and contaminant-free environment as required to accommodate all trade's equipment that will be positioned in the room. This condition likely will precede general occupancy.

Refer to Division 27 and 28 specification sections that may include additional requirements.

END OF SECTION

SECTION 26 05 19
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

SCOPE
The work under this section includes furnishing and installing required wiring and cabling systems including pulling, terminating and splicing. Included are the following topics:

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

Section 26 05 33 – Raceway and Boxes for Electrical Systems.
Section 26 05 53 – Identification for Electrical Systems.

REFERENCES
SPS 316- Electrical

SUBMITTALS
Submit product data: Provide for each cable assembly type.

Submit factory test reports: Indicate procedures and values obtained.

Submit shop drawings for modular wiring system including layout of distribution devices, branch circuit conduit and cables, circuiting arrangement, and outlet devices.

Submit manufacturer's installation instructions. Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

PROJECT CONDITIONS
Verify that field measurements are as shown on Drawings.

Conductor sizes are based on copper.

Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required for project conditions.

Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

PART 2 - PRODUCTS

GENERAL
All wire shall be new, delivered to the site in unbroken cartons and shall be less than one year old out of manufacturer's stock.

All conductors shall be copper. Aluminum conductors size #1/0 and larger may be substituted for copper and used for phase and neutral conductors for transformer feeders, switchboard feeders, and panelboard feeders. All ground conductors shall be copper.

Aluminum conductors shall not be used for serving individual motors, chillers, VFD's and motor controllers.

The following requirements shall be met when aluminum conductors are used:

Aluminum alloy conductors shall be compact stranded conductors of a recognized Aluminum Association 8000 Series aluminum alloy conductor material (AA-8000 series alloy).

It is the responsibility of the contractor to increase the size of the conduit, wire gutter, or enclosure, if necessary, to accommodate the aluminum conductors and meet allowable code requirements.

It is the responsibility of the contractor to increase the size of the aluminum conductor and associated termination lugs to match the ampacity of the copper conductor circuit shown on the Drawings.

The contractor shall submit a feeder schedule to the Engineer for all conductor substitutions indicating the aluminum conductor wire size and the conduit size. The contractor shall not begin the installation until written approval is granted by the Engineer.

All aluminum conductors shall terminate on a mechanical screw-type connector or mechanical compression-type connector. Connector shall be dual rated (AL7CU or AL9CU) and Listed by UL for use with aluminum and copper conductors, and sized to accept aluminum conductors of the required ampacity. When using compression-type connectors, the lugs shall be marked with wire size, die index, number and location of crimps and shall be suitably color-coded. Using a suitable stripping tool, remove insulation from the required length of the conductor. Wire brush the conductor and apply a Listed joint compound. Tighten or crimp the connection per the connector manufacturer's recommendation. Wipe off any excess joint compound.

When terminating aluminum conductors to aluminum bus, prepare a mechanical screw-type or compression-type connection. Bolts shall be anodized alloy and conform to current ANSI and ASTM chemical and mechanical property limits. Nuts shall be aluminum alloy and conform to current ANSI standards. Washers shall be flat aluminum alloy, Type A plain, standard wide series conforming to current ANSI standards. Lubricate and tighten the hardware per manufacturer's recommendations.

When terminating aluminum conductors to copper bus, prepare a mechanical screw-type or compression-type connection. Bolts shall be plated or galvanized medium carbon steel; heat treated, quenched and tempered equal to current ASTM standard or SAE grade 5. Nuts shall conform to current ANSI standards. Washers shall be steel, Type A plain, standard wide series conforming to current ANSI standards. Belleville conical spring washers shall be of hardened steel, cadmium plated or silicone bronze. Lubricate and tighten the hardware per manufacturer's recommendations.

The final tightening torque shall be recorded for all aluminum conductor mechanical screw-type connections and provided in report form, in the completed O&M manuals.

The contractor shall perform an infrared survey of all aluminum conductor connections after the installation is complete and in normal service. Infrared surveys shall be performed during periods of maximum possible loading with at least 30% of rated load of the equipment being inspected. All connections with elevated temperatures shall be corrected by the contractor. The infrared survey results shall be provided in report form, in the completed O&M manuals.

No copper-to-aluminum transitions permitted when splicing onto existing copper feeders.

Insulation shall have a 600 volt rating.

All conductors shall be stranded.

Stranded conductors may only be terminated with UL OR ETL Listed type terminations or methods: e.g. stranded conductors may not be wrapped around a terminal screw but must be terminated with a crimp type device or must be terminated in an approved back wired method.

BUILDING WIRE
Description: Single conductor insulated wire 90 degree C.

Insulation: Type THHN/THWN-2, XHHW-2 insulation.

SERVICE ENTRANCE CONDUCTORS
Description: Single conductor or multi-conductor insulated wire. 90 degree C sized at the 75 degree C table.

Insulation: Type USE-2, XHHW-2 insulation for service entrance conductors routed from exterior source to exterior termination location.
Type XHHW-2 insulation for services entrance conductors routed from exterior source to interior termination location.

VARIABLE FREQUENCY DRIVE (VFD) WIRE
All power wiring from the VFD output to the motor shall be type XHHW-2 insulation, single conductor wire.

ABOVEGROUND WIRE FOR EXTERIOR WORK
Description: Single conductor insulated wire, 90 degree C.

Insulation: Type XHHW-2 insulation.

UNDERGROUND WIRE FOR EXTERIOR WORK
Description: Stranded single or multiple conductor insulated wire, 90 degree C.

Insulation: Type USE-2, XHHW-2, RHW-2 insulation.

This wiring shall be used in all underground feeder and branch circuit applications, except THHN/THWN-2 is permitted when run in a concrete-encased ductbank.

WIRING CONNECTORS
Split Bolt Connectors: Not acceptable.

Solderless Pressure Connectors: High copper alloy terminal. May be used only for cable termination to equipment terminals. Not approved for splicing.

Twist Type Wire Connectors: Solderless twist type spring connector (wire-nut) with insulating cover for copper wire splices and taps. Use for conductor sizes 10 AWG and smaller. The manufacturer's wire fill capacity must be followed. Use Silicone filled twist type spring connectors in all wet location areas.

Mechanical Spring Actuation Connectors: Toolless type spring actuation connector (push-in) with spacers for copper wire splices and taps. Use for conductor sizes 12 AWG and smaller. The manufacturer's wire fill capacity must be followed. Use in interior, dry locations only.

All wire connectors used in underground or exterior pull boxes or hand holes shall be gel filled twist connectors or a connector designed for damp and wet locations. Gel filled twist type connectors can be used for copper conductor sizes 6 AWG and smaller for site lighting applications. The manufacturer's wire fill capacity must be followed.

Mechanical Connectors: Bolted type tin-plated; high conductivity copper alloy; spacer between conductors; beveled cable entrances.

Compression (crimp) Connectors: Long barrel; seamless, tin-plated electrolytic copper tubing; internally beveled barrel ends. Connector shall be clearly marked with the wire size and type and proper number and location of crimps. Connector must be installed with a crimper tool listed for use with the manufacturer and type of compression connector.

Insulation Piercing Connectors: Molded insulated body, copper teeth, wrench tightened, UL 486B Listed. May be used only for connection of a tap conductor in run and tap type applications when main conductor is 8 AWG and larger.

PART 3 - EXECUTION

GENERAL WIRING METHODS
All wire and cable shall be installed in conduit.

Do not use wire smaller than 12 AWG for power and lighting circuits.

All phase, neutral and ground conductors shall be sized to prevent excessive voltage drop at rated circuit ampacity. As a minimum use 10 AWG conductors for 20 ampere, 120 volt branch circuit home runs longer than 100 feet (30 m), and for 20 ampere, 277 volt branch circuit home runs longer than 200 feet (61 m).

Ground conductor size shall be increased per NEC 250.122(B) when phase and phase/neutral conductors are increased in size.

Make conductor lengths for parallel conductors equal.

Splice only in junction or outlet boxes.

No conductor less than 10 AWG shall be installed in exterior underground conduit.

Identify ALL low voltage wire, 600V and lower, per section 26 05 53.

Neatly train and lace wiring inside boxes, equipment, and panelboards.

WIRING INSTALLATION IN RACEWAYS
Pull all conductors into a raceway at the same time. Use Listed water or silicone based wire pulling lubricant for pulling 4 AWG and larger wires and for other conditions when necessary. Wax based lubricants are not allowed. Pulling lubricant is not required for low friction type products where the cable manufacturer recommends that cables be pulled without lube.

Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.

Completely and thoroughly swab raceway system before installing conductors.

Place all conductors of a given circuit (this includes phase wires, neutral (if any), and ground conductor) in the same raceway. If parallel phase and/or neutral wires are used, then place an equal number of phase and neutral conductors in same raceway or cable.

Manufacturers maximum pulling tensions shall be not be exceeded and individual pulls shall not exceed 270 degrees.

VFD Installations: Install VFD input wiring and output wiring in separate conduit systems. Do not mix VFD input power and output power, or control wiring in a common raceway.

In high ambient spaces, mechanical rooms, utility rooms and exterior exposed conduit, 90 degree C, XHHW-2 conductors shall be utilized.

WIRING CONNECTIONS AND TERMINATIONS
Splice only in accessible junction boxes.

Wire splices and taps shall be made firm, and adequate to carry the full current rating of the respective wire without soldering and without perceptible temperature rise.

All splices shall be so made that they have an electrical resistance not in excess of two feet (600 mm) of the conductor.

Use solderless twist type spring connectors (wire nuts) with insulating covers for copper wire splices and taps, 10 AWG and smaller or toolless type actuation connectors (push-in) with spacers for copper wire splices and taps, 12 AWG and smaller. Use mechanical or compression connectors for wire splices and taps, 8 AWG and larger. Tape uninsulated conductors and connectors with electrical tape to 150 percent of the insulation value of the wiring.

Thoroughly clean wires before installing lugs and connectors.

At all splices and terminations, leave tails long enough to cut splice out and completely re-splice.

FIELD QUALITY CONTROL

Field inspection and testing will be performed under provisions of Section 26 05 04.

Additional testing as follows shall be performed if aluminum conductors are used:

Feeders terminated with aluminum conductors shall be tested with a thermal imager and recorded.

Conductors shall be closely checked for loose or poor connections, and for signs of overheating or corrosion.

Test procedures shall meet NETA guidelines.

Test results and report shall be provided to the engineer and included in O&M manual under AL conductors/ tests.

Contractor shall correct all deficiencies reported in the test report.

WIRE COLOR

General:

Solid colored insulation is required for all THHN/THWN-2 wire. For other wire types use colored wire or identify wire with colored tape at all terminals, splices and boxes. Wire shall be colored as indicated below.

In existing facilities, use existing color scheme.

In new facilities, use black and red for single phase circuits at 120/240 volts, use Phase A black, Phase B red and Phase C blue for circuits at 120/208 volts single or three phase, and use Phase A brown, Phase B orange and Phase C yellow for circuits at 277/480 volts single or three phase. Note: This includes fixture whips except for Listed whips mounted by the fixture manufacturer on the fixture and Listed as a System.

Switch legs shall be the same color as their associated circuit, except for the second switch leg used for dual-level switching. The second switch leg shall be the next phase color, e.g. if the first switch leg is brown (277/480V phase A), the second switch leg shall be orange (277/480V phase B).

Traveler conductors run between 3 and 4 way switches shall be colored pink or purple.

Neutral Conductors: White for 120/208V and 120/240V systems, Gray for 277/480V systems. Where there are two or more neutrals in one conduit, each shall be individually identified with a different stripe.

Branch Circuit Conductors: Three or four wire home runs shall have each phase uniquely color coded.

Feeder Circuit Conductors: Each phase shall be uniquely color coded.

Ground Conductors: Green colored insulation for THHN/THWN-2 wire. For other wire types use green colored wire or identify wire with green tape at both ends and at all access points, such as panelboards, motor starters, disconnects and junction boxes. When isolated grounds are required, contractor shall provide green with yellow tracer.

BRANCH CIRCUITS

The use of single-phase, multi-wire branch circuits with a common neutral is not permitted, except as noted on drawings. All single-phase branch circuits shall be furnished and installed with an individual accompanying neutral, sized the same as the phase conductors, except as noted on drawings.

EMERGENCY CIRCUITS

All Emergency, Legally Required Standby and Optional Standby system wiring shall be installed in separate raceways after their associated transfer switches. The wiring shall be separate from each other and from all normal system wiring.

All emergency wiring serving fire pumps, requiring minimum 2 hour fire rating shall comply with NEC 695.6(B).

All emergency wiring serving NEC 700 loads, requiring minimum 2 hour fire rating shall comply with NEC 700.10(D)(1).

All generator control conductors installed between transfer equipment and the emergency generator serving Emergency, Legally Required Standby and Optional Standby systems shall be kept entirely independent of all other wiring. This shall require a dedicated conduit system between each transfer switch and the emergency generator. If a Fire Pump is served off the emergency generator, a separate conduit shall be provided between fire pump controller and generator.

END OF SECTION

SECTION 26 05 23
CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

SCOPE
The work under this section includes furnishing and installing cabling for remote-control, signaling and power-limited circuits. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- References
- Submittals
- Project Conditions

PART 2 - PRODUCTS
- General
- Remote-Control and Signaling Cable
- Wiring Connectors

PART 3 - EXECUTION
- General Wiring Methods
- Wiring Installation In Raceways
- Free-Air Cable Installation
- Wiring Connections and Terminations
- Field Quality Control

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

Section 26 05 33 – Raceway and Boxes for Electrical Systems.
Section 26 05 53 – Identification for Electrical Systems.

REFERENCES
NFPA 70 - National Electrical Code.

SUBMITTALS
Submit product data: Provide for each cable assembly type.

Submit manufacturer's installation instructions. Indicate application conditions and limitations of use stipulated by product testing agency.

PROJECT CONDITIONS
Verify that field measurements are as shown on Drawings.

Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.

Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

PART 2 - PRODUCTS

GENERAL
All wire shall be new, delivered to the site in unbroken cartons and shall be less than one year old out of manufacturer's stock.

All conductors shall be copper.

Insulation shall have a 600 volt rating.

All conductors shall be suitable for the application intended. Conductors #12 and smaller may be solid or stranded with the following requirements or exceptions:

All conductors terminated with crimp type devices shall be stranded.

Stranded conductors shall be terminated with an approved ETL Listed type terminations or methods: e.g. stranded conductors shall not be wrapped around a terminal screw but shall be terminated with a crimp type device or in an approved back wired method.

REMOTE-CONTROL AND SIGNALING CABLE
All systems cabling shall meet the requirements of NEC Article 725 and the following:

Cable for 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, riser or plenum) for the application as required in the National Electrical Code.

Cable for Class 2 or Class 3 Remote-Control, Signaling and Power-Limited Circuits shall be Listed, temperature rated, and suitable Type (general purpose, riser or plenum) for the application as required in the National Electrical Code.

WIRING CONNECTORS
Split Bolt Connectors: Not acceptable.

Spring Wire Connectors: Solderless spring type pressure connector with insulating covers for copper wire splices and taps. Use for conductor sizes 10 AWG and smaller.

All wire connectors used in underground or exterior pull boxes shall be gel filled twist connectors or a connector designed for damp and wet locations.

PART 3 - EXECUTION

GENERAL WIRING METHODS
Control-voltage cables shall be installed in conduit. However, they may be installed free-air (without conduit) above accessible ceilings if the cable meets NEC requirements for the application, unless specified to be in conduit in other sections of the specifications. See requirements for free-air cable installation below.

Control cables for controlling HVAC and lighting equipment connected to emergency power shall be routed in raceway.

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.

Splice only in junction boxes.

Identify wire per section 26 05 53.

Neatly train and lace wiring inside boxes, and equipment.

WIRING INSTALLATION IN RACEWAYS
Pull all conductors into a raceway at the same time. Use Listed wire pulling lubricant for pulling conditions when necessary.

Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.

FREE-AIR CABLE INSTALLATION
Cabling shall be neatly run at right angles and be kept clear of other trades work.

Cabling shall be supported at a maximum of 4-foot intervals utilizing “J-Hook” or “Bridal Ring” supports anchored to ceiling concrete, piping supports or structural steel beams. If cable sag at mid-span exceeds 12-inches, another support shall be provided. Cable supports shall be installed to maintain cable bend to larger than the minimum bend radius.

Cabling shall not be attached to or supported by existing cabling, plumbing or steam piping, ductwork, suspended ceiling supports or electrical or communications conduit. Do not place cable directly on the ceiling grid or attach cable in any manner to the ceiling grid wires.

To reduce or eliminate Electro-Magnetic Interference (EMI), the following minimum separation distances for 'Free-Air' cabling installations shall be adhered to:

- Twelve (12) inches from power lines of less than 5kV.
- Thirty-nine (39) inches from power lines of 5kV or greater.
- Five (5) inches from lighting fixtures.
- Thirty-nine (39) inches from transformers and motors.

A coil of 4 feet in each cable shall be placed in the ceiling at each 'free-air' wired device. These coils shall be secured (wire tied) at the last cable support before the cable reaches the device and shall be coiled from 100% to 200% of the cable recommended minimum bend radius.

All cable shall be free of tension at both ends. Nylon strain relief connectors shall be provided at each device and junction box where cables enter. In cases where the cable must bear some stress, Kellum type grips may be used to spread the strain over a longer length of cable.

Cable manufacturers minimum bend radius shall be observed in all instances. Care should be taken in the use of cable ties to secure and anchor the station cabling. Ties should not be over tightened as to compress the cable jacket. No sharp burrs should remain where excess length of the cable tie has been cut.

All exposed vertical cable extensions to devices located below the finished ceiling shall be in conduit.

Use suitable cable fittings and connectors.

When permitted in exposed ceiling areas as designated on the plan drawings, Free-Air wiring runs shall avoid areas of high traffic (i.e. aisle way), shall be run as close as possible to outlining walls and shall be a minimum of ten (10) feet above finished floor. Provide protection for exposed cables where subject to damage.

WIRING CONNECTIONS AND TERMINATIONS
Splice only in accessible junction boxes (except splices to low voltage occupancy sensor power packs and terminations to temperature control devices).

All splices shall be so made that they have an electrical resistance not in excess of two feet (600 mm) of the conductor.

Use solderless spring type pressure connectors with insulating covers for wire splices and taps, 10 AWG and smaller.

Thoroughly clean wires before installing lugs and connectors.

At all splices and terminations, leave tails long enough to cut splice out and completely re-splice.

FIELD QUALITY CONTROL
Field inspection and testing will be performed under provisions of Section 26 05 04.

END OF SECTION

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

SCOPE
The work under this section includes grounding electrodes and conductors, equipment grounding conductors, and bonding for Electrical and Communications systems. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- References
- Performance Requirements
- Submittals
- Project Record Documents
- Regulatory Requirements

PART 2 - PRODUCTS
- Rod Electrode
- Concrete-Encased Grounding Electrode
- Mechanical Connectors
- Compression Connectors
- Exothermic Connections
- Conductors
- Bus/Busbar

PART 3 - EXECUTION
- Examination
- General
- Less Than 600 Volt System Grounding
- Communication System Grounding
- Field Quality Control
- Identification and Labeling
- Construction Verification Items
- Warranty

All hardware, cables and related termination and support hardware shall be furnished, installed, wired, tested, labeled, and documented by the Contractor, as detailed in this and related sections.

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

Section 26 08 00 - Commissioning of Electrical.

REFERENCES
ANSI/IEEE 81 (Latest edition) - Guide to Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Grounding System
ANSI/IEEE 142 (Latest edition) - Recommended Practice for Grounding of Industrial and Commercial Power Systems
UL 467 Electrical Grounding and Bonding Equipment
IEEE 837 - IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding
TIA-607-C - Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

PERFORMANCE REQUIREMENTS
Grounding System Resistance:
- Equipment Rated 500 KVA and Less: 10 ohms maximum at building service entrance.
- Equipment Rated 500 to 1000 KVA: 5 ohms maximum at building service entrance.
- Equipment Rated more than 1000 KVA: 3 ohms building service entrance.
- Communications Ground Busbars: 5 ohms maximum.

Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test instrument manufacturer's recommendations. Perform fall-of-potential test in accordance with ANSI/ IEEE 81 on main grounding electrode system.

Testing of grounding system resistance is to be witnessed by the AEC or Construction Representative.

Provide test report of grounding system overall resistance and resistance of each electrode in final O&M manuals and noted on record documents.

SUBMITTALS
Product Data: Provide data for grounding electrodes and connections.

Provide samples of ground labels.

Test Reports: Indicate overall resistance to ground and resistance of each electrode.

Manufacturer's Instructions: Include instructions for preparation, installation and examination of exothermic connectors.

PROJECT RECORD DOCUMENTS
Record locations of all electrical and telecommunications grounding electrodes, busbars and grounding conductors as installed including recorded ground resistance test results.

REGULATORY REQUIREMENTS
Conform to requirements of NFPA 70.

Furnish products listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

PART 2 - PRODUCTS

ROD ELECTRODE
Material: Copper-clad steel.

Diameter: 3/4 inch (19 mm) minimum.

Length: 10 feet (3.5 m) minimum. Rod shall be driven at least 9' 6" deep.

CONCRETE-ENCASED GROUNDING ELECTRODE FOR BUILDINGS
Fabricate per NFPA 70, Article 250.52 (A)(3)(2) using 20 feet (6m) of bare copper wire not smaller than bare seven-strand #4 AWG. Metallic components shall be encased by at least 2 in. of concrete and shall be located horizontally with in that portion of a concrete foundation or footing that is in direct contact with earth or within vertical foundations or structural components or members that are in direct contact with the earth.

CONCRETE-ENCASED GROUNDING ELECTRODE FOR POLE BASES
Fabricate per NFPA 70, Article 250.52 (A)(3)(2) using 20 feet (6m) of bare copper wire not smaller than bare seven-strand #4 AWG. If concrete foundation is less than 20 feet (6m) long, coil excess conductor within the base of the foundation. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts.

MECHANICAL CONNECTORS
The mechanical connector bodies shall be manufactured from high strength, high conductivity cast copper alloy material. Bolts, nuts, washers and lock washers shall be made of Silicon Bronze and supplied as a part of the connector body and shall be two hole, two bolt type.

Split bolt connector types are NOT allowed. Exception: the use of split bolts is acceptable for grounding of wire-basket type cable tray, and for cable shields/straps of medium voltage cable.

The connectors shall meet or exceed UL 467 and be clearly marked with the catalog number, conductor size and manufacturer.

COMPRESSION CONNECTORS
The compression connectors shall be manufactured from pure wrought copper. The conductivity of this material shall be no less than 99% by IACS standards.

Each connector shall be factory filled with an oxide-inhibiting compound.

The connectors shall meet or exceed the performance requirements of IEEE 837, latest revision.

The connectors shall be clearly marked with the manufacturer, catalog number, conductor size and the required compression tool settings.

The installation of the connectors shall be made with a compression tool and die system, as recommended by the manufacturer of the connectors, and shall be irreversible.

Pre-crimping of the ground rod is required for all irreversible compression connections to a ground rod.

Terminal lug for communication system grounding shall be compression type and conform to the following:
Material: Tin Plated Copper (aluminum not permitted).
Wire Size: to match conductor
Number of Stud Holes: 2
Stud Hole Size: 3/8”
Bolt Hole Spacing: per TIA-607-C
Tongue Angle: Straight

EXOTHERMIC CONNECTIONS
As manufactured by Erico Cadweld, Harger Ultraweld or similar.

CONDUCTORS
Material: Stranded copper (aluminum not permitted).

Grounding Electrode Conductor: Bare seven-strand conductors. Size as shown on drawings, specifications or as required by NFPA 70, whichever is larger.

Foundation Electrodes: As shown on drawings.

Feeder and Branch Circuit Equipment Ground: Size as shown on drawings, specifications or as required by NFPA 70, whichever is larger. Differentiate between the normal ground and the isolated ground when both are used at the same facility.

Branch Circuit Equipment Ground shall be proportionately increased in size when routed with phase conductors increased in size.

Conductors for Telecommunications shall be as follows:
Telecommunications Bonding Conductor (TMGB to Service Ground): No. 3/0 minimum or as shown on drawings.
Telecommunications Bonding Backbone (TBB; TMGB to TGB): No. 3/0 minimum or as shown on drawings.
Telecommunications Grounding Equalizer (GE): No. 3/0 minimum or as shown on drawings.
Bonding Conductors shall be insulated with a Green Jacket or jacket marked with Green Tape or labeled per NEC Guidelines.

BUS/BUSBAR
Material: Copper (aluminum not permitted).

Size:
All Power systems: 1/4" X 2", length as needed (24” minimum).
Telecommunications Main Ground Busbar (TMGB): 1/4" x 4" x 20" long (minimum).
Telecommunications Grounding Busbar (TGB): 1/4" x 2" x 12" long (minimum).

Busbars:
Be pre-drilled to accommodate two-hole lugs.
3/8” stud hole size; hole spacing per TIA-607-C.
Incorporate insulators and stand-off brackets that electrically isolate busbar from mounting surface.

Provide main ground busbar located adjacent to main electrical service equipment to terminate all ground conductors.

PART 3 - EXECUTION

EXAMINATION
Verify that final backfill and compaction has been completed before driving rod electrodes.

GENERAL
Install Products in accordance with manufacturer's instructions.

Mechanical connections shall be accessible for inspection and checking. No insulation shall be installed over mechanical ground connections.

Ground connection surfaces shall be cleaned and all connections shall be made so that it is impossible to move them.Attach grounds permanently before permanent building service is energized.

All grounding conductor connections to Busbars shall be via two hole lugs.

Terminate each grounding conductor on its own terminal lug. Sharing a single lug by multiple conductors is not allowed.

All grounding electrode conductors and individual grounding conductors shall be installed in PVC conduit, in exposed locations.

Each grounding electrode conductor shall be labeled at each terminated end as to system served and location of second termination.

LESS THAN 600 VOLT ELECTRICAL SYSTEM GROUNDING

Supplementary Grounding Electrode: Use driven ground rod on exterior of building or effectively grounded metal frame of the building.

Provide code sized copper grounding electrode conductor from electrical room ground bus to secondary switchboard ground bus, each separately derived system neutral, secondary service system neutral to street side of water meter, building steel, ground rod, and any concrete encased electrodes. Provide bonding jumper around water meter. Provide physical protection as required.

Equipment Grounding Conductor: Provide separate, insulated equipment grounding conductor within each raceway. Terminate each end on suitable lug, bus, enclosure or bushing. Provide a ground wire from each device to the respective enclosure.

Bond together system neutrals, service equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, and plumbing systems.

FIELD QUALITY CONTROL
Inspect grounding and bonding system conductors and connections for tightness and proper installation.

Testing of grounding system resistance is to be witnessed by the AEC or Construction Representative. Provide test report of grounding system resistance in final O&M manuals and noted on record drawings.

Provide resistance test at each electrical and telecommunications Busbar to ground.

IDENTIFICATION AND LABELING
Label Grounds at point of termination.

Label for Bus Bars and Ground Bars shall be engraved laminate or Pre-printed (manufactured) plastic and include the following:

IF THIS CONNECTOR OR CABLE IS LOOSE OR MUST BE REMOVED, PLEASE CALL THE BUILDING MANAGER.

Provide additional labeling of each individual terminated ground conductor at bus bar identifying installed source per NEC 250.52 A 1-7.

CONSTRUCTION VERIFICATION
Record locations of all electrical and telecommunications grounding electrodes, busbars and grounding conductors as installed including recorded ground resistance test results.

WARRANTY
See Division 1, General Conditions, and General Requirements.

END OF SECTION

SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

SCOPE
The work under this section includes conduit and equipment supports, straps, clamps, steel channel, etc., and fastening hardware for supporting electrical work. Included are the following topics:

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

Section 26 05 53 – Identification for Electrical Systems

SUBMITTALS
Product Data: Provide data for support channel.

QUALITY ASSURANCE
Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2 - PRODUCTS

SUPPORT CHANNEL
Epoxy Painted
Strut shall be made from steel meeting the minimum mechanical properties of ASTM A1011 SS Grade 33, then painted with water born epoxy applied by a cathodic electro-deposition process.

All fittings and hardware shall be zinc plated in accordance with ASTM B633 (SC3 for fittings, SC1 for threaded hardware).

Hot-dip Galvanized Steel
Strut shall be made from steel meeting the minimum mechanical properties of ASTM A1011 SS, Grade 33 and shall be hot-dip galvanized after fabrication in accordance with ASTM A123.

Fittings shall be manufactured from steel meeting the minimum requirements of ASTM A907 SS, Grade 33, and hot-dip galvanized after fabrication in accordance with ASTM A123.

All hardware shall be stainless steel Type 304 or chromium zinc ASTM F1136 Gr. 3.

All hot-dip galvanized after fabrication products must be returned to point of manufacture after coating for inspection and removal of all sharp burrs.

Stainless Steel
All strut, fittings and hardware shall be made of AISI Type 304 or Type 316 stainless steel as indicated.

CONDUIT SUPPORTS
Conduit clamps, straps, supports, etc., shall be steel or malleable iron.

One-hole straps shall be heavy duty type. All straps shall have steel or malleable backing plates when rigid steel conduit is installed on the interior or exterior surface of any exterior building wall.

Above suspended ceilings, bar joist conduit hangers: Spring Steel Clips with Snap-Close Clamps (Conduit Supports): Conduit clamps shall pivot a full 360 degrees and shall snap close around the conduit. Push-in type conduit clamps are not allowed. Spring clips shall require a hammer to install onto supporting surface.

Stud wall applications: Spring Steel Clips with Push-in or Snap-Close Conduit Clamps (Conduit Supports): Conduit clamps shall pivot a full 360 degrees. Spring clips shall require a fastener to install onto stud.

Box/conduit hanger with rod/wire clip (a.k.a. antlers): One assembly provides support for electrical box and conduit from drop wire or rod. Conduit clamps shall snap close around the conduit.

Spring Steel Clip products shall be provided with corrosion resistance and be warranted against failure from corrosion for a period of ten (10) years from date of manufacture.

NYLON ANCHORS
Nylon anchors may only be used in limited applications with the pre-approval of the AEC. See Part 3 – Execution for examples of applications of where nylon anchors may be allowed.

Nylon wall plugs shall be designed for 2-way expansion, providing rapid fixing with high pull-out values. Nylon wall plugs shall be molded with protruding side fins which restrict rotation and prevent fall out from overhead holes. Examples of these include Mungo types MN or MU, or Fischer type S nylon plugs.

Nylon one-piece self-drilling anchors designed for use in hollow gypsum wallboard for light duty loads. Anchors shall be engineered nylon or Zamac alloy. Examples of these are the Zip-It ® or Zip-It Jr. ® self-drilling anchors.

Manufacturer's names and catalog numbers are used for quality and performance only. Anchors manufactured by others shall be equally acceptable provided they meet or exceed in performance and quality as specified.

THREADED ROD
Minimum sized threaded rod for supports shall be 3/8” for trapezes and single conduits 1-1/4” and larger, and ¼” for single conduits 1” and smaller.

HARDWARE
Corrosion resistant, or as noted for each product above.

PART 3 - EXECUTION

INSTALLATION
Fasten hanger rods, conduit clamps, and outlet-, junction-, and pull-boxes to building structure using pre-cast insert system, preset inserts, beam clamps, or expansion anchors.

Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchors on concrete surfaces; sheet metal screws in sheet metal studs and wood screws in wood construction. If nail-in anchors are used, they must be removable type anchors.

Powder-actuated fasteners are not permitted.

Do not fasten supports to piping, ductwork, mechanical equipment, cable tray or conduit.

Do not fasten to suspended ceiling systems.

Do not drill structural steel members unless approved by AEC.

In wet locations, mechanical rooms, and electrical rooms, install free-standing electrical equipment on 3.5-inch (89 mm) concrete pads.

Install surface-mounted cabinets and panelboards with a minimum of four anchors. At all cabinet and panelboard locations on concrete or concrete block walls, and at ALL locations below grade, provide steel channel supports to stand cabinet one inch (25 mm) off wall (7/8” Uni-strut or 3/4” painted fire-retardant plywood is acceptable). In above-grade equipment rooms that have drywall walls, the cabinets and panelboards may be mounted to the drywall if backing is provided in the stud walls behind the equipment.

Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

Furnish and install all supports as required to fasten all electrical components required for the project, including free standing supports required for those items remotely mounted from the building structure, catwalks, walkways etc.

Fabricate supports from galvanized structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

Support Channel
Use one of the following types of support channel as appropriate for the installed environment:

- Indoor: Epoxy Painted Steel, Hot-dipped Galvanized Steel, or as noted on the drawings.
- Exterior and wet locations: Hot-dipped Galvanized Steel or Stainless Steel, as appropriate for the environment or as noted on the drawings. Type 316 stainless steel shall be used for Food Service type environments. Epoxy painted support channel shall not be used for exterior installations.
- Manholes, steam pits, steam tunnels, or corrosive environments: Stainless Steel Type 316.
- Field cuts: File and de-bur cut ends of support channel and paint to prevent rusting. For epoxy-painted support channel, paint cut ends to match the original color. For hot-dipped galvanized support channel, spray cut ends with cold galvanized paint.

Support Wires
Support wires that are installed in addition to the ceiling grid support wires to provide secure support for raceways, cables assemblies, boxes, cabinets, and fittings shall be secured at both ends (e.g., the ceiling structure at the top and the ceiling grid at the bottom) per NEC 300.11(A).

Compressed-air power-actuated fasteners may ONLY be used for the installation of separate ceiling wires required for support of conduits and aircraft cable hung light fixtures.

Support wires shall be identified per specification section 26 05 53.

Spring Steel Clip Conduit Supports
Above suspended ceilings: Spring steel clips with snap-close clamps may be used to support conduit from bar joist (steel truss) systems above suspended ceilings.

Stud wall applications: Spring steel clips with push-in or snap-close conduit clamps may be used to support conduit in interior metal stud wall applications. Use screw fasteners to install conduit clamp onto stud.

Box/conduit hanger with rod/wire clip (a.k.a. antlers): These may only be used in limited applications with the pre-approval of the AEC.

Nylon anchor applications
Nylon anchors may only be used in limited light duty applications with the pre-approval of the AEC.

Nylon anchors shall be designed for the construction material in which they are intended to be installed and shall be designed for the weight in which the anchors are intended to support.

Nylon wall plug applications may include attaching 4” square boxes or conduit straps to plaster-covered clay tile, drywall, or hollow concrete block. Screws used with nylon wall plugs shall be #10 minimum and shall be longer than the anchor.

Nylon one-piece self-drilling anchor applications may include attaching 4” square boxes or conduit straps to hollow gypsum wallboard for light duty loads. Use No. 8 screws with one-piece self-drilling anchors designed for 3/8” to 1” thick wallboard. Use No. 6 screws with anchors designed for 3/8” to 5/8” wallboard.

END OF SECTION

SECTION 26 05 33
RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

SCOPE
This section describes the products and execution requirements relating to furnishing and installing raceways and boxes and related systems as part of a raceway system for electrical, communications, and other low-voltage systems for the project. Included are the following topics:

RELATED WORK

Applicable provisions of Division 1 govern work under this section.

Section 26 05 26 – Grounding and Bonding for Electrical Systems
Section 26 05 29 – Hangers and Supports for Electrical Systems.
Section 26 27 26 – Wiring Devices.

REFERENCES
Wisconsin Administrative Code SPS 316 - Electrical
ANSI/TIA-569-C-Telecommunications Pathways and Spaces

SUBMITTALS
Surface Raceway System - submit product data and catalog sheets for all components.

Boxes - provide product data showing configurations, finishes, dimensions, and manufacturer's instructions.

Conduits in Concrete Slabs Above Grade - provide proposed conduit routing and sizing to Structural Engineer prior to approval of installation to verify structural integrity and fire rating of concrete slab.

Mockups -- Provide on request, mockups for Floor Box and Poke-through Assemblies to demonstrate configuration, capacity and aesthetics and to set quality standards for fabrication and installation.

PART 2 - PRODUCTS

GENERAL
All steel fittings and conduit bodies shall be galvanized.

All conduit transitional fittings shall be listed for installed application.

No cast metal or split-gland type fittings permitted.

All condulet covers must be fastened to the condulet body with screws and be of the same manufacture.

Mogul-type condulets 2 inch (50 mm) and larger, shall be permitted.

C-condulets shall not be used in lieu of pull boxes.

All boxes shall be of sufficient size to provide free space for all conductors enclosed in the box and shall comply with NEC requirements.

RIGID METAL CONDUIT (RMC) AND FITTINGS
Conduit: Heavy wall threaded, galvanized steel.

Fittings and Conduit Bodies: Use all steel threaded fittings and conduit bodies.

Expansion Fittings/Expansion Joints: Expansion Fittings shall be Internal Grounding type and shall not rely on external bonding jumpers to maintain grounding continuity between raceway components.

INTERMEDIATE METAL CONDUIT (IMC) AND FITTINGS
Conduit: Galvanized [Steel] [Aluminum], threaded.

Fittings and Conduit Bodies: Use all [Steel] [Aluminum] threaded fittings and conduit bodies.

Expansion Fittings/Expansion Joints: Expansion Fittings shall be Internal Grounding type and shall not rely on external bonding jumpers to maintain grounding continuity between raceway components.

ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS
Conduit: Steel, Unthreaded thin wall galvanized tubing.

Fittings: All steel, compression or set screw type. No push-on or indenter types permitted.

Transitional fitting: ½-1": All steel and malleable iron; 1 ¼" and above: All steel, Malleable iron and Die cast where not subjected to physical damage and with project specific AEC and A/E approval.

Conduit Bodies: All steel conduit bodies.

FLEXIBLE METAL CONDUIT (FMC) AND FITTINGS
Conduit: steel, galvanized, spiral strip.

Fittings and Conduit Bodies: All steel, galvanized or malleable iron.

LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC) AND FITTINGS
Conduit: flexible, steel, galvanized, spiral strip with an outer Liquidtight, nonmetallic, sunlight-resistant jacket.

Fittings and Conduit Bodies: ANSI/NEMA FB 1, compression type. There shall be a metallic cover/insert on the end of the conduit inside the connector housing to seal the cut conduit end.

ELECTRICAL NONMETALLIC TUBING (ENT) AND FITTINGS
Conduit: ENT (smurf tube), UL listed and NEC recognized.

Fittings: One piece quick connect fittings for 1/2 inch to 1 inch size and schedule 40 cemented fittings for larger size. When installed in concrete, fittings shall be suitable for damp locations and shall be concrete–tight, stub-ups and stub-downs kits shall meet manufacturer's recommendations.

RIGID POLYVINYL CHLORIDE CONDUIT (PVC) AND FITTINGS
Conduit: Rigid non-metallic conduit, Schedule 40 PVC minimum, Listed, sunlight resistant, rated for 90^0 C conductors. Schedule 80 for locations exposed to physical damage or as required.

Fittings and Conduit Bodies: NEMA TC 2, Listed.

CONDUIT SUPPORTS
See specification Section 26 05 29.

SURFACE METAL RACEWAY
Description: Sheet metal channel with fitted cover, suitable for use as surface metal raceway.

Size: As shown on Drawing.

Finish: Gray enamel.

Fittings: Couplings, elbows, and connectors designed for use with raceway system.

Boxes and Extension Rings: Designed for use with raceway systems.

AUXILIARY GUTTERS (WIREWAYS)
Description: [General purpose] [Oil-tight and dust- tight] [Rain-tight] type wireway without knockouts.

Size: As indicated on Drawings; length as indicated on Drawings.

Cover: Hinged

Connector: Slip-in construction, hinged cover.

Fittings: Lay-in type with removable top, bottom, and side; captive screws.

Finish: Rust inhibiting primer coat with gray enamel finish.

CONDUIT WATER SEALANT
Description: Conduit sealant used to prevent water from entering buildings via conduits.

Sealant shall seal conduits against water and gas intrusion, such as Polywater® FST™-250 Foam Duct Sealant, Raychem RDSS Rayflate Duct Sealing System, or approved alternate. Sealant shall be re-enterable, shall be compatible with the conduit and conductor types being used, and shall comply with NEC 225.27, 230.8, and 300.5(G).

Manufacturer names and catalog numbers are used to develop quality and performance requirements only. Products manufactured by others may be acceptable provided they meet or exceed the specifications.

PULL AND JUNCTION BOXES
Interior Sheet Metal Boxes: code gauge galvanized steel, screw covers, flanged and spot-welded joints and corners.

Interior Sheet Metal Boxes larger than 12 inches (300 mm) in any dimension shall have a hinged cover or a chain installed between box and cover. Boxes 9 square-feet or larger shall have hinged covers and a single cover shall not exceed 10 square-feet.

Interior Sheet Metal Boxes connected to an exterior underground raceway, shall have a drain fitting located in the bottom.

Exterior Boxes and Wet Location Installations: Type 4 and Type 6, flat-flanged, surface-mounted junction box, UL listed as rain-tight. Galvanized cast iron, Aluminum, PVC box and cover with ground flange, neoprene gasket, and stainless steel cover screws.

Boxes installed in Parking Ramps shall be Type 4X, flat-flanged, surface-mounted junction box, ETL listed as rain-tight. [Stainless Steel] box and cover with ground flange, neoprene gasket, and stainless steel cover screws.

Box extensions and adjacent boxes within 48 inches of each other are not allowed for the purpose of creating more wire capacity.

Junction boxes 6 inch-by-6 inch or larger size shall be without stamped knock-outs.

Wireways shall not be used in lieu of junction boxes.

OUTLET BOXES
Sheet Metal Outlet Boxes: galvanized steel, with stamped knockouts.

Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 3/8 inch male fixture studs where required.

Concrete Ceiling Boxes: Concrete type.

Cast Boxes: Cast ferroalloy or aluminum, deep type, gasketed cover, threaded hubs.

OUTLET BOX EXTENDERS
Outlet Box Extenders: Non-Metallic, adjustable depth.

Outlet Box Extenders may only be used in limited applications with the pre-approval of the AEC. See Part 3 – Execution for examples of applications of where Outlet Box Extenders may be allowed.

BOXES FOR FIRE ALARM AUDIO-VISUAL NOTIFICATION APPLIANCES
Recessed boxes for Fire Alarm audio, visual, and audio-visual notification appliances shall be galvanized steel sheet metal with stamped knockouts. Boxes shall be painted red.

For surface mounting, use manufacturer supplied back boxes and trim plates, painted red or off white to match device color, and shall contain no visible conduit knock-outs. Mark each device with its circuit number.

PART 3 - EXECUTION

CONDUIT SIZING, ARRANGEMENT, AND SUPPORT
EMT is permitted to be used in sizes 4 inch (100 mm) and smaller for power and low-voltage systems. See CONDUIT INSTALLATION SCHEDULE below for other limitations for EMT and other types of conduit.

Size power conductor raceways for conductor type installed. Conduit size shall be 1/2 inch (16 mm) minimum except all homerun conduits shall be 3/4 inch (21 mm), or as specified elsewhere. Caution: Per the NEC, the allowable conductor ampacity is reduced when more than three current-carrying conductors are installed in a raceway. Contractor must take the NEC ampacity adjustment factors into account when sizing the raceway and wiring system.

Size communications and other low-voltage systems raceways as follows:

> Communications, including Equipment Outlet Box: 1 1/4 inch minimum. Conduit used for single device locations (e.g. Wireless Access Point, Video Surveillance Camera, and Wall mounted telephone) may be 3/4 inch minimum.
>
> Control, security, signal, and other low-voltage applications (not including AV): 3/4 inch minimum.
>
> Fire Alarm: 1/2 inch minimum.

Arrange conduit to maintain 6’-8” clear headroom and present a neat appearance.

Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.

Maintain minimum 6 inch (150 mm) clearance between conduit and piping. Maintain 12 inch (300 mm) clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.

Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized pipe straps, conduit racks (lay-in adjustable hangers), clevis hangers, or bolted split stamped galvanized hangers.

Group conduit in parallel runs where practical and use conduit rack (lay-in adjustable hangers) constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.

Do not fasten conduit with wire or perforated pipe straps. Before conductors are pulled, remove all wire used for temporary conduit support during construction.

Support and fasten metal conduit at a maximum of 8 feet (2.4 m) on center.

Supports shall be independent of the installations of other trades, e.g. ceiling support wires, HVAC pipes, other conduits, etc., unless so approved or detailed.

Conceal all conduits except where noted on the drawings or approved by the Architect/Engineer. Contractor shall verify with Architect/Engineer all surface conduit installations except in mechanical rooms.

Changes in direction shall be made with symmetrical bends, cast steel boxes, stamped metal boxes or cast steel conduit bodies.

For indoor and exposed exterior conduits, no continuous conduit run shall exceed 100 feet (30 meters) without a junction box.

All conduits installed in exposed areas shall be installed with a box offset before entering box.

CONDUIT INSTALLATION
Cut conduit square; de-burr cut ends.

Conduit shall not be fastened to the corrugated metal roof deck nor drywall or suspended ceiling grids.
Bring conduit to the shoulder of fittings and couplings and fasten securely.

Use conduit hubs for fastening conduit to cast boxes. Use sealing locknuts or conduit hubs for fastening conduit to sheet metal boxes in damp or wet locations.

Threads cut in the field, and factory threads of conduit and nipples not coated with corrosion protection, shall be coated with an approved electrically conductive compound per NEC 300.6.

Corrosion inhibitor, when used in the food service environment, shall be approved for Food Service locations.

Terminate all conduit (except for terminations into conduit bodies) using conduit hubs, or connectors with one locknut, or utilize double locknuts (one each side of box wall).

Provide bushings for the ends of all conduit not terminated in box walls. Refer to Section 26 05 26 – Grounding and Bonding for Electrical Systems for grounding bushing requirements.

Provide insulated bushings where raceways contain 4 AWG or larger conductors.

Communication and Low Voltage systems conduits shall terminate in horizontal plane.

Use pendants supported from swivel hangers in exposed ceiling/ structure locations where necessary to mount boxes supporting luminaires and wiring devices. Installation method shall comply with NEC 314.23 (H).

Install no more than the equivalent of the following for building:

Three 90 degree bends between boxes for electrical systems.

Two 90 degree bends between boxes for communications and other low voltage systems. Note: Offsets shall be considered 90 degrees.

No single bend may exceed 90 degrees.

Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2 inch (50 mm) size unless sweep elbows are required.

Bend conduit according to manufacturer's recommendations. Torches or open flame shall not be used to aid in bending of PVC conduit.

Use suitable conduit caps or other approved seals to protect installed conduit against entrance of dirt and moisture.

Provide 1/8 inch (3 mm) nylon pull string in empty conduit, except sleeves and nipples.

Install listed expansion-deflection fitting or other approved means shall be used where a raceway crosses a structural joint for expansion, contraction or deflection, used in buildings, bridges, parking garages or other structurers.

Install expansion fitting in PVC conduit runs per NEC table 352.44 utilizing a minimum temperature change of 120 degree F.

Avoid moisture traps where possible. Where moisture traps are unavoidable, provide junction boxes with drain fittings at conduit low points.

Where conduit passes between areas of differing temperatures such as into or out of cool rooms, freezers, unheated and heated spaces, buildings, etc., provide condulet or box with duct seal or other means to prevent the passage of moisture and water vapor through the conduit.

Route conduit through roof openings for piping and ductwork where possible.

Where communication cabling is to be installed in conduit to the wiring hub (e.g. Telecom Room), multiple conduits may be consolidated into fewer, larger conduits. Capacity of shared conduits shall equal the capacity of the individual conduits unless otherwise noted.

Use NRTL listed metallic grounding clamps when terminating conduit to cable tray.

Ground and bond conduit under provisions of Section 26 05 26.

Conduit is not permitted in any slab topping of two inches (50 mm) or less.

PVC conduit shall transition to galvanized rigid metal conduit before it enters a foundation wall or up through a concrete floor.

PVC conduit shall be allowed without need of transition to galvanized rigid metal conduit up through concrete floor and concrete equipment pads for pad mounted transformers and switchgear. Provide a PVC connector and bushing, or bell-ends, on each conduit entry. Coordinate conduit installation with submittals and shop drawings for transformers and switchgear.

Identify conduit under provisions of Section 26 05 53.

Conduits penetrating underground foundation walls: Individual conduits or each conduit as part of a ductbank penetrating underground foundation walls (excluding manholes) shall be sealed against water intrusion into the building.

Clean PVC conduit with solvent, and dry before application of glue. The temperature rating of glue/cement shall match weather conditions. Apply full even coat of cement/glue to entire area that will be inserted into fitting. The entire installation shall meet manufacturer’s recommendations.

CONDUIT INSTALLATION SCHEDULE
Conduit other than that specified below for specific applications shall not be used.

- Wet Interior Locations: Exposed: [Rigid metal conduit] [Schedule 80 PVC conduit] [PVC coated Rigid metal conduit] [Fiberglass Resin Conduit (XW)].
- Concealed Dry Interior Locations: Rigid metal conduit, Intermediate metal conduit, Electrical metallic tubing, PVC conduit (Ground conductor).
- Interior Building Grounding Electrode Conductor: Schedule 80 PVC.
- Exposed Dry Interior Locations: Rigid metal conduit, Intermediate metal conduit, Electrical metallic tubing.
- Motor and equipment connections: Liquidtight flexible metal conduit (LFMC) in all locations except in Mechanical equipment plenum spaces where Flexible Metal Conduit (FMC) shall be utilized. Minimum length shall be one foot (300 mm); maximum length shall be three feet (900 mm). Conduit must be installed perpendicular to direction of equipment vibration to allow conduit to freely flex.

- Exposed Dry Interior Locations for HVAC control devices with Conduit Connections: Electrical metallic tubing, Flexible Metal Conduit (FMC). For FMC installations, Minimum length shall be one foot (300 mm), Maximum length shall be three feet (900 mm). Minimum size FMC of 3/8".

- Exposed Dry Interior Locations for HVAC control devices without Conduit Connections: Where HVAC equipment control panels or devices do not provide for the direct connection of conduits, exposed Class 2 wiring may be extended to complete the final connections in dry locations, provided it does not exceed 18 inches in length.

- Plenum Spaces: Installation shall comply with requirements of NEC 300.22.

SURFACE METAL RACEWAY AND MULTI-OUTLET ASSEMBLY INSTALLATION
Use flat-head screws to fasten channel to surfaces every twenty-four (24) inches. Mount plumb and level.

Use suitable insulating bushings and inserts at connections to outlets and corner fittings.

Maintain grounding continuity between raceway components to provide a continuous grounding path under provisions of Section 26 05 26.

Fastener Option: Use clips and straps suitable for the purpose.

AUXILIARY GUTTERS (WIREWAYS) INSTALLATION
Bolt auxiliary gutter to wall using two-piece hangers or steel channels fastened to the wall or in self-supporting structure.

Gasket each joint in oil-tight gutter.

Mount rain-tight gutter in horizontal position only.

Maintain grounding continuity between raceway components to provide a continuous grounding path under provisions of Section 26 05 26.

COORDINATION OF BOX LOCATIONS
Provide electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance.

Electrical box locations shown on Contract Drawings are approximate unless dimensioned. Verify location of floor boxes and outlets in offices and work areas prior to rough-in.

No outlet, junction, or pull boxes shall be located where it will be obstructed by other equipment, piping, lockers, benches, counters, etc.

Conduit and boxes shall not be fastened to the metal roof deck. If conduit and boxes are required to be located and installed on roof decks, the conduit and boxes are required to be spaced minimum 1-5/8 inch off the lowest part of the metal roof decking material, per NEC 300.4 (E).

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.

In case of any question or argument over the location of an outlet, the Contractor shall refer the matter to the Architect/Engineer and install outlet as instructed by the Architect/Engineer.

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.

Locate and install boxes to allow access to them. Where installation is inaccessible, coordinate locations and provide 18 inch (450 mm) by 24 inch (600 mm) access doors. Boxes must be installed within 12" from edge of the access door.

Locate and install to maintain headroom and to present a neat appearance.

Install boxes to preserve fire resistance rating of partitions and other elements, using approved materials and methods.

Boxes installed in the building envelop shall be sealed with caulking materials or closed with gasketing systems compatible with the construction materials and locations per IEC 502.4.3.

PULL AND JUNCTION BOX INSTALLATION
Pull boxes and junction boxes shall be minimum 4 inches square (100 mm) by 2 1/8 inches (54 mm) deep for use with 1 inch (25 mm) conduit and smaller. On conduit systems using 1 1/4 inch (31.75 mm) conduit, minimum junction box size shall be 4 11/16 inches square by 2 1/8 inches deep.

Where used with raceway(s) containing conductors of 4 AWG or larger, pull box shall be sized as required unless otherwise noted on the drawings.

Locate pull boxes and junction boxes above accessible ceilings, in unfinished areas or furnish and install AEC approved access panels in non-accessible ceilings where boxes are installed. All boxes are to be readily-accessible.

Provide Pull and Junction boxes for communications and other low voltage applications (a) in any section of conduit longer than 100 feet, (b) where there are bends totaling more than 180 degrees between pull points or pull boxes and (c) wherever there is a reverse bend in run. Locate boxes on straight section of raceway (e.g. do not use boxes in place of raceway bends).

Support pull and junction boxes independent of conduit.

OUTLET BOX INSTALLATION
Do not install boxes back-to-back in walls. Provide minimum 6 inch (150 mm) separation, except provide minimum 24 inch (600 mm) separation in acoustic-rated walls.

Power:

Recessed (1/4 inch maximum) outlet boxes in masonry, concrete, tile construction, or drywall shall be minimum 4 inch square, with device rings. Device covers shall be square-cut except rounded corner plaster rings are allowed in drywall applications. Angle cut plaster rings are not permitted. Coordinate masonry cutting to achieve neat openings for boxes. A single gang box can be used in drywall and masonry, for a single device location, when a single conduit enters box.

Shallow 4 inch square by 1 1/2 inch deep boxes can be used as device boxes for power provided the box and plaster ring is sized for installed device and conductors.

Low Voltage:

Recessed (1/4 inch maximum) outlet boxes in masonry, concrete, tile construction or drywall shall be minimum 4 11/16 inch square by 2 1/8 inch deep with single gang device ring (unless noted otherwise on drawings or in companion specifications). Device covers shall be square-cut except rounded corner plaster rings are allowed in drywall applications. Angle cut plaster rings are not permitted. Coordinate masonry cutting to achieve neat openings for boxes.

Provide one conduit from each communications Equipment Outlet box. Conduit runs between outlet boxes for communications are not allowed. Terminate conduit above accessible ceiling or as detailed on drawings.

Provide knockout closures for unused openings.

Support boxes independently of conduit except for cast boxes that are connected to two rigid metal conduits, both supported within 12 inches (300 mm) of box.

Use multiple-gang boxes where more than one device are mounted together; do not use sectional boxes. Sectional boxes may only be used with the pre-approval of the AEC for remodeling applications where it is impractical to install multi-gang boxes. Provide non-metallic barriers to separate wiring of different voltage systems.

Install boxes in walls without damaging wall insulation.

Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

Ceiling outlets shall be 4 inch square, minimum 2 1/8 inch (54 mm) deep except that concrete boxes and plates will be approved where applicable. Position outlets to locate luminaires as shown on reflected ceiling plans.

In inaccessible ceiling areas, position outlets and junction boxes within 6 inches (150 mm) of recessed luminaire, to be accessible through luminaire ceiling opening.

Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.

Align wall-mounted outlet boxes for switches, thermostats, and similar devices.

Provide cast ferroalloy or aluminum outlet boxes in exterior and wet locations.

Surface wall outlet boxes shall be 4 inch (100 mm) square with raised covers for one and two gang requirements. For three gang or larger requirements, use gang boxes with non-overlapping covers.

Outlet Box adjustable ring and depth device applications:

Provide box extenders for boxes that are set too far back in the wall due to un-anticipated wall finishes. Place the box extender over the existing box face to make the box face flush with the wall finish.

END OF SECTION

SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

SCOPE
The work under this section includes the requirements relating to the furnishing and installation of Identification for Electrical Systems. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- Submittals

PART 2 - PRODUCTS
- Materials

PART 3 - EXECUTION
- General
- Box Identification
- Communication Conduit Labeling
- Power, Control and Signal Wire Identification
- Wiring Device Identification
- Support Wire Identification
- Nameplate Engraving for Electrical Equipment
- Panelboard Directories

RELATED WORK
Applicable provisions of Division 1 shall govern work under this section.

Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables
Section 26 05 23 – Control-Voltage Electrical Power Cables

SUBMITTALS
Include schedule for nameplates.

Prior to installation, the contractor shall provide samples of all label types planned for the project. These samples shall include examples of the lettering to be used. Samples shall be mounted on 8 1/2" x 11" sheets, explaining their purposed use.

PART 2 - PRODUCTS

MATERIALS
Labels: All labels shall be permanent, and machine generated. NO HANDWRITTEN OR NON-PERMANENT LABELS ARE ALLOWED.

Wire Labels: All wiring labels shall be white/transparent nylon or vinyl, self-laminating, wraparound type. Flag type labels are not allowed. The labels shall be of adequate size to accommodate the circumference of the cable being labeled and properly self-laminate over the full extent of the printed area of the label.

Tape (wiring phase identification only): Scotch #35 tape in appropriate colors for system voltage and phase. Embossed tape shall not be permitted for any application.

Nameplates: Engraved multi-layer laminated plastic. See Electrical Equipment Identification in the Execution section for nameplate color and size requirements.

See Box Identification and Wiring Device Identification sections for allowed usage of permanent marker.

PART 3 - EXECUTION

GENERAL
Clean all surfaces before attaching labels with the label manufacturer's recommended cleaning agent. Install all labels firmly as recommended by the label manufacturer. Labels shall be installed plumb and neatly on all equipment.

Install nameplates parallel to equipment lines. Secure nameplates to equipment fronts using screws, rivets or manufacturer approved adhesive or cement.

Provide all warning labels to electrical equipment as required per NEC 110.16 and 110.21. Provide available fault current labeling to service equipment as required per NEC 110.24.

Provide a sign at the service-entrance equipment indicating type and location of on-site emergency power sources and on-site legally required standby power sources, per NEC 700.7 and NEC 701.7.

Provide a sign at each service disconnect indicating "Service Disconnect", per NEC 230.70(B).

Emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency system per NEC 700.10(A)(2). Identification shall be made by the following methods:

1. All boxes and enclosures shall be permanently identified by box color(s) or nameplate(s) as indicated under the headings Box Identification or Electrical Equipment Identification below.
2. Where boxes or enclosures are not encountered, exposed cable or raceway shall be labeled as described under the heading Wire Labels above. Wire Labels shall be color coded as defined under the heading Box Identification below. Labels shall be applied at intervals not to exceed 7.6 m (25 ft).

BOX IDENTIFICATION

All junction and pull boxes shall be identified by color, based on the following color scheme:

Power Systems	**Color(s)**
Secondary Power – 480Y/277V	Brown
Secondary Power – 208Y/120V, 240/120V	White
Emergency (NEC 700) – 480Y/277V	Brown/Red
Emergency (NEC 700) – 208Y/120V	White/Red
Legally Required Standby (NEC 701) – 480Y/277V	Brown/Blue
Legally Required Standby (NEC 701) – 208Y/120V	White/Blue
Optional Standby (NEC 702) – 480Y/277V	Brown/Yellow
Optional Standby (NEC 702) – 208Y/120V	Black/Yellow

Other Systems	**Color(s)**
Fire Alarm (see below)	Red
Temperature Control	Green
Door Access Control	Orange
Sound and Intercom Systems	Gray
Video Surveillance System	Yellow
Communications	Blue
Lighting Control 0-10VDC	Purple

The means of junction and pull box identification shall be as follows:

1. Boxes 8" Square or Smaller – Concealed (Above Accessible Ceilings).
   - Color identified utilizing fully painted covers. If box contains power wiring, the box shall be further identified with circuit numbers and source panel designation, using machine-generated adhesive label or neatly hand-written permanent marker.
2. Boxes 8" Square or Smaller – Exposed.
   - Color identified utilizing fully painted covers. If box contains power wiring, the box shall be further identified with circuit numbers and source panel designation, using machine-generated adhesive label or engraved nameplate.
3. Boxes Larger than 8" Square – Concealed (Above Accessible Ceilings).
   - Color identified utilizing 4" x 4" minimum-sized painted patch, or color-correct machine-generated adhesive label. If box contains power wiring, the box shall be further identified with circuit numbers and source panel designation using machine-generated adhesive label or neatly hand-written permanent marker. Letter height shall be ½" minimum.
4. Boxes Larger than 8" Square – Exposed.
   - Color identified utilizing 4" x 4" minimum-sized painted patch, or color-correct engraved nameplate. If box contains power wiring, the box shall be further identified with circuit numbers and source panel designation using engraved nameplate. Letter height shall be ½" minimum.

All fire alarm boxes (covers and outer sides) shall be painted red and labeled “Fire Alarm” or “FA”. When red conduit is used for the alarm system installation, there is no need to paint the box sides, - paint the covers only. Non-factory device boxes shall also be painted red.

Other system boxes shall be further identified as shown on drawing details or approved shop drawings.

COMMUNICATIONS CONDUIT LABELING
Provide label on all conduits installed between Telecommunication Equipment Rooms. Both ends of the conduits shall be labeled. All labels shall be mechanical, no hand-written labels.

The label shall indicate the location of the far end of the conduit run and a unique conduit number. (i.e. TR-1A-01 or Room #216 – 01). Refer to agency standards where applicable.

POWER, CONTROL AND SIGNALING WIRE IDENTIFICATION
Provide wire labels on each conductor in panelboard gutters, all boxes, and at load connection. Identify with branch circuit or feeder number for power and lighting circuits, and with wire number as indicated on schematic and interconnection diagrams or equipment manufacturer's shop drawings for control and signaling wires.

All wiring shall be labeled within 2 to 4 inches of terminations. Each end of a wire or cable shall be labeled as soon as it is terminated, including wiring used for temporary purposes.

WIRING DEVICE IDENTIFICATION
Wall switches, receptacles, occupancy sensors, photocells, poke-through fittings, access floor boxes, and time clocks shall be identified with circuit numbers and panelboard source (ex. Panel ABC-3). In exposed areas, identifications should be made inside of device covers, unless directed otherwise. Use machine-generated adhesive labels, or neatly hand-written permanent marker.

SUPPORT WIRE IDENTIFICATION
Support wires that are installed in addition to the ceiling grid support wires to provide secure support for raceways, cables assemblies, boxes, cabinets, and fittings shall be distinguishable from the ceiling grid support wires per NEC 300.11(A). This identification shall be either approximately 6 inches of fluorescent orange paint, or orange tape flags 3/4 inches high-by-2 inches wide (minimum) within 12 inches of the bottom of the support wires.

ELECTRICAL EQUIPMENT IDENTIFICATION
Nameplates for all panelboards, circuit breakers, disconnect switches, and transformers shall be based on the following color scheme:

Power Systems	**Color(s)**
Secondary Power – 480Y/277V	White letters on Brown background
Secondary Power – 208Y/120V, 240/120V	Black letters on White background
Emergency (NEC 700) – 480Y/277V	Brown letters on Red background
Emergency (NEC 700) – 208Y/120V	White letters on Red background
Legally Required Standby (NEC 701) – 480Y/277V	Brown letters on Blue background
Legally Required Standby (NEC 701) – 208Y/120V	White letters on Blue background
Optional Standby (NEC 702) – 480Y/277V	Brown letters on Yellow background
Optional Standby (NEC 702) – 208Y/120V	Black letters on Yellow background

Provide nameplates of minimum letter height as scheduled below:
All Panelboards (Distribution, Branch, Sub-feed, and Feed-Through), Switchboards and Motor Control Centers: 1 inch (25 mm); identify equipment designation (same designation used by the main distribution center). 1/2 inch (13 mm); identify voltage rating, source and room location of the source.

Panelboards serving NEC 700, 701 or 702 loads shall identify which branch they serve.

Both panels in a double tub application shall be labeled.

Circuit Breakers, Switches, and Motor Starters in Distribution Panelboards, Switchboards and Motor Control Centers: 1/2 inch (13 mm); identify circuit number and load served, including location.

Individual Disconnect Switches, Enclosed Circuit Breakers, and Motor Starters: ½ inch (13 mm); identify voltage, source and load served.

Transformers: 1 inch (25 mm); identify equipment designation. 1/2 inch (13 mm); identify primary and secondary voltages, primary source and location, and secondary load and location.

PANELBOARD DIRECTORIES
Typed directories for panelboards shall be covered with clear plastic and shall have a metal frame. Room number on directories shall be Owner's numbers, not Plan numbers unless Owner so specifies.

END OF SECTION

SECTION 26 05 73
SHORT CIRCUIT/COORDINATION STUDY
AND
ARC FLASH RISK ASSESSMENT

PART 1 - GENERAL

SCOPE

The electrical contractor shall retain the services of an independent third party firm, or the equipment manufacturer's technical services group, to perform a short circuit/coordination study and arc flash risk assessment as described herein.

Preliminary studies shall be submitted to the A/E prior to receiving final approval of the distribution equipment shop drawings and/or prior to release of equipment for manufacture to ensure the characteristics and ratings of the proposed overcurrent devices will be satisfactory. The final submittal shall capture any changes in circuit lengths, wire sizes, additional loads, etc. that may occur during the construction project.

The studies shall include all portions of the electrical distribution system from the normal power source or sources, and emergency/standby sources, down to and including the smallest OCPD in the distribution system (for short circuit calculations). Normal system connections and those which result in maximum fault conditions shall be adequately covered in the study.

The firm should be currently involved in medium- and low-voltage power system evaluation. The study shall be performed, stamped and signed by a registered professional engineer in the State of Wisconsin. Credentials of the individual(s) performing the study and background of the firm shall be submitted to the A/E for approval prior to start of the work. A minimum of five (5) years experience in power system analysis is required for the individual in charge of the project.

The firm performing the study should demonstrate capability and experience to provide assistance during start up as required.

The study and assessment shall be performed on SKM Dapper, Captor and PowerTool software or EasyPower product suite software.

Included are the following topics:

RELATED WORK

Applicable provisions of Division 1 govern work under this section.

Section 26 14 13 - Switchboards
Section 26 24 16 – Panelboards

REFERENCE STANDARDS

Standards listed in the IEEE "Buff Book", latest edition

National Fire Protection Association (NFPA) 70E, latest addition
IEEE 1584 – Guide for Performing Arc Flash Calculations

DATA COLLECTION FOR THE STUDY
The contractor shall provide the required data for preparation of the studies. The engineer performing the system studies shall furnish the contractor with a listing of the required data immediately after award of the contract.

The contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to release of the equipment for manufacture.

SUBMITTALS
THIRD PARTY QUALIFICATIONS
Submit qualifications of individual(s) who will perform the work to the A/E for approval prior to commencement of the studies.

PRELIMINARY REPORT
Submit a draft of the studies to the A/E for review prior to delivery of the final study to the Owner. Make all additions or changes as required by the reviewer.

For building construction projects, submit a draft of the studies to the A/E for review prior to A/E approval of project electrical switchgear, panelboard and generator shop drawings.

FINAL STUDY REPORT
Provide studies in conjunction with equipment submittals to verify equipment ratings required.

The results of the power system studies shall be summarized in a final report and provided in the following formats. Provide (2) bound hard copies of the final report. Provide (2) electronic copies (on CD) of the final report and one-line diagrams in PDF format. Provide (2) electronic copies (on CD) of the final report in MS Word format and the one-line diagrams in CAD format.

Also provide (2) electronic copies (on CD) of all files generated by the SKM or EasyPower software for all scenarios evaluated in the studies. The files shall permit the studies to be opened, reviewed or updated by any user of the analysis software used for the studies.

The report shall typically include the following sections:

I. Overview
II. Short Circuit Study
    - SC-1 Purpose
    - SC-2 Explanation of Data
    - SC-3 Assumptions
    - SC-4 Analysis of Results
    - SC-5 Recommendations
    - SC-6 Fault Analysis Input Report from Software Program
    - SC-7 Fault Contribution Report
III. Protective Device Coordination Study
    - PDC-1 Purpose
    - PDC-2 Explanation of Data
    - PDC-3 Assumptions
    - PDC-4 Analysis of Results
    - PDC-5 Recommendations (Including NEC 700-27 Requirement)
    - PDC-6 Results from Software Program
    - PDC-7 Example Drawings
IV. Arc Flash Study
    - ARC-1 Purpose
    - ARC-2 Explanation of Data

ARC-3 Assumptions
ARC-4 Analysis of Results
ARC-5 Recommendations
ARC-6 Arc Flash Evaluation Report from Software Program

V. Prioritized Recommendations and Conclusions

VI. Appendices

APP-1 One-line Diagrams from Software Program
APP-2 AutoCAD One-line Diagrams
APP-3 Protective Device Summaries from Software Program
APP-4 Reference Data
APP-5 Sample Work Permit Form
APP-6 Copy of Warning Labels, including study date

The above sections shall include the following items in detail:

- Obtain available fault current from the local utility company.
- Short circuit studies shall evaluate the available fault current at each bus (each change of impedance), including all three-phase motors.
- Coordination study recommendations for relay settings, breaker settings, and motor protection settings.
- Recommendations for improving the coordination and/or load distribution, as well as ground fault requirements.
- Worst case Arc Flash values (highest incident energy) for project specific scenarios (low short circuit and high short circuit for each possible power supply source).
- Arc flash values for two maintenance cases, which define the arc flash values available at the equipment that would be available if the instantaneous trip of the upstream circuit breaker is set at a minimum value. This is recommended if someone has to work on live equipment.
- IEEE standard one-line diagram with equipment evaluation and circuit breaker settings that clearly define the system data and are easy to interpret. The diagrams should include the bus names and references used in the studies.
- Recommendations to reduce the arc flash incident energy in all areas that are subject to 8 calories per square centimeter or greater of available incident energy.
- Condition of Maintenance information for any existing equipment included in the study.
- Prioritized report summarizing all recommendations from this study. This shall include observed NEC code violations and their corrective action.
- The contractor shall provide a one-line diagram that meets IEEE/ANSI standard 141, mounted on 24” x 36” (minimum) Styrofoam backboard. This one-line diagram shall be mounted in each electrical room.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

SHORT CIRCUIT AND COORDINATION STUDY

The short circuit, coordination, and arc flash hazard studies shall be performed using SKM Dapper, Captor and PowerTool for Windows software or EasyPower product suite Windows based software packages. In the short circuit

study, provide calculation methods and assumptions, the base per unit quantities selected, one-line diagrams, source impedance data including power company system characteristics, typical calculations, and recommendations. Calculate short circuit interrupting and momentary (when applicable) duties for an assumed 3-phase bolted fault at each supply switchgear lineup, unit substation primary and secondary terminals, low voltage switchgear lineup, switchboard, motor control center, distribution panelboard, pertinent branch circuit panelboard, and other significant locations throughout the system. Provide a ground fault current study for the same system areas, including the associated zero sequence impedance data. Include in tabulations fault impedance, X to R ratios, asymmetry factors, motor contribution, short circuit KVA, and symmetrical and asymmetrical fault currents.

In the protective device coordination study, provide time-current curves graphically indicating the coordination proposed for the system, centered on conventional, full-size, log-log forms. Include with each curve sheet a complete title and one-line diagram with legend identifying the specific portion of the system covered by that particular curve sheet. Include a detailed description of each protective device identifying its type, function, manufacturer, and time-current characteristics. Tabulate recommended device tap, time dial, pickup, instantaneous, and time delay settings.

Include on the curve sheets power company relay and fuse characteristics, system medium-voltage equipment relay and fuse characteristics, low-voltage fuse characteristics, circuit breaker trip device characteristics, pertinent transformer characteristics, pertinent transformer characteristics, pertinent motor and generator characteristics, and characteristics of other system load protective devices. Include at least all devices down to largest branch circuit and largest feeder circuit breaker in each motor control center, and main breaker in branch panelboards.

Include all adjustable settings for ground fault protective devices. Include manufacturing tolerance and damage bands in plotted fuse characteristics. Show transformer full load and 150, 400, or 600 percent currents, transformer magnetizing inrush, ANSI transformer withstand parameters, and significant symmetrical and asymmetrical fault currents. Terminate device characteristic curves at a point reflecting the maximum symmetrical or asymmetrical fault current to which the device is exposed.

Select each primary protective device required for a delta-wye connected transformer so that its characteristic or operating band is within the transformer characteristics, including a point equal to 58 percent of the ANSI withstand point to provide secondary line-to-ground fault protection. Where the primary device characteristic is not within the transformer characteristics, show a transformer damage curve. Separate transformer primary protective device characteristic curves from associated secondary device characteristics by a 16 percent current margin to provide proper coordination and protection in the event of secondary line-to-line faults. Separate medium-voltage relay characteristic curves from curves for other devices by at least a 0.4-second time margin.

Include complete fault calculations as specified herein for each proposed and ultimate source combination. Note that source combinations may include present and future supply circuits, large motors, or generators as noted on drawing one-lines.

When Current Limiting fuses are utilized as part of the distribution system, the current limiting characteristics shall be accounted for when doing calculations downstream. Manufacturer’s data utilizing maximum fault current-Apparent RMS Symmetrical Current that the fuse will let through during fault conditions shall be used. If modeling software does not take this into account, values shall be manually entered prior to doing calculations.

Utilize equipment load data for the study obtained by the Contractor from contract documents, including contract addendums issued prior to bid openings.

Include fault contribution of all motors in the study. Notify the Engineer in writing of circuit protective devices not property rated for fault conditions.

Provide settings for the chiller motor starters or obtain from the mechanical contractor, include in the study package, and comment.

When an emergency generator is provided, include phase and ground coordination of the generator protective devices, to meet NEC 700.27 requirements. Show the generator decrement curve and damage curve along with the operating characteristic of the protective devices. Obtain the information from the generator manufacturer and include the

generator actual impedance value, time constants and current boost data in the study. Do not use typical values for the generator.

Evaluate proper operation of the ground relays in 4-wire distributions with more than one main service circuit breaker, or when generators are provided, and discuss the neutral grounds and ground fault current flows during a neutral to ground fault.

For motor control circuits, show the MCC full-load current plus symmetrical and asymmetrical of the largest motor starting current to ensure protective devices will not trip major or group operation.

FIELD SETTINGS

The Contractor shall perform field adjustments of the protective devices as required to place the equipment in final operating condition. The settings shall be in accordance with the approved short circuit study, protective device coordination study and arc flash risk assessment.

Necessary field settings and adjustments of devices and minor modifications to equipment to accomplish conformance with the approved short circuit and protective device coordination study shall be carried out by the Contractor at no additional cost to the owner.

ARC FLASH RISK ASSESSMENT

As part of the short circuit and coordination study, arc flash risk assessment shall be included. The study shall include the following:

1. Determine and document all possible utility and generator/emergency sources that are capable of being connected to each piece of electrical gear. Calculations shall be based on highest possible source connection.

2. Calculations to conform to National Fire Protection Association (NFPA) 70E recognized means of calculation standards. All incident energy units shall be calculated in calories per square centimeter.

3. Provide recommended boundary zones and personal protective equipment (PPE) based on the calculated incident energy and requirements of NFPA 70E for each piece of electrical gear.

Electrical Contractor shall provide warning labels as required by OSHA based upon the results of the arc flash risk assessment. At a minimum, the labeling shall contain the following information: nominal system voltage, arc flash boundary, limited approach boundary, restricted approach boundary, available incident energy and the corresponding working distance or the arc flash PPE category, minimum arc rating of clothing, and study date. Label shall also include the name or logo and the phone number of the company performing the study.

Arc flash warning labels shall be affixed to all electrical equipment that is likely to require examination, adjustment, servicing or maintenance while energized. This includes, but is not limited to, medium-voltage switchgear, transformers, switchboards, panel boards, three-phase disconnect switches, transfer switches, motor control centers, motor controllers, and three-phase motor disconnect switches.

END OF SECTION

SECTION 26 24 16
PANELBOARDS

PART 1 - GENERAL

SCOPE
The work under this section includes main, distribution and branch circuit panelboards. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- References
- Submittals
- Operation and Maintenance Data
- Spare Parts

PART 2 - PRODUCTS
- Power Distribution Panelboards
- Branch Circuit Panelboards
- Coordination Branch Panelboards
- Coordination of Overcurrent Protective Devices

PART 3 - EXECUTION
- Installation
- Field Quality Control
- AEC Training

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

Section 26 05 73 - Short Circuit/Coordination Study and Arc Flash Risk Assessment

REFERENCES
ANSI C57.13 – Instrument Transformers
NEMA AB 1 - Molded Case Circuit Breakers
NEMA KS 1 - Enclosed Switches
UL-891 - Dead Front Switchboards

SUBMITTALS
Include outline and support point dimensions, voltage, main bus ampacity, circuit breaker arrangement and sizes, and interrupting ratings confirming a fully-rated system for all equipment and components.

Submit required short circuit coordination study per specification section 26 05 73 to the consulting engineer for review and approval. Submittal shall be on or before date of panelboard equipment submittal.

OPERATION AND MAINTENANCE DATA
All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

SPARE PARTS
Keys: Furnish 2 keys for each panelboard to Owner.

Handle lock-off: Furnish (2) 20/1P circuit breaker handle lock-off devices for each panelboard to Owner.

One set of three spare fuses of each size and type utilized.

PART 2 - PRODUCTS

POWER DISTRIBUTION PANELBOARDS
Panelboards: Circuit breaker or fusible switch type.

The panelboard and overcurrent devices contained within shall be fully-rated.

Enclosure: NEMA Type 1. Minimum cabinet size: 6.5 inches (165 mm) deep; 26 inches (660 mm) wide. Constructed of galvanized code gauge steel.

Cabinet front cover and cabinet shall be Type 4X, 304 stainless steel in wet and damp locations including kitchen, foodservice and therapeutic/pool applications.

Power distribution panelboards installed in electrical rooms and mechanical rooms shall utilize a standard dead front cover. In all other areas provide cabinet front with hinged door, flush lock and hinged trim (door-in-door) to allow access to wiring gutters without removal of panel front. Hinged trim shall be held in place with screw fasteners. Finish in manufacturer's standard gray enamel.

Provide metal directory holders with clear plastic covers. Holder to be factory mounted.

Provide panelboards with copper bus (phase buses, bus fingers, etc.), ratings as scheduled on Drawings. Provide ground bars in all panelboards. Neutral and ground bars can be dual rated ALCU9. All spaces shall have bus fully extended and drilled for the future installation of breakers.

Minimum System (i.e. individual component) Short Circuit Rating: As shown on the Drawings and as required by short circuit/coordination study.

Main breakers shall be individually mounted. Back feed mains shall NOT be utilized.

The circuit breakers are to be totally front accessible and mounted in the panelboard to permit installation, maintenance and testing without reaching over line side bussing. The circuit breakers are to be removable by the disconnection of only the load side terminations and line and load side connections are to be individual to each circuit breaker. Common mounting brackets or electrical bus connectors are not acceptable.

Circuit breakers shall be provided with provisions for mounting handle padlock attachments.

Breaker feeder lugs shall be dual rated for use with either aluminum or copper conductors.

Each circuit breaker is to be furnished with an externally operable mechanical means to trip the circuit breaker, enabling maintenance personnel to verify the ability of the circuit breaker trip mechanism to operate, as well as exercise the circuit breaker operating mechanisms.

A minimum of 20% future circuit breaker spaces shall be included. Spaces for future circuit breakers shall be “prepared” spaces. These spaces shall be provided with the necessary mounting hardware and bus extensions so that when future breakers are added, only the breaker itself needs to be purchased by the installer.

Circuit breakers serving single motor loads may be magnetic only, instantaneous trip. Overload protection shall be shall be part of the motor combination controller.

Circuit breakers in 480V power distribution panelboards shall be fully adjustable LSI circuit breakers with electronic trip for frame sizes greater than 400A.

Circuit Breakers:

Electronic Trip Circuit Breakers: As scheduled on the drawings, electronic circuit breakers shall have, at a minimum, adjustments for long time, short time and instantaneous trip. Provide integral ground fault sensing with adjustable ground fault trip where indicated on the drawings.

Molded Case Circuit Breakers: As scheduled on the drawings, integral thermal and instantaneous magnetic trip elements in each pole.

Fusible Distribution Switches:

Fusible switches shall be quick make, quick break and shall be group mounted in panel type construction. Switches of 30 amperes to 200 amperes shall have plug-on line side connections. Each switch is to be contained in a separate steel enclosure. The enclosure shall employ a hinged cover for access to the fuses which shall be interlocked with the operating handle to prevent opening the cover when the switch is in the "ON" position.

This interlock shall be constructed so that it can be released with a standard electrician's tool for testing fuses without interrupting service. Units shall have padlocking provisions in "OFF" position and operating handle position shall give positive switch position indication, i.e. red for "ON" and black for "OFF". Switches shall pass industry standard I^2t with-stand tests and fuse tests.

A minimum of 20% future fusible switch spaces shall be included. Spaces for future fusible switches shall be “prepared” spaces. These spaces shall be provided with the necessary mounting hardware and bus extensions so that when future fusible switches are added, only the fusible switch itself needs to be purchased by the installer.

Meter: Provide an electronic meter (with meter test switch and instrument transformers) for Owner’s use in the distribution panelboard. Meter and related equipment shall meet the requirements of specification section 26 27 13.

Surge Protective Device: Provide a surge protective device meeting the requirements of specification section 26 43 13. Surge protective devices shall be served from an overcurrent protective device within the power distribution panelboard. Surge protective device shall be installed external to the distribution panelboard.

BRANCH CIRCUIT PANELBOARDS
Lighting and Appliance Branch Circuit Panelboards: Circuit breaker type.

The panelboard and overcurrent devices contained within shall be fully-rated.

Enclosure: Type 1. Minimum cabinet size: 5-3/4 inches (144 mm) deep; 20 inches (508 mm) wide with 5" minimum gutter space top and bottom. Constructed of galvanized code gauge steel. Panel enclosure (back box) shall be of non-stamped type (without KO's) to avoid concentric break out problem.

Cabinet front cover and cabinet shall be Type 4X, 304 stainless steel in wet and damp locations including kitchen, food service and therapeutic/pool applications.

Provide flush or surface (appropriate for installation) cabinet front with concealed trim clamps, concealed hinge and flush cylinder lock all keyed alike. Front cover shall be hinged to allow access to wiring gutters without removal of panel trim. Hinged trim shall be held in place with screw fasteners. Finish in manufacturer's standard gray enamel.

Provide metal directory holders with clear plastic covers. Holder to be factory mounted.

Provide panelboards with copper bus (phase buses, bus fingers, etc.), ratings as scheduled on Drawings.
Provide ground bars in all panelboards. Phase, neutral and ground bar terminations can be dual rated ALCU9. All spaces shall have bus fully extended and drilled for the future installation of breakers.

Incoming conductors shall terminate at lug landing pads rated for the panelboard.

Provide compression type lugs to accommodate the conductor shown on drawings.

Minimum System (i.e. individual component) Short Circuit Rating: As shown on the Drawings and as required by short circuit/ coordination study.

Molded Case Circuit Breakers: Bolt-on type thermal magnetic trip circuit breakers. Provide UL Class A ground fault interrupter circuit breakers where shown on Drawings. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.

Do not use tandem circuit breakers.

Circuit breakers shall be bolt-on type with common trip handle for all poles. No handle ties of any sort will be approved.

Provide a minimum of 10% spare circuit breakers in branch panelboards.

All of the panelboards provided under this section shall be by the same manufacturer.

All panelboards installed side by side (double tub) shall utilize same enclosure height.

Double tub panelboard installations shall identify type of feed to adjacent panelboard- sub-feed or feed-thru. Identification shall be integral with panel label.

COORDINATION BRANCH PANELBOARDS
Branch Circuit Panelboards: Fusible switch type with current limiting Class J time delay or equivalent protection.

The panelboard and overcurrent devices contained within shall be fully-rated.

Enclosure: Type 1. Minimum cabinet size: 5-3/4 inches (144 mm) deep; 20 inches (508 mm) wide with 5" minimum gutter space top and bottom. Constructed of galvanized code gauge steel. Panel enclosure (back box) shall be of non-stamped type (without KO's) to avoid concentric break out problem.

Provide flush or surface (appropriate for installation) cabinet front with concealed trim clamps, concealed hinge and flush cylinder lock all keyed alike. Front cover shall be hinged to allow access to wiring gutters without removal of panel trim. Hinged trim shall be held in place with screw fasteners. Finish in manufacturer's standard gray enamel.

Provide metal directory holders with clear plastic covers. Holder to be factory mounted.

Provide panelboards with copper bus (phase buses, bus fingers, etc.), ratings as scheduled on Drawings. Provide ground bars in all panelboards. Phase, neutral and ground bar terminations can be dual rated ALCU9. All spaces shall have bus fully extended and drilled for the future installation of devices.

Overcurrent devices shall be fused branch disconnects including compact base and fuse holder with the following features:

Current limiting Class J time delay or equivalent protection.
Single handle common trip, 1-, 2-, and 3 pole versions.
Bolt on type.
Local open fuse indication.
UL listed for type and temperature rating of wire specified.
Permanently installed integrated lockout/tag out provisions.
600V AC rated.

COORDINATION OF OVERCURRENT PROTECTIVE DEVICES
Provide a coordination study of the electrical system and recommend set points for all of the overcurrent and ground fault trip adjustments on the equipment provided. The coordination study and set point recommendations shall be submitted to the consulting engineer for approval. Submittal shall be on or before date of switchboard and panelboard equipment submittal. The study shall meet the requirements of specification section 26 05 73.

PART 3 - EXECUTION

INSTALLATION
See section 26 05 29 for support requirements.

Install panelboards plumb with wall finishes.

Height:

Power Distribution panelboards: Minimum 12” above finished floor and maximum of 6’-7” to center of the grip of the operating handle of the top most mounted switch or circuit breaker, when at its highest position.

Branch panelboards: 6’-0” to top of panelboard.

Install a crimp type stud termination to stranded conductor when terminating on circuit breakers without a captive assembly rated for terminating stranded conductors.

Provide filler plates for unused spaces in panelboards.

See section 26 05 53 for identification requirements. Provide typed circuit directory for each panelboard per NEC 408.4(A). Revise directory to reflect circuiting changes required to balance phase loads.

Stub three (3) empty ¾” conduits to accessible location above ceiling or below floor out of each recessed panelboard. Cap these conduits to prevent material from entering them.

FIELD QUALITY CONTROL
If aluminum conductors size #1/0 and larger (per Section 26 05 19) are to be used as panelboard feeders, it is the responsibility of the contractor to provide panelboards with adequate wire bending space to accommodate the aluminum conductors and terminators to meet allowable code requirements.

The Contractor shall circuit the panelboards as shown on the drawings.

Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections.

AEC TRAINING
All training provided for agency shall comply with the format, general content requirements and submission guidelines specified under Section 01 91 01 or 01 91 02.

END OF SECTION

SECTION 26 27 26
WIRING DEVICES

PART 1 - GENERAL

SCOPE
This section describes the products and execution requirements relating to furnishing and installing wiring devices and related systems for the project. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- Submittals
- Operation and Maintenance Data

PART 2 - PRODUCTS
- Device Colors
- Device Plates and Box Covers
- Modularly Connected (Modular) Devices
- Wall Switches
- Wall Dimmers
- Receptacles
- Corrosion-Resistant Receptacles
- Motion Sensors (Occupancy and Vacancy)
- Photocells
- Time Clocks
- Time Switch

PART 3 - EXECUTION
- Installation
- Field Quality Control
- Motion Sensors
- Adjusting

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

SUBMITTALS
Provide product data showing model numbers, configurations, finishes, dimensions, and manufacturer's instructions.

For motion sensor shop drawings, the manufacturer’s actual layout of motion sensors and the wiring diagrams shall be provided.

OPERATION AND MAINTENANCE DATA
All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

PART 2 - PRODUCTS

DEVICE COLORS:
Device colors shall be selected by project architect’s interior designer and coordinated with AEC representative during shop drawing review.

All switches and convenience outlets on emergency circuits shall have a red handle or red face with matching red cover plate.

DEVICE PLATES AND BOX COVERS
Decorative Cover Plate: 302/304 lined stainless steel. Note requirement for red plates on emergency outlets and switches.

Weatherproof Cover: All receptacles installed in wet locations shall have an enclosure that is weatherproof whether or not the attachment plug is inserted. Covers shall be gasketed metal with hinged “in-use” device covers, powder coat painted. Non-metallic covers are not allowed. Covers shall be latching type and shall be lockable. Covers shall be identified as “extra-duty” type per NEC 406.9(B)(1).

Damp Location Cover: All receptacles installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure that is weatherproof when the receptacle is covered (attachment plug not inserted and receptacle covers closed). Covers shall be gasketed metal with hinged device covers, powder coat painted. Non-metallic covers are not allowed.

Surface Cover Plate: Raised galvanized steel.

MODULARLY CONNECTED (MODULAR) DEVICES:
Modularly connected devices are allowed, but not required.

Modular Pigtailed Connector: Polarized connector with minimum six-inch stranded copper wire leads, polycarbonate right-angle housing, UL498 listed, with finger-safe connector housing which provides insulation from conductive surfaces. Contacts shall be brass. Connector shall be manufactured so that it provides a secure connection such that it will maintain contact with the device until the device is removed for replacement. Modular connectors shall be provided with covers which protect the contacts from paint, drywall mud, and construction dust and debris. Connectors shall be Hubbell SNAPConnect, Leviton Lev-Lok, Pass & Seymour PlugTail, or approved equal.

WALL SWITCHES
General: Heavy duty use toggle switch, rated 20 amperes and 120/277 volts AC. Switches shall be UL20 Listed and meet Federal Specification WS-896. All switches shall be heavy duty Specification Grade.

Handle: Made of nylon or high impact resistant material.

Wall Switches for Lighting Circuits and Motor Loads Under 1/2 HP: All switches shall be back- and side-wired, screw clamp type, suitable for solid or stranded wire up to #10 AWG, with separate green ground screw. Switches shall be as follows:

Hubbell 1221*,
Leviton 1221-S*,
Pass & Seymour CSB20AC1-*,
or approved equal. (* indicates color selection).

Modular Wall Switches for Lighting Circuits and Motor Loads Under 1/2 HP: Switches shall be as follows:

Hubbell SNAP1221*NA,
Leviton M1221-*,
Pass & Seymour PT20AC1-*,
or approved equal. (* indicates color selection).

WALL DIMMERS
General:

1. Compatible with the voltage of the circuit being controlled: 120V or 277V;
2. Compatible with the load being dimmed;
3. Linear full-range slide control;
4. ON/OFF paddle switch incorporated into the Wall Dimmer, separate from dimming slide control: single-pole, 3-way, or multiple-location operation as indicated on the drawings;
5. No derating required in multi-gang applications;
6. Polycarbonate construction;
7. Color to match receptacles and/or standard toggle switches.

Line-voltage LED Dimmer:

1. Forward or reverse phase dimming control as required for the application;

Stand-alone 0-10V Dimmers:

1. Electronic dimming;
2. Ratings: 30 mA sink current;
3. Adjustable dial allows users to trim the low-end dimming range.
4. Complete with 0-10V DC power source.

RECEPTACLES
General Requirements: NEMA Type 5-20R, Nylon or high impact resistant face. Receptacles shall be UL498 Listed and meet Federal Specification WC-596. All duplex receptacles shall be heavy duty Specification Grade, 20 amp rated.

Generally, all receptacles shall be duplex convenience type unless otherwise noted.

All receptacles on emergency circuits shall have a red face with matching red cover plate.

All receptacles designated as isolated ground shall have an isolated ground triangle imprint on the face of the receptacle.

All receptacles installed in bathrooms, kitchens, and within 6 feet of the outside edge of sinks shall be GFCI type.

All receptacles installed in outdoor locations, garages, rooftops, and in other damp or wet locations shall be GFCI type with a weather-resistant (WR) rating.

Convenience and Straight-blade Receptacles: All receptacles shall be back- and side-wired, screw clamp type, suitable for solid or stranded wire up to #10 AWG, with a separate green ground screw. Receptacles shall be as follows:
Hubbell 5362*,
Leviton 5362-S*,
Pass & Seymour 5362*,
or approved equal. (* indicates color selection).

GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter meeting the requirements of UL standard 943 Class A, including self-test functionality and reverse line-load misfire function repeatability. GFCI receptacles shall be as follows:
Hubbell GFR5362SG*,
Leviton GFNT2-*,
Pass & Seymour 2097*,
or approved equal. (* indicates color selection).

GFCI Receptacles with a weather-resistant (WR) rating: Weather-Resistant duplex convenience receptacle with integral ground fault current interrupter meeting the requirements of UL standard 943 Class-A, including self-test functionality and reverse line-load misfire function repeatability. WR GFCI receptacles shall be as follows:
Hubbell GFR5362SG*,
Leviton GFWR2-*,
Pass & Seymour 2097TRWR*,
or approved equal. (* indicates color selection).

USB Charger and Duplex Tamper-Resistant Receptacles: Do not use combination duplex receptacles with USB chargers. Use duplex receptacles as required for the application and as specified herein. Use separate 4-port USB charging devices.

USB Charging Devices: Single-gang 4-port USB charging station. USB ports shall meet UL94 for 5V flammability rating, and shall comply with battery charging specification USB BC1.2. USB ports shall be compatible with USB 1.1/2.0/3.0 devices, including Apple products. USB ports shall be rated 5VDC, 4.2A minimum. Devices shall be as follows:
Hubbell USB4*,
Leviton USB4P-*,
Pass & Seymour TM8USB4*CC6,
or approved equal. (* indicates color selection).

Locking-Blade Receptacles: As indicated on drawings.

Specific-use Receptacle Configuration: As indicated on drawings.

Modular Convenience and Straight-blade Receptacles: Receptacles shall be as follows:
Hubbell SNAP5362*A,
Leviton M5362-S*,
Pass & Seymour PT5362*,
or approved equal. (* indicates color selection).

Modular GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter meeting the requirements of UL standard 943 Class A, including self-test functionality and reverse line-load misfire function repeatability. GFCI receptacles shall be as follows:
Hubbell GFRST83SNAP*,
Leviton MGFN2-*,
Pass & Seymour PT2097*,
or approved equal. (* indicates color selection).

Modular GFCI Receptacles with a weather-resistant (WR) rating: Use back- and side-wired devices in lieu of modular weather-resistant rated GFCI receptacles.

CORROSION-RESISTANT RECEPTACLES
General Requirements: NEMA Type 5-20R, Nylon or high impact resistant yellow face. Receptacles shall be UL498 Listed. All duplex receptacles shall be Industrial Extra Heavy Duty Specification Grade, Corrosion Resistant, 20 amp rated.

Generally, all receptacles shall be duplex convenience type unless otherwise noted.

All receptacles that are required to be GFCI type shall be served from a GFCI style circuit breaker.

Convenience and Straight-blade Receptacles: All receptacles shall be back- and side-wired, screw clamp type, suitable for solid or stranded wire up to #10 AWG, with a separate green ground screw. Receptacles have one-piece brass mounting strap with integral ground, 0.036-inch-thick brass triple-wipe power contacts, and nickel-plated straps and contacts for corrosion resistance. Receptacles shall be as follows:

Hubbell: equal to Pass & Seymour CR6300,
Leviton: equal to Pass & Seymour CR6300,
Pass & Seymour CR6300,
or approved equal. Color shall be yellow.

MOTION SENSORS (OCCUPANCY and VACANCY)
Digital Motion Sensors: Low-Voltage motion sensors that are part of a Digital Lighting Control System: Refer to specification section 26 09 43 Distributed Digital Lighting Controls.

General Requirements: All motion sensors shall be hardwired type; battery type shall not be permitted.

Sensors shall use either passive infrared, or if dual technology, passive infrared and passive acoustic sensing or passive infrared and ultrasonic sensing for detecting room motion.

Sensitivity shall be user adjustable or self-adjusting type.

The delay timer shall be adjusted within a range of 6 to 30 minutes by the contractor in the field. The sensor shall have a test mode for performance testing.

The test LED shall indicate motion.

Line voltage sensors are acceptable, especially in exposed ceiling areas where all wiring shall be installed in conduit, including low voltage cabling if power packs are used. Provide power pack as required for low voltage sensors.

See drawings for actual types of sensors.

Vacancy sensors shall allow for manual-ON and automatic-ON operation.

Motion sensors and power packs shall have five-year warranties.

Wall Mounted (Wall Switch Type): The unit shall fit in/on a standard single gang switch box.
Rated capacity: 600 watts minimum at 120 volts, 60 Hz; 1000 watts minimum at 277 volts, 60 Hz.
The sensor shall have two switches where dual-level lighting is required. The switch shall have manual override for positive OFF and automatic ON.
The area of coverage shall be approximately 180 degrees by 35-40 feet.

Zero-10 Volt Dimming Wall Switch Sensor: The unit shall fit in/on a standard single gang switch box.
Device allows the user to increase or decrease the lighting levels via 0-10 Vdc output. Device sinks up to 50mA for control of compatible drivers. DIP switch settings enable a variety of control options such as Auto-ON operation, high and low trim, ramp up and fade down times, power loss mode, smart light level, walk-through and test modes. Additional DIP switch settings allow the user to choose which sensing technologies turn ON, hold ON or retrigger the lighting.

The area of coverage shall be approximately 180 degrees by 35-40 feet.

Ceiling Mounted: The unit shall fit in/on a standard octagon box. All ceiling mounted sensors shall be installed to a box with ring and box support.

The coverage area shall be 360 degrees by approximately 15 feet radius when mounted at 9-foot height. The sensor shall have provisions, such as masking, to block out problem areas.

Ceiling/Corner Mounted: The unit shall fit in/on a standard octagon box. All ceiling mounted sensors shall be installed to a box with ring and box support.

The coverage area shall be 90 degrees or greater by approximately 40 feet radius when mounted at 9-foot height. The sensor shall have provisions, such as masking, to block out problem areas.

Power Packs: Provide power packs as required for low voltage sensors. Rated capacity shall be 20 amps at 120 or 277 volts for fluorescent lamps.

The unit shall fit on a standard octagon box. All power packs shall be installed onto a supported box.

Low voltage cabling shall be plenum rated or installed in conduit in plenum-rated areas.

Auxiliary Contacts for HVAC Interlock: Provide auxiliary dry contacts for HVAC BAS interlock when required. Refer to the "Occ Sensor Interlock" column in the Air Terminal Schedule(s) on the HVAC drawings. When required, provide auxiliary contacts regardless if the motion sensors are line- or low-voltage.

The motion sensors and auxiliary contacts shall be wired such that the sensor still detects motion and controls the auxiliary contacts regardless if the light switch(es) are in the OFF position (e.g., the occupant has turned the lights OFF because there is enough daylight, but the occupant is still occupying the space, and the motion sensor senses the occupant and closes the auxiliary contacts for BAS input).

The BAS wiring to the auxiliary contacts shall be by the Division 23 contractor.

PHOTOCELLS
The controller shall be rated 2000 watts tungsten at 120, 240 or 277 volts. The cell shall be cadmium sulfide, 1" diameter.

The enclosure shall be die-cast zinc, gasketed for maximum weather proofing.

The enclosure shall include the positioning lug on the top of the enclosure.

The unit shall have a delay of up to two minutes to prevent false switching. ON/Off adjustment shall be done by moving a light selector with a range from 2 to 50 foot-candles.

Mounting shall be for a 1/2" conduit nipple.

The unit shall have a 5-year warranty.

The contacts shall be SPST normally closed.

The operational temperature range shall be -40 to 140 degrees F (-40 to +60 degrees C).

TIME CLOCKS
Unit shall be a multi-purpose, 7-day, 365-day advance single and skip a day, combination 2-channel electronic time clock with a SPDT switching configuration and astronomic dial.

The contacts shall be rated 10 amp resistive at 120/250 VAC, 7.5 amps inductive at 120/250 VAC, 5 amps inductive at 30 VDC and up to 1/2 HP at 250 VAC. The unit shall be rate for 30 VDC, 120 VAC, 250 VAC and 277 VAC.

The controller shall be capable of programming in the AM/PM or 24-hour format by jumper selection, in one minute resolution, using 2 buttons only for all basic settings.

Display shall be LED type.

The unit shall have 365 day and or holiday selection capabilities, with 16 single date and 5 holiday selection options and user selectable daylight savings/standard time functions.

The unit shall have 72-hour memory backup with rechargeable battery and charger.

The unit shall be capable of manual override, ON and OFF to the next scheduled event, using 1 button for each channel.

The enclosure shall be rated for indoor or outdoor installation.

TIME SWITCH
The switch shall be programmed to automatically turn lights off after a preset time.
The delay timer shall be adjustable with a range of 5 minutes to 12 hours.

Switch shall be rated for 120/277V, 1200W load.

The switch shall beep warning every 5 seconds during the last minute of countdown. Also, the switch shall flash lights (for warning) at one minute before timer expires.

Time scrolling shall be provided to override preset time by pressing the ON/OFF switch for four seconds.

LCD provided to show count down time.

The switch shall have zero crossing circuitry.

Time switches shall NOT be used for mechanical rooms, electrical rooms or telecommunication closets.

PART 3 - EXECUTION

INSTALLATION
See plans for device mounting heights.

Install wall switches with OFF position down.

Wall dimmers: de-rate ganged dimmers as instructed by manufacturer; do not use common neutral.

Install convenience receptacles with grounding pole on bottom.

Install box for information outlet at the same height as adjacent convenience receptacles. Locate boxes for information outlet as close as practical to duplex power outlet, approximately 2-inches apart.

Install box for telephone jack for wall telephone at 46-inches to center above finished floor.

Install specific-use receptacles at heights shown on Contract Drawings.
Install decorative plates on switch, receptacle, and blank outlets in finished areas.

Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets.

Install devices and wall plates flush and level.

Receptacles shall have a bonding conductor from grounding terminal to the metal conduit system. Self-grounding receptacles using mounting screws as bonding means are not approved.

FIELD QUALITY CONTROL
Inspect each wiring device for defects.

Operate each wall switch and sensor with circuit energized, and verify proper operation.

Verify operation of each ELCU by turning off the normal power circuit breaker at the panelboard.

Verify that each receptacle device is energized.

Test each receptacle device for proper polarity.

Test each GFCI receptacle device for proper operation.

The AEC personnel reserve the right to be present at all tests.

MOTION SENSORS

Power packs used in return air plenum ceiling areas shall be installed in an approved enclosure or UL listed for return air plenum.

Provide a minimum of 4’ of coiled cable for ceiling-mounted sensors.

Motion sensors shall be installed at locations indicated on the manufacturer’s submittal layout drawings. Sensors shall be located to prevent false “ON” tripping of the lights.

Sensitivity Test: After the sensor has been energized for at least 15 minutes, walk to the middle of the room (if conference room), or sit at the normal desk position (if an office). Make no motion for 20 seconds. Move one arm up and down slowly. The test LED should blink.

Time Delay Test: Set the time delay for 10 minutes. Walk into the room to activate the sensor then leave room. Sensor must turn lights off at approximately 10 minutes. Walk into the room again to reactivate the lights. Lights should activate within 1 second.

ADJUSTING
Adjust devices and wall plates to be flush and level.

Mark all conductors with the panel and circuit number serving the device with a machine generated label, at the device, and on the back of the device cover.

END OF SECTION

SECTION 26 27 28
DISCONNECT SWITCHES

PART 1 - GENERAL

SCOPE
The work under this section includes disconnect switches, fuses and enclosures. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- References
- Submittals
- Operation and Maintenance Data
- General

PART 2 - PRODUCTS
- Disconnect Switches
- Fuses

PART 3 - EXECUTION
- Installation

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

REFERENCES
NECA (National Electrical Contractors Association) "Standard of Installation"
NEMA ICS 2 – Industrial Control Devices, Controllers, and Assemblies
NEMA KS 1 – Enclosed Switches
UL 50 – Enclosures for Electrical Equipment
UL 98 – Enclosed and Dead-front Switches

SUBMITTALS
Include outline drawings with dimensions, and equipment ratings for voltage, ampacity, horsepower, and short circuit.

OPERATION AND MAINTENANCE DATA
All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

GENERAL
Provide disconnect switches for loads required by code. Review HVAC and Plumbing specifications to determine what equipment is furnished with disconnect switches. Install disconnect switches whether furnished under this contract or not. It is the Electrical Contractors responsibility to determine the need for a disconnect switch for each load. The contractors shall include in their bid the code required disconnect switches whether indicated on the drawings or not.

PART 2 - PRODUCTS

DISCONNECT SWITCHES
Fusible Switch Assemblies: NEMA Type Heavy Duty; quick-make, quick-break, load interrupter, enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: designed to accommodate Class R, Class J or Class CC (motors) cartridge type fuses.

Nonfusible Switch Assemblies: NEMA Type Heavy Duty; quick-make, quick-break, load interrupter, enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.

Enclosure:
- Indoor: NEMA 1 code gauge steel with rust inhibiting primer and baked enamel finish.

Outdoors: NEMA 3R code gauge zinc coated steel with baked enamel finish. or NEMA 4X, 304 stainless steel with brushed finish, when indicated on drawings.

Corrosive Areas, Kitchen/Food service areas, Therapeutic/Pool spaces and Interior Damp/Wet locations: NEMA 4X, 304 stainless steel with brushed finish.
Provide manufacturer's equipment ground kit in all disconnect switches.

In applications where the switch serves as the service entrance disconnect, provide service ground kit, label as service disconnect and provide UL listing for service disconnect.

FUSES
Fuses 600 Amperes and Less: Dual element, time delay, 250 or 600 volt (as appropriate), UL Class RK 5, Interrupting Rating: 200,000 rms amperes.

Fuses 601 Amperes and Larger: Low Peak, time delay, 600 volt, UL Class L. Interrupting Rating: 200,000 rms amperes.

Fuses 30 Amperes and less: Time-Delay, 600 volt, UL Class CC. Interrupting rating: 200,000 rms amperes.

Provide three (3) spares of each size and type fuse.

Provide cabinet/enclosure for spare fuses sized to accommodate all required spare fuses for entire facility. Cabinet shall have hinged and latched cover. Label cabinet "Spare Fuses". Locate cabinet in main electrical room.

PART 3 - EXECUTION

INSTALLATION
Install disconnect switches where indicated on Drawings or required by NEC.

Provide identification as specified in Section 26 05 53.

Provide label on inside of disconnect cover identifying the type and size of fuse to be utilized.

VFD installations; Provide aux contact to de energize VFD when operating local disconnect.

END OF SECTION

SECTION 26 28 13
FUSES

PART 1 - GENERAL

SCOPE
The work under this section includes 250 and 600 volt fuses. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- Submittals
- Regulatory Requirements
- Extra Materials

PART 2 - PRODUCTS
- Fuses

PART 3 - EXECUTION
- Installation

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

SUBMITTALS
Provide device dimensions, nameplate nomenclature, and electrical ratings.

Submit manufacturer’s product data sheets with installation instructions.

REGULATORY REQUIREMENTS
Listed by Underwriter's Laboratories, Inc., and suitable for specific application.

EXTRA MATERIALS
Provide three (3) spares of each size and type fuse.

PART 2 - PRODUCTS

FUSES
Fuses 600 Amperes and Less: Dual element, time delay, 250 or 600] volt (as appropriate), UL Class RL 5, Interrupting Rating: 200,000 rms amperes.

Fuses 601 Amperes and Larger: Low Peak, time delay, 600 volt, UL Class L. Interrupting Rating: 200,000 rms amperes.

Fuses 30 Amperes and less: Time-Delay, 600 volt, UL Class CC. Interrupting rating: 200,000 rms amperes.

Provide storage enclosure for spare fuses. Enclosure shall be a hinged-cover junction box, minimum size of 12” x 12” x 6” D. Enclosure shall be labeled as “Spare Fuses”. Install enclosure in main electrical room.

PART 3 - EXECUTION

INSTALLATION
Fuses shall not be installed until equipment is ready to be energized.

END OF SECTION

SECTION 26 28 16
ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

SCOPE
The work under this section includes enclosed circuit breakers. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- References
- Submittals
- Operation and Maintenance Data
- Regulatory Requirements
- Delivery, Storage, and Handling

PART 2 - PRODUCTS
- Circuit Breakers
- Ratings
- Enclosure
- Accessories

PART 3 - EXECUTION
- Installation
- Adjusting
- Field Quality Control

RELATED WORK
Applicable provisions of Division 1 govern work under this Section.

REFERENCES
NEMA AB 1 - Molded Case Circuit Breakers
NEMA KS 1 - Enclosed Switches

SUBMITTALS
Include circuit breaker ratings, withstand ratings, frame size, time-current and let-through current curves, outline dimensions, and terminal lug sizes.

Documentation shall be provided for Arc Energy Reduction where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted is 1200A or higher.

OPERATION AND MAINTENANCE DATA
All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

REGULATORY REQUIREMENTS
Circuit breakers listed by Underwriter's Laboratories, Inc., and suitable for specific application.

DELIVERY, STORAGE, AND HANDLING
Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

PART 2 - PRODUCTS

CIRCUIT BREAKERS
Molded Case Circuit Breakers: Inverse time with integral thermal and instantaneous magnetic trip elements in each pole.

Electronic Trip Circuit Breaker: As scheduled on the drawings, electronic circuit breakers shall have, at a minimum, adjustments for long time trip, short time trip and instantaneous trip.

Provide integral ground fault sensing with adjustable ground fault trip where indicated on the drawings.

Provided for Arc Energy Reduction where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted is 1200A or higher.

RATINGS:
Ratings as shown on the Drawings.

ENCLOSURE
Enclosure:

Indoor: NEMA Type -1 code gauge steel with rust inhibiting primer and baked gray enamel finish.

Outdoor: NEMA 3R code gauge zinc coated steel with baked gray enamel finish [NEMA 4X stainless steel with brushed finish].

Corrosive Areas, Kitchen/Food service areas, Therapeutic/Pool spaces and Damp/Wet locations: NEMA type 4X, 304 stainless steel with brushed finish.

ACCESSORIES
Provide accessories as scheduled or shown on drawings, to NEMA AB 1.

Shunt Trip Device: 120 volts, AC. Electrically operated solenoid for remote opening of circuit breaker main contacts.

Auxiliary Switch: 120 volts, 5 amps. One set of normally open and one set of normally closed contacts. Contacts signal the status of CB main contacts independent of the method used to open or close CB.

Alarm Switch: 120 volts, 5 amps. One set of normally open and one set of normally closed contacts. Contact activation upon any trip function of the CB or external trip device.

Handle Lock: Include provisions for padlocking.

PART 3 - EXECUTION

INSTALLATION
Install enclosed circuit breakers where shown on Drawings, in accordance with manufacturer's instructions.

Install free standing enclosed circuit breakers on a 3.5 inch high concrete equipment pad.

Install 90 degree C insulated conductors based on ampacity of 75 degree C conductors when utilizing 100% rated OCPD’s. Consult manufacturer’s requirements for specific devices.

ADJUSTING
Adjust all operating mechanisms for free mechanical movement.

Adjust trip and time delay settings to values as recommended in coordination study or as instructed by the A/E. Include a copy of the coordination study and recommended circuit breaker set points in the O&M manual

FIELD QUALITY CONTROL
Inspect completed installation for physical damage, proper alignment, anchorage, and grounding.

Check tightness of accessible bolted bus joints using a calibrated torque wrench. Tightness shall be in accordance with manufacturer's recommended values.

Touch up scratched or marred surfaces to match original finish.

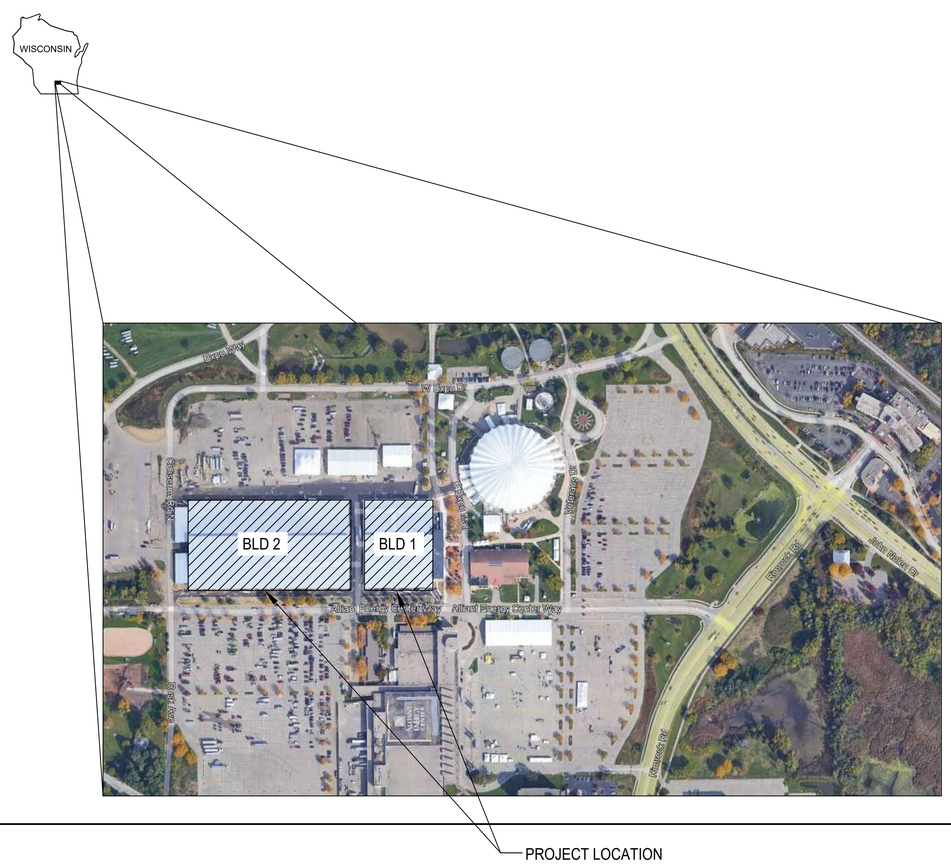
Inspect visually and perform several mechanical ON-OFF operations on each device.

END OF SECTION

RFB NO. 322031

ELECTRICAL UPGRADES
ALLIANT ENERGY CENTER PAVILIONS 1 & 2
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

VICINITY MAP:



ELECTRICAL DRAWING INDEX

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Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
1	08-22-2022	Issued for Bidding

RFB NO. 322031 - ELECTRICAL UPGRADES

ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

TITLE SHEET - ELECTRICAL

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER: 22005
DATE: 08-11-2022
DRAWN BY: TP
CHECKED BY: BK
SHEET NUMBER: E000

Issued for Bidding Set

RECEPTACLE SYMBOLS

	DUPLEX RECEPTACLE
	QUAD RECEPTACLE
GFI	GFI DUPLEX RECEPTACLE
GFI	GFI QUAD RECEPTACLE
GFI WR	GFI WEATHER RESISTANT TYPE DUPLEX RECEPTACLE. PROVIDE WEATHER RESISTANT IN-USE COVER
	DUPLEX RECEPTACLE MOUNTED FLUSH IN CEILING
SWH SWCH SWFH	SLASH THROUGH CENTER OF RECEPTACLE SYMBOL INDICATES DEVICE MOUNTED ABOVE COUNTER (H) INDICATES HORIZONTAL MOUNTING
	SHADED SIDES INDICATE GENERATOR FED DEVICE
	SHADED BASE INDICATES SWITCHED RECEPTACLE
USB	RECEPTACLE WITH INTEGRAL USB CHARGER
IG	ISOLATED GROUND RECEPTACLE
	SINGLE GANG RECESSED FLOOR BOX. PROVIDE DEVICE AS INDICATED
	TWO-GANG RECESSED FLOOR BOX. PROVIDE DEVICE IN EACH COMPARTMENT AS INDICATED
	THREE-GANG RECESSED FLOOR BOX. PROVIDE DEVICE IN EACH COMPARTMENT AS INDICATED
	FIRE-RATED POKE-THRU DEVICE. PROVIDE POWER AND DATA DEVICES AS INDICATED
	SURFACE WIREMOLD

NOTE: ALL SYMBOLS MAY NOT BE USED FOR THIS PROJECT

LIGHT FIXTURE SYMBOLS

F1 A-9 b	FIXTURE TYPE PANEL-CIRCUIT CONTROL DEVICE
	RECESSED DOWNLIGHT - ROUND TRIM
	SUSPENDED DOWNLIGHT - ROUND
	RECESSED DOWNLIGHT - SQUARE TRIM
	FLOOD LIGHT
	WALL WASH FIXTURE
	SURFACE FIXTURE
	RECESSED DIRECT-INDIRECT FIXTURE
	RECESSED TROFFER
	LINEAR PENDANT FIXTURE
	CEILING FAN
	CHANDELIER
	WALL MOUNTED SCONCE OR WALL PACK
	SITE LIGHTING POLE MOUNTED FIXTURE
	SITE LIGHTING POST TOP LIGHT FIXTURE/BOLLARD
	UNDERCABINET/STRIP FIXTURE
	EMERGENCY/EGRESS LIGHT FIXTURES
	EMERGENCY BATTERY UNIT - CEILING MOUNTED
	EMERGENCY BATTERY UNIT - WALL MOUNTED
	EXIT SIGN - SINGLE OR DOUBLE FACE, CEILING MOUNTED, PROVIDE ARROWS AS INDICATED
	EXIT SIGN - SINGLE OR DOUBLE FACE, WALL MOUNTED, PROVIDE ARROWS AS INDICATED

NOTE: ALL SYMBOLS MAY NOT BE USED FOR THIS PROJECT

SWITCHING SYMBOLS

X a	SINGLE POLE TOGGLE SWITCH MOUNTED AT 48" AFF TO TOP OF BOX UOI SWITCH TYPE: (3) THREE WAY (4) FOUR WAY (K) KEY OPERATED (P) PILOT LIGHT (T) TEACHER STATION SWITCHING DESIGNATION (NO SWITCHING DESIGNATION IMPLIES DEVICE CONTROLS ALL ZONES OR SWITCH LEGS WITHIN THE ROOM IT IS INSTALLED)
X a	WALL BOX DIMMER MOUNTED AT 48" AFF TO TOP OF BOX UOI SWITCH TYPE SWITCH DESIGNATION
LV	LOW VOLTAGE SWITCH MOUNTED AT 48" AFF TO TOP OF BOX UOI
OS OS	WALL MOUNTED OCCUPANY SENSOR (PASSIVE INFRARED) MOUNTED AT 48" AFF TO TOP OF BOX UOI
VS VS	WALL MOUNTED VACANCY SENSOR (PASSIVE INFRARED) MOUNTED AT 48" AFF TO TOP OF BOX UOI
VSa OSa	OCCUPANCY SENSOR (OS), VACANCY SENSOR (VS) SWITCH DESIGNATION
POa	PHOTOCELL / DAYLIGHT SENSOR SWITCH DESIGNATION
ER	EMERGENCY LIGHTING CONTROL RELAY (UL924 RATED)
LC	LIGHTING CONTACTOR
RC/X	RELAY CABINET - REFER TO DRAWINGS FOR WIDTH AND RELAY CABINET SCHEDULES

POWER SYMBOLS

X	ELECTRICAL PANEL - REFER TO DRAWINGS FOR WIDTH AND PANEL SCHEDULES PANEL NAMING: XXP-#X: DENOTES PANEL FUNCTION: L = LIGHTING P = GENERAL POWER E = EMERGENCY S = OPTIONAL STANDBY C = CRITICAL LOADS XXP-#X: DENOTES VOLTAGE: H = 480Y/277V L = 208Y/120V XXP-# X: DENOTES FLOOR PANEL IS ON (1, 2, 3...) XXP-# X: DENOTES WHICH PANEL ON FLOOR (A, B, C...)
DP/X	DISTRIBUTION PANELBOARD - REFER TO DRAWINGS FOR WIDTH AND PANEL SCHEDULES
MSB	MAIN SWITCHBOARD - REFER TO DRAWINGS FOR DIMENSIONS AND ONE LINE DIAGRAM
INV/X	BATTERY INVERTER - REFER TO DRAWINGS FOR WIDTH AND INVERTER SCHEDULES
T T/X	ELECTRICAL PANEL - REFER TO DRAWINGS FOR DIMENSIONS AND ONE LINE DIAGRAM
MCC/X	MOTOR CONTROL CENTER - REFER TO DRAWINGS FOR DETAILS
	NON-FUSED DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
	MOTOR STARTER
	COMBINATION MOTOR STARTER-DISCONNECT
M	MANUAL MOTOR STARTER W/ THERMAL OVERLOAD
	SPECIAL OUTLET - SEE SPECIAL OUTLET SCHEDULE
J	JUNCTION BOX - FLOOR / CEILING MOUNTED
T	THERMOSTAT
J	JUNCTION BOX - WALL MOUNTED
	MOTOR
M	MOTORIZED DAMPER
TCP	TEMPERATURE CONTROL PANEL
VFD	VARIABLE FREQUENCY DRIVE
SPD	SURGE PROTECTIVE DRIVE
CB	ENCLOSED CIRCUIT BREAKER
TC	TIME CLOCK
UPS	UNINTERRUPTIBLE POWER SUPPLY
ATS	AUTOMATIC TRANSFER SWITCH
E	ELECTRICAL CONNECTION
CD	CORD DROP

NOTE: ALL SYMBOLS MAY NOT BE USED FOR THIS PROJECT

FIRE ALARM SYMBOLS

FB	FIRE BELL
FSK	FIRE ALARM HORN-STROBE - WALL MOUNTED AT 80" AFF TO BOTTOM OF BOX OR 6" FROM CEILING TO TOP OF BOX (WHICHEVER IS LOWER) (S) DENOTES SPEAKER-STROBE
FH	FIRE ALARM HORN - WALL MOUNTED AT 96" AFF TO BOTTOM OF BOX OR 6" FROM CEILING TO TOP OF BOX (WHICHEVER IS LOWER)
F	FIRE ALARM STROBE - WALL MOUNTED AT 80" AFF TO BOTTOM OF BOX OR 6" FROM CEILING TO TOP OF BOX (WHICHEVER IS LOWER)
FS	FIRE ALARM HORN-STROBE - CEILING MOUNTED (S) DENOTES SPEAKER-STROBE
F	FIRE ALARM STROBE - CEILING MOUNTED
MN	MASS NOTIFICATION SPEAKER-STROBE
LF	LOW FREQUENCY SOUNDER
LFS 15cd	LOW FREQUENCY SOUNDER-STROBE COMBINATION DEVICE - CANDELA (cd) RATING AS SHOWN.
P	FIRE ALARM PULL STATION MOUNTED AT 48" AFF
S CO	SYSTEM SMOKE DETECTOR (ER) DENOTES ELEVATOR RECALL (CO) DENOTES COMBINATION CO/SMOKE DETECTOR (SC) DENOTES SELF CONTAINED
CO	SYSTEM CARBON MONOXIDE DETECTOR
S CO	SMOKE ALARM (120 VOLT WITH BATTERY) (CO) DENOTES COMBINATION CO/SMOKE ALARM
CO	CARBON MONOXIDE ALARM (120V WITH BATTERY)
SD	INTELLIGENT PHOTOELECTRIC DUCT SMOKE DETECTOR
H	HEAT DETECTOR - 135°F FIXED AND 15°F/MIN RATE OF RISE UOI
DH	FIRE ALARM MAGNETIC DOOR HOLDER
SD	SMOKE DAMPER
FD	FIRE DAMPER
FS	SPRINKLER FLOW SWITCH (PROVIDE ADDRESSABLE MODULE)
TS	SPRINKLER TAMPER SWITCH (PROVIDE ADDRESSABLE MODULE)
MM	ADDRESSABLE MONITOR MODULE
CM	ADDRESSABLE CONTROL MODULE
FACP	FIRE ALARM CONTROL PANEL
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FCCP	FIRE COMMAND CENTER PANEL
NAC	NOTIFICATION APPLIANCE CIRCUIT (NAC) PANEL

NOTE: ALL SYMBOLS MAY NOT BE USED FOR THIS PROJECT

ELECTRICAL ABBREVIATIONS

A	AMP
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AMP	AMPLIFIER
ATS	AUTOMATIC TRANSFER SWITCH
BFG	BELOW FINISHED GRADE
C	CONDUIT
CB, C/B	CIRCUIT BREAKER(S)
CD	CANDELA
CEF	CEILING EXHAUST FAN
CF	COMBINATION FUSIBLE FULL VOLTAGE STARTER
CKT	CIRCUIT
CM	CONSTRUCTION MANAGER
CO	CARBON MONOXIDE
CPT	CONTROL PANEL TRANSFORMER
CS	COMBINATION STARTER
CU	CONDENSING UNIT
CUH	CABINET UNIT HEATER
D, DS	DISCONNECT SWITCH
DD	DOUBLE DUPLEX
DM	DOOR MANUFACTURER
DN	DOWN
DP	DISTRIBUTION PANELBOARD
DRWGS	DRAWINGS
EC	BY ELECTRICAL CONTRACTOR
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
EM	EMERGENCY
EP	EXPLOSION PROOF
ERL	EXISTING TO BE RELOCATED
ET	ELAPSED TIMER
ETR	EXISTING TO REMAIN
EUH	ELECTRIC UNIT HEATER
EWH	ELECTRIC WALL HEATER
EX	EXISTING
F	FURNISHED BY
FC	FOOTCANDLE
FD	FUSIBLE DISCONNECT SWITCH
FLA	FULL LOAD AMPS
FS	FLOW SWITCH
FZS	FREEZE STAT

SECURITY SYMBOLS

	PUSHBUTTON
B	DOOR BELL
IC	DOOR INTERCOM SYSTEM
KP	KEY PAD
CR	CARD READER
ML	MAGNETIC DOOR LOCK
ES	ELECTRIC DOOR STRIKE
TV	MOTION SENSOR
	VIDEO SURVEILLANCE CAMERA - WALL OR POLE MOUNTED
C	VIDEO SURVEILLANCE DOME CAMERA - WALL OR POLE MOUNTED
C	VIDEO SURVEILLANCE DOME CAMERA - CEILING MOUNTED
SAP	SECURITY ALARM PANEL

NOTE: ALL SYMBOLS MAY NOT BE USED FOR THIS PROJECT

TELECOMMUNICATIONS SYMBOLS

W	VOICE OUTLET (W) DENOTES WALL PHONE
#	WORKSTATION DATA OUTLET - (#) DENOTES FACEPLATE CONFIGURATION
#	VOICE/DATA OUTLET - (#) DENOTES FACEPLATE CONFIGURATION
WAP	WIRELESS ACCESS POINT - PROVIDE DATA SERVICE LOOP (20') ABOVE CEILING
TV	CABLE TV/VIDEO/PROJECTOR OUTLET
MDF/X	MAIN DISTRIBUTION FRAME
SR/X	SWITCH RACK

NOTE: ALL SYMBOLS MAY NOT BE USED FOR THIS PROJECT

CLOCK/AUDIO/VISUAL SYMBOLS

	CLOCK
CP #	CLOCK CONTROL PANEL
M #	MICROPHONE CONTROL PANEL
M	MICROPHONE JACK
	EXTERIOR PAGING SPEAKER
S VC	FLUSH MOUNTED CEILING SPEAKER (VC) DENOTES VOLUME CONTROL
S VC	SURFACE MOUNTED CEILING SPEAKER (VC) DENOTES VOLUME CONTROL
S VC	WALL MOUNTED SPEAKER (VC) DENOTES VOLUME CONTROL
VC	VOLUME CONTROL
AMP	AMPLIFIER

NOTE: ALL SYMBOLS MAY NOT BE USED FOR THIS PROJECT

ELECTRICAL ABBREVIATIONS

GC	PROJECT GENERAL CONTRACTOR
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER TYPE
GRD	GROUND
H, HV	HEATING/VENTILATING CONTRACTOR
HOA	HAND/OFF/AUTO SELECTOR SWITCH
HP	HORSEPOWER
IG	ISOLATED GROUND
IU	IN UNIT
JB	JUNCTION BOX
KS	KEY SWITCH
KVA	KILOVOLT-AMPERES
KW	KILOWATT
LD	LOAD (KW OR HP)
LS	LIFE SAFETY
LV	LOW VOLTAGE
LVC	LOW VOLTAGE CONTRACTOR
LVT	LINE VOLTAGE THERMOSTAT (120V)
MAG	MAGNETIC STARTER
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED DAMPER
MDF	MAIN DISTRIBUTION FRAME
MFR	MANUFACTURER
MLO	MAIN LUGS ONLY
MNTS	MAINTENANCE SERVICE
MS	MANUAL STARTER
MSB	MAIN SWITCHBOARD
MTD	MOUNTED
NFD	NON-FUSIBLE DISCONNECT SWITCH
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT - 24 HOUR OPERATION
NTS	NOT TO SCALE
NU	NEAR UNIT (REFER TO HVAC & PLUMBING DRAWINGS FOR EXACT LOCATION)
OOS	ON/OFF SWITCH
OU	ON UNIT

ELECTRICAL ABBREVIATIONS

PCI#	PHOTOCELL, # INDICATES PHOTOCELL DESIGNATION
PBL	PUSH BUTTON WITH PILOT LIGHT
PBS	PUSH BUTTON STATION
PC	PLUMBING CONTRACTOR
PL	PILOT LIGHT
PRV	POWER ROOF VENTILATION
RAF	RETURN AIR FAN
RAI	REMAIN AS IS
RD	REMOVE EXISTING AND DISPOSE OFF SITE
RE	REPLACE EXISTING
RESD	REMOVE EXISTING; SAVE AND/OR DISPOSE OFF SITE (OWNER'S OPTION)
RL	RELOCATED DEVICE OR EQUIPMENT
RVS	REDUCED VOLTAGE STARTER
SB	SOUNDER BASE
SF	SUPPLY FAN
SPD	SURGE PROTECTION DEVICE
SPS	SELECTOR SWITCH
SR	SERVER RACK
SS	SOFT START
SSP	START-STOP WITH PILOT LIGHT
SVS	SUPERVISORY SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCH GEAR
T, XFMR	TRANSFORMER
T-STAT	THERMOSTAT
TC	TIME CLOCK
TCC	TEMPERATURE CONTROL CONTRACTOR
TCP	TEMPERATURE CONTROL PANEL
TS	TAMPER SWITCH
TV	TELEVISION
TYP	TYPICAL
UFD	UNDERFLOOR DUCT
UG	UNDERGROUND
UGD	UNDERGROUND DUCT
UH	UNIT HEATER
UOI	UNLESS OTHERWISE INDICATED
UPS	UNINTERRUPTIBLE POWER SUPPLY
USS	UNIT SUBSTATION
W	WATTS
W/	WITH
WAP	WIRELESS ACCESS POINT
WP	WEATHERPROOF
WR	WEATHER RESISTANT

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Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
1	08-22-2022	Issued for Bidding

RFB NO. 322031 - ELECTRICAL UPGRADES

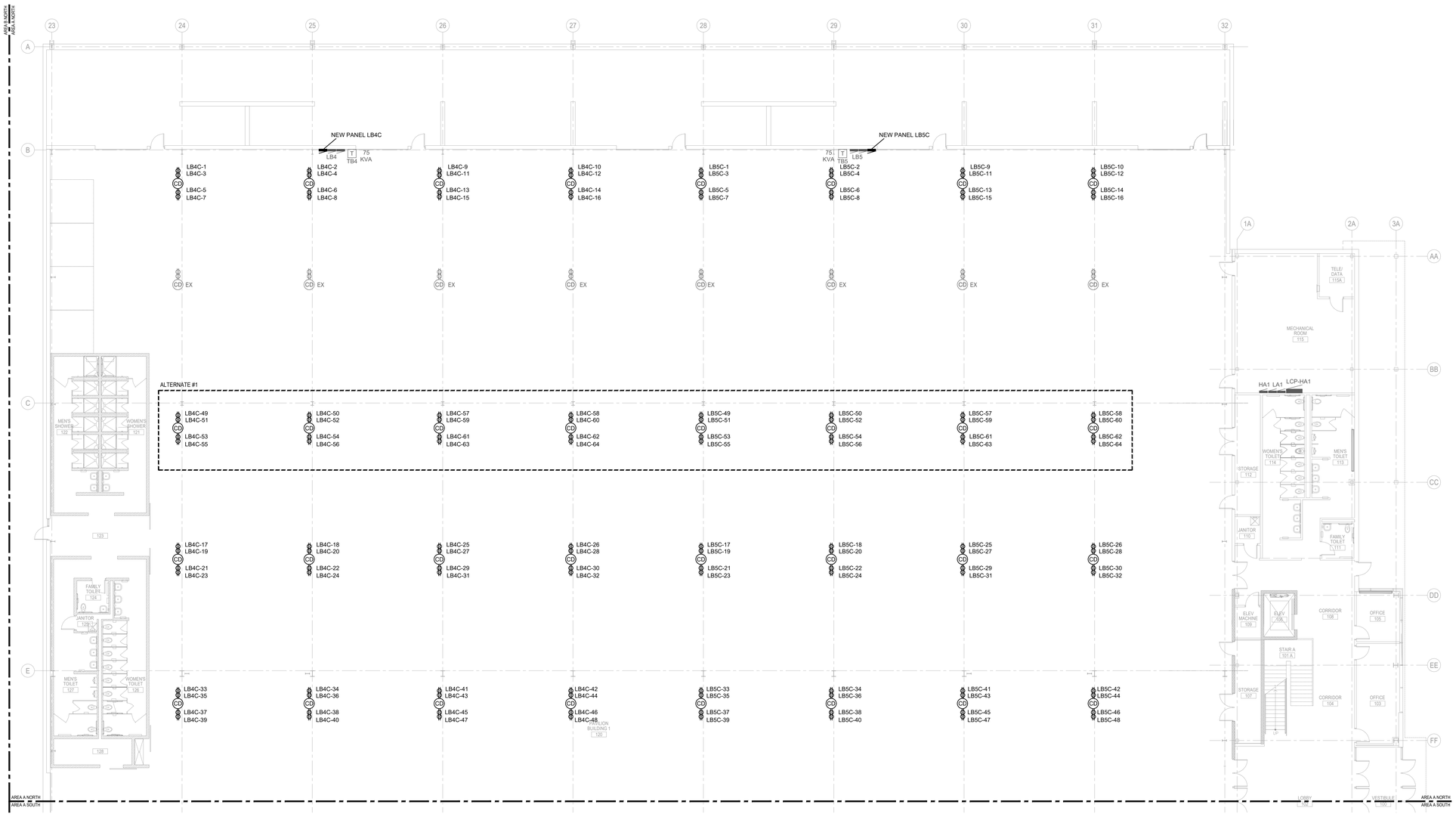
ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

ELECTRICAL GENERAL NOTES, SYMBOLS AND ABBREVIATIONS

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER: 22005
DATE: 08-11-2022
DRAWN BY: TP
CHECKED BY: BK
SHEET NUMBER: E001

Issued for Bidding Set



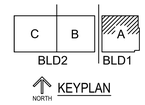
NORTH

FIRST FLOOR ELECTRICAL PLAN - AREA 'A NORTH' - BLD 1

3/32"=1'-0"

GENERAL NOTES:

1. ALL NEW CORD DROPS SHALL BE FED THROUGH CONDUITS IN THE JOIST SPACES SIMILAR TO EXISTING CORD DROPS. DROPS SHALL HANG TO 6' 0" AFF WHEN EXTENDED. PROVIDE STRAIN RELIEF. OVERSIZE CONDUCTORS FOR VOLTAGE DROP. USE #10 AWG Cu 7-CONDUCTOR SOO (OR EQUIVALENT) CORD FOR 1 X 3-PHASE SHARED NEUTRAL CIRCUIT, 1 UNSHARED NEUTRAL CIRCUIT AND ONE EQUIPMENT GROUND CONDUCTOR. ALL RECEPTACLES SHALL BE 20A, 125V, GFCI DEVICES. TYPICAL ALL CORD DROPS.



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P:608.440.9594 W:www.tailoredeng.com

Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
1	08-22-2022	Issued for Bidding

RFB NO. 322031 - ELECTRICAL UPGRADES

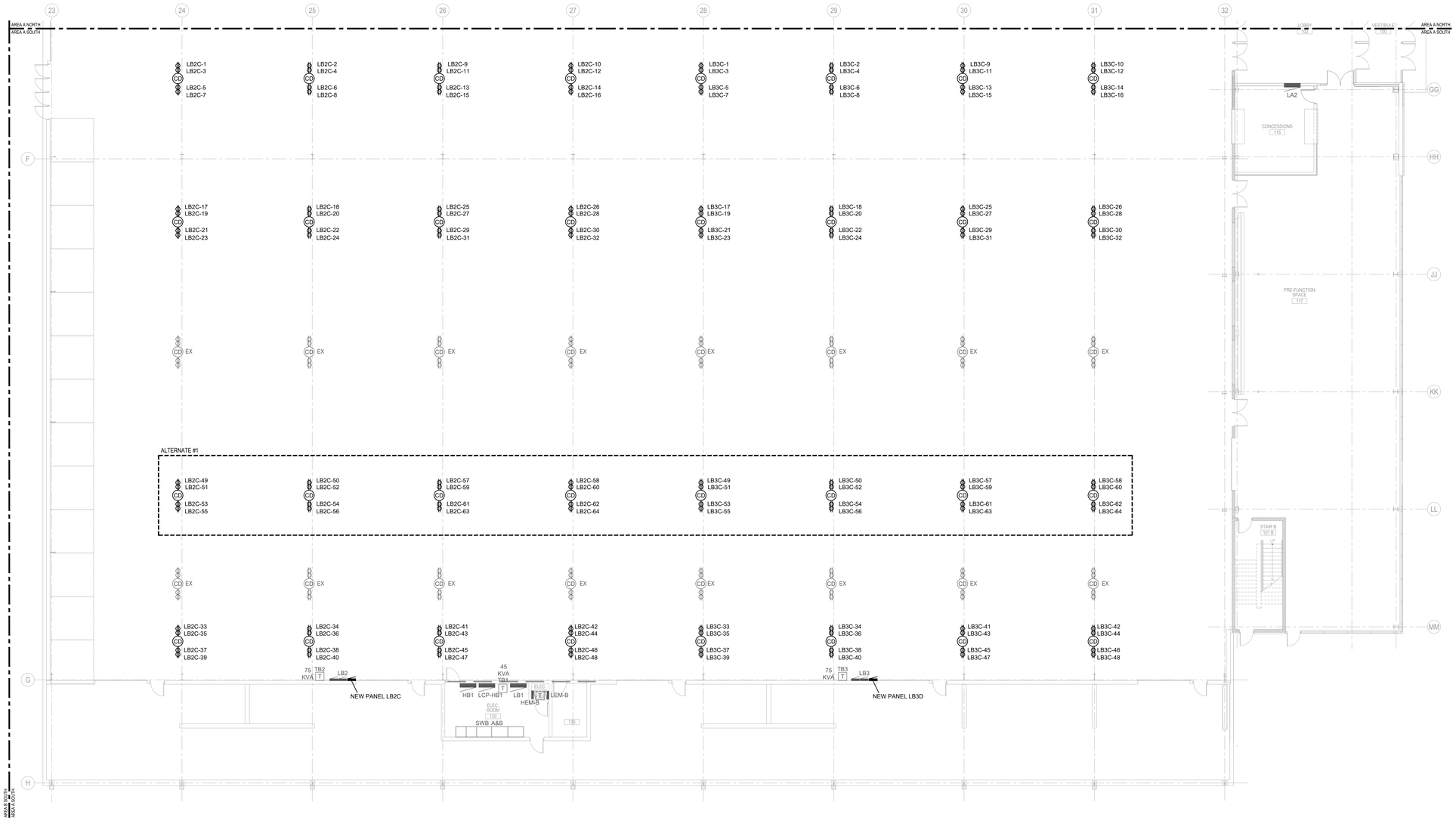
ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

FIRST FLOOR ELECTRICAL PLAN – AREA 'A NORTH' – BLD 1

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER: 22005
DATE: 08-11-2022
DRAWN BY: TP
CHECKED BY: BK
SHEET NUMBER: E201

Issued for Bidding Set



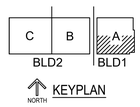
NORTH

FIRST FLOOR ELECTRICAL PLAN - AREA 'A SOUTH' - BLD 1

3/32"=1'-0"

GENERAL NOTES:

1. ALL NEW CORD DROPS SHALL BE FED THROUGH CONDUITS IN THE JOIST SPACES SIMILAR TO EXISTING CORD DROPS. DROPS SHALL HANG TO 6' 0" AFF WHEN EXTENDED. PROVIDE STRAIN RELIEF. OVERSIZE CONDUCTORS FOR VOLTAGE DROP. USE #10 AWG Cu 7-CONDUCTOR SOO (OR EQUIVALENT) CORD FOR 1 X 3-PHASE SHARED NEUTRAL CIRCUIT, 1 UNSHARED NEUTRAL CIRCUIT AND ONE EQUIPMENT GROUND CONDUCTOR. ALL RECEPTACLES SHALL BE 20A, 125V, GFCI DEVICES. TYPICAL ALL CORD DROPS.



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Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
1	08-25-2022	Issued for Bidding

RFB NO. 322031 - ELECTRICAL UPGRADES

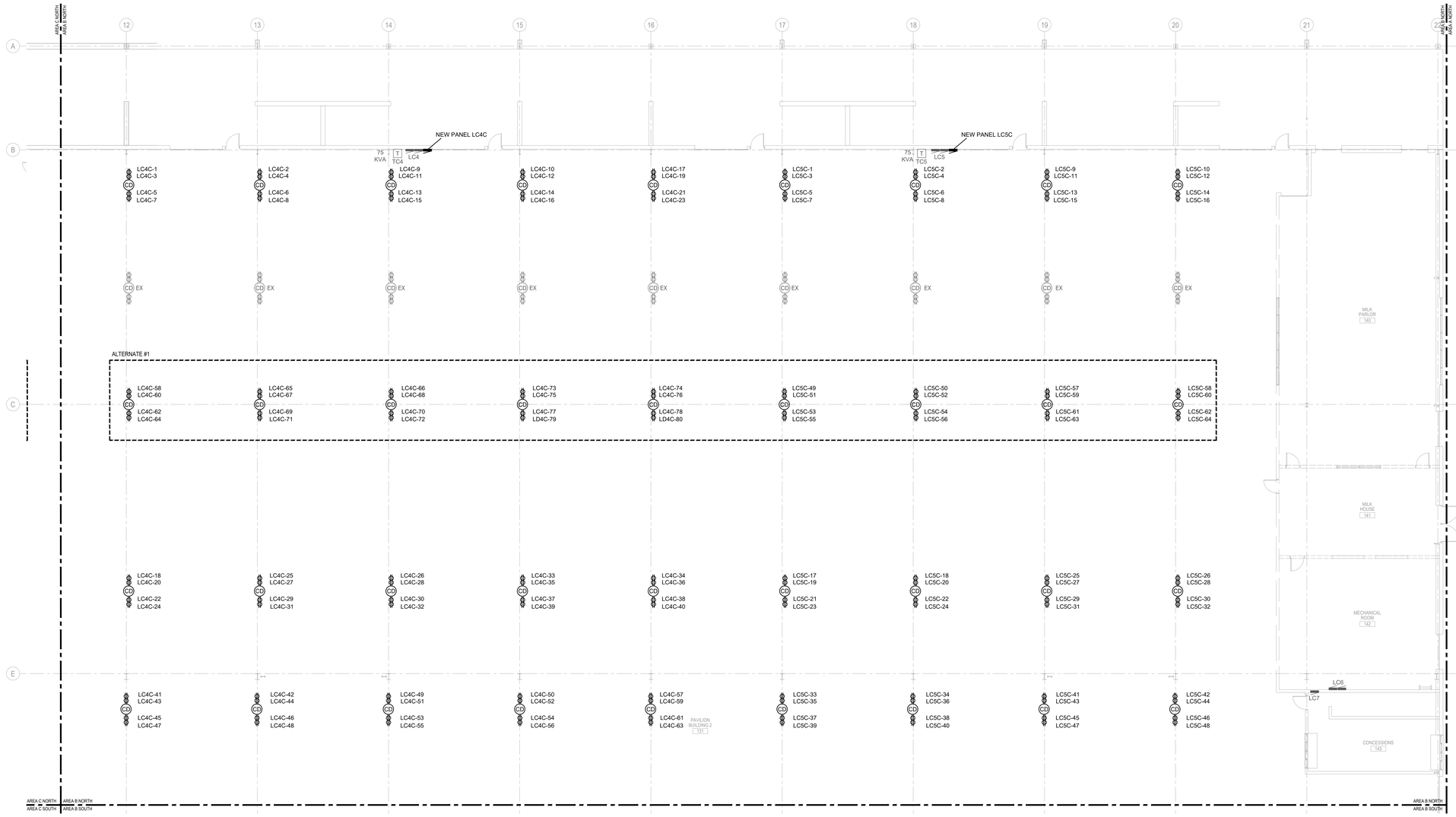
ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

FIRST FLOOR ELECTRICAL PLAN – AREA 'A SOUTH' – BLD 1

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER: 22005
DATE: 08-11-2022
DRAWN BY: TP
CHECKED BY: BK
SHEET NUMBER: E202

Issued for Bidding Set



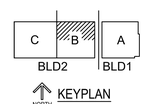
NORTH

FIRST FLOOR ELECTRICAL PLAN - AREA 'B NORTH' - BLD 2

3/32"=1'-0"

GENERAL NOTES:

1. ALL NEW CORD DROPS SHALL BE FED THROUGH CONDUITS IN THE JOIST SPACES SIMILAR TO EXISTING CORD DROPS. DROPS SHALL HANG TO 6' 0" AFF WHEN EXTENDED. PROVIDE STRAIN RELIEF. OVERSIZE CONDUCTORS FOR VOLTAGE DROP. USE #10 AWG Cu 7-CONDUCTOR SOO (OR EQUIVALENT) CORD FOR 1 X 3-PHASE SHARED NEUTRAL CIRCUIT, 1 UNSHARED NEUTRAL CIRCUIT AND ONE EQUIPMENT GROUND CONDUCTOR. ALL RECEPTACLES SHALL BE 20A, 125V, GFCI DEVICES. TYPICAL ALL CORD DROPS.



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Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
1	08-26-2022	Issued for Bidding

RFB NO. 322031 - ELECTRICAL UPGRADES

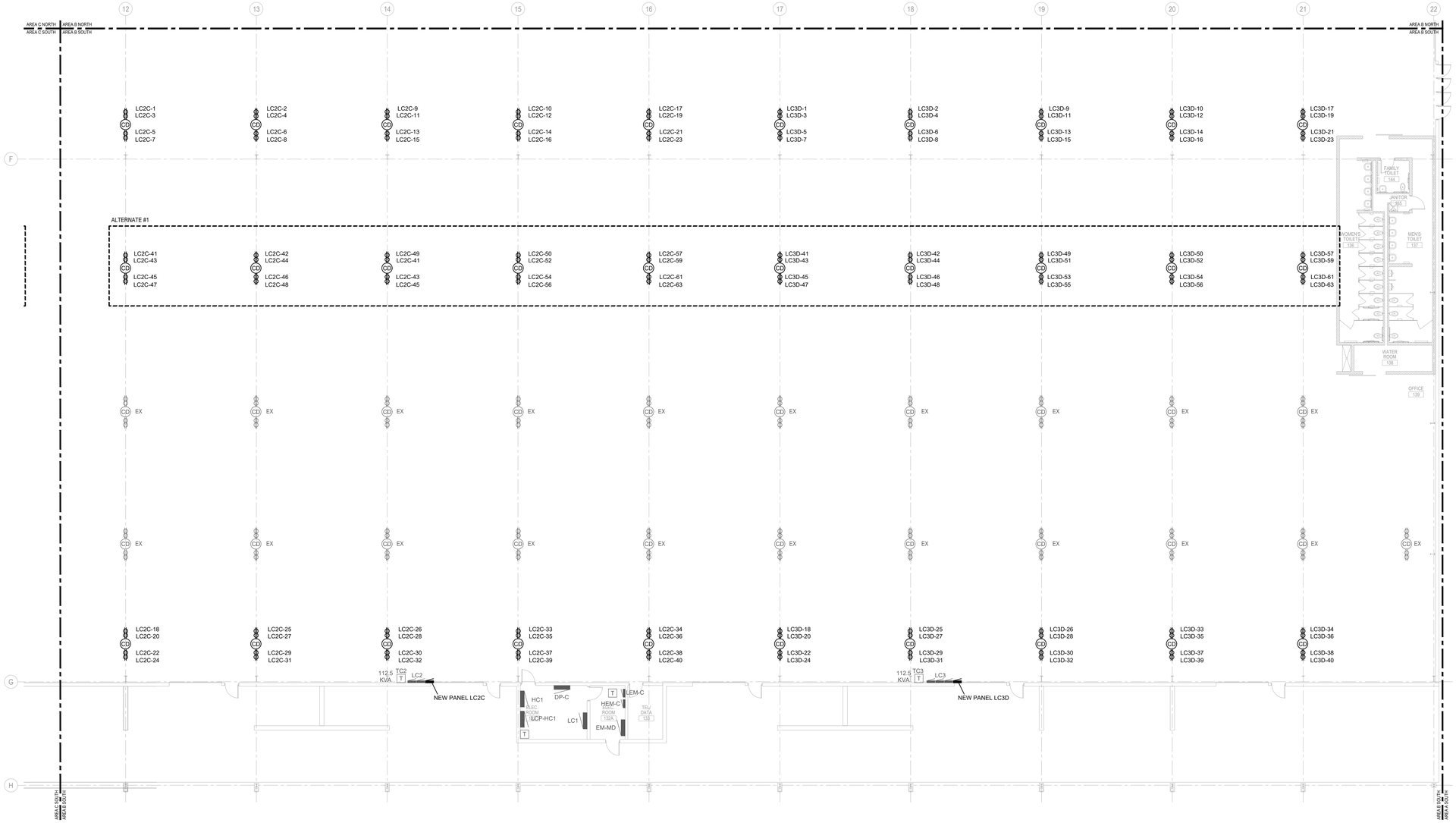
ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

FIRST FLOOR ELECTRICAL PLAN – AREA 'B NORTH' – BLD 2

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER	22005
DATE	08-11-2022
DRAWN BY	TP
CHECKED BY	BK
SHEET NUMBER	E203

Issued for Bidding Set



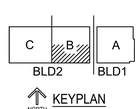
NORTH

FIRST FLOOR ELECTRICAL PLAN - AREA 'B SOUTH' - BLD 2

3/32"=1'-0"

GENERAL NOTES:

1. ALL NEW CORD DROPS SHALL BE FED THROUGH CONDUITS IN THE JOIST SPACES SIMILAR TO EXISTING CORD DROPS. DROPS SHALL HANG TO 6' 0" AFF WHEN EXTENDED. PROVIDE STRAIN RELIEF. OVERSIZE CONDUCTORS FOR VOLTAGE DROP. USE #10 AWG Cu 7-CONDUCTOR SOO (OR EQUIVALENT) CORD FOR 1 X 3-PHASE SHARED NEUTRAL CIRCUIT, 1 UNSHARED NEUTRAL CIRCUIT AND ONE EQUIPMENT GROUND CONDUCTOR. ALL RECEPTACLES SHALL BE 20A, 125V, GFCI DEVICES. TYPICAL ALL CORD DROPS.



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Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
1	08-25-2022	Issued for Bidding

RFB NO. 322031 - ELECTRICAL UPGRADES

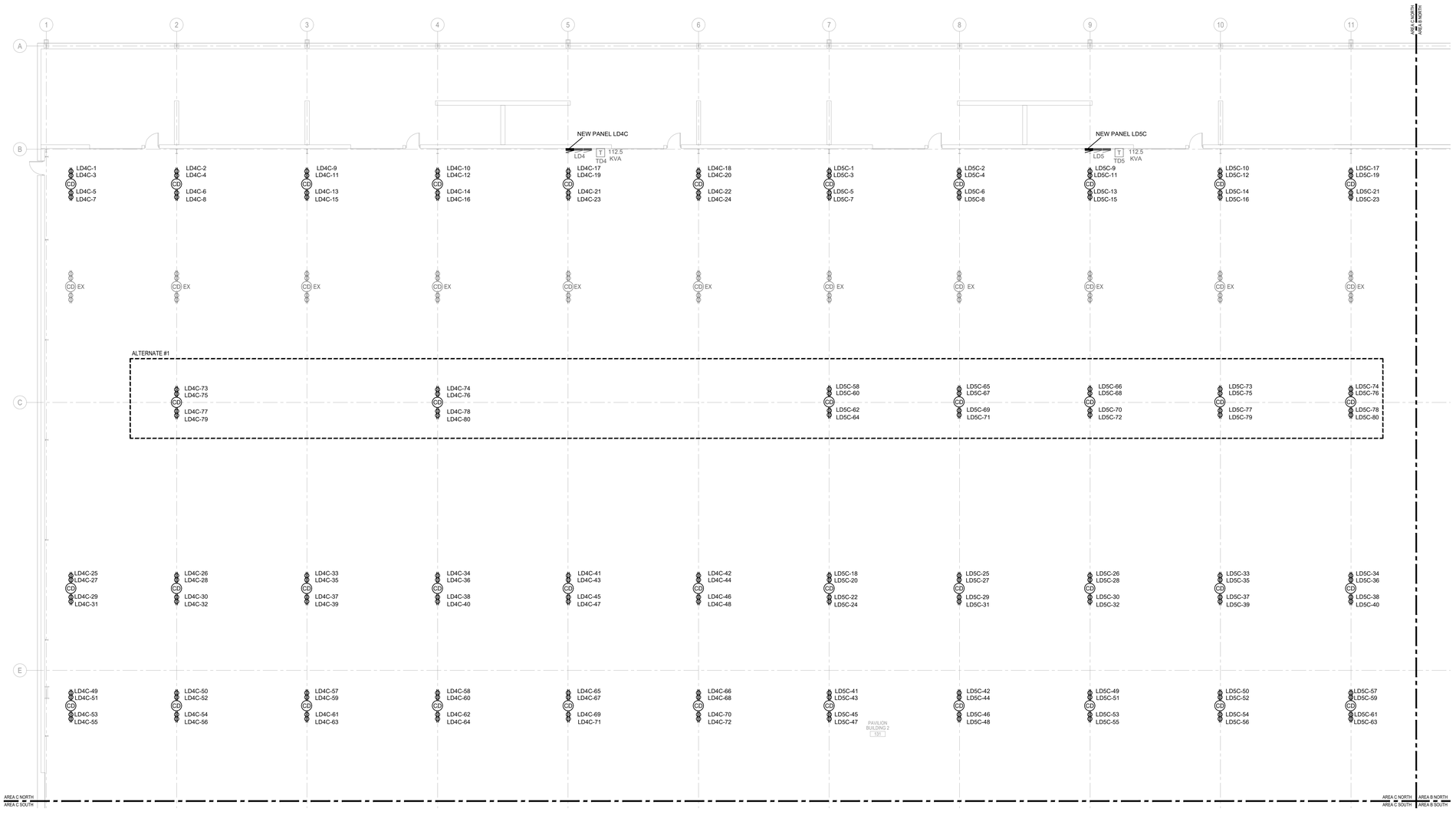
ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

FIRST FLOOR ELECTRICAL PLAN – AREA 'B SOUTH' – BLD 2

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER: 22005
DATE: 08-11-2022
DRAWN BY: TP
CHECKED BY: BK
SHEET NUMBER: E204

Issued for Bidding Set



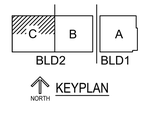
NORTH

FIRST FLOOR ELECTRICAL PLAN - AREA 'C NORTH' - BLD 2

3/32"=1'-0"

GENERAL NOTES:

1. ALL NEW CORD DROPS SHALL BE FED THROUGH CONDUITS IN THE JOIST SPACES SIMILAR TO EXISTING CORD DROPS. DROPS SHALL HANG TO 6' 0" AFF WHEN EXTENDED. PROVIDE STRAIN RELIEF. OVERSIZE CONDUCTORS FOR VOLTAGE DROP. USE #10 AWG Cu 7-CONDUCTOR SOO (OR EQUIVALENT) CORD FOR 1 X 3-PHASE SHARED NEUTRAL CIRCUIT, 1 UNSHARED NEUTRAL CIRCUIT AND ONE EQUIPMENT GROUND CONDUCTOR. ALL RECEPTACLES SHALL BE 20A, 125V, GFCI DEVICES. TYPICAL ALL CORD DROPS.



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Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
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RFB NO. 322031 - ELECTRICAL UPGRADES

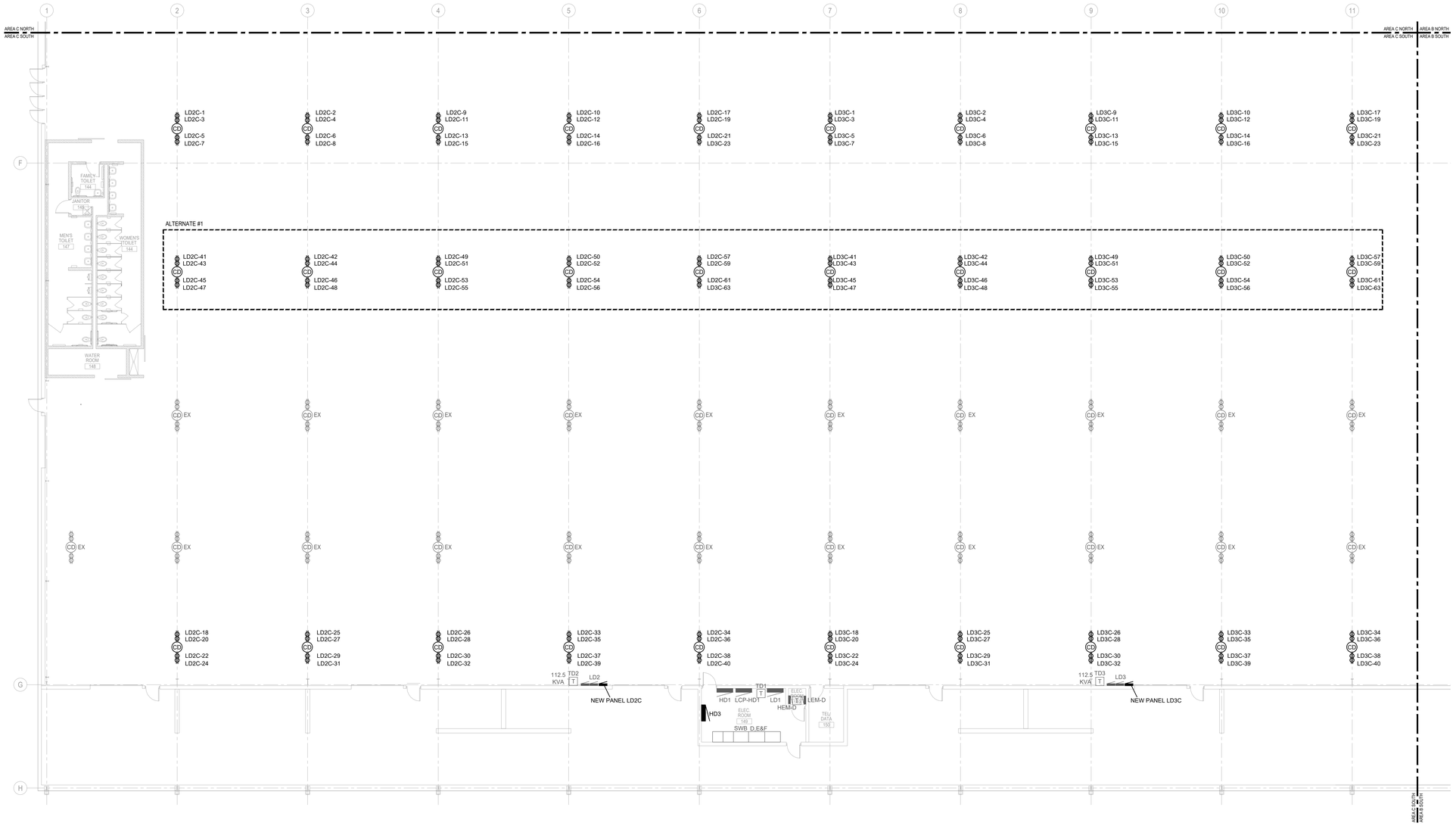
ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

FIRST FLOOR ELECTRICAL PLAN – AREA 'C NORTH' – BLD 2

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER: 22005
DATE: 08-11-2022
DRAWN BY: TP
CHECKED BY: BK
SHEET NUMBER: E205

Issued for Bidding Set



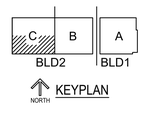
NORTH

FIRST FLOOR ELECTRICAL PLAN - AREA 'C SOUTH' - BLD 2

3/32"=1'-0"

GENERAL NOTES:

1. ALL NEW CORD DROPS SHALL BE FED THROUGH CONDUITS IN THE JOIST SPACES SIMILAR TO EXISTING CORD DROPS. DROPS SHALL HANG TO 6' 0" AFF WHEN EXTENDED. PROVIDE STRAIN RELIEF. OVERSIZE CONDUCTORS FOR VOLTAGE DROP. USE #10 AWG Cu 7-CONDUCTOR SOO (OR EQUIVALENT) CORD FOR 1 X 3-PHASE SHARED NEUTRAL CIRCUIT, 1 UNSHARED NEUTRAL CIRCUIT AND ONE EQUIPMENT GROUND CONDUCTOR. ALL RECEPTACLES SHALL BE 20A, 125V, GFCI DEVICES. TYPICAL ALL CORD DROPS.



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Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
1	08-26-2022	Issued for Bidding

RFB NO. 322031 - ELECTRICAL UPGRADES

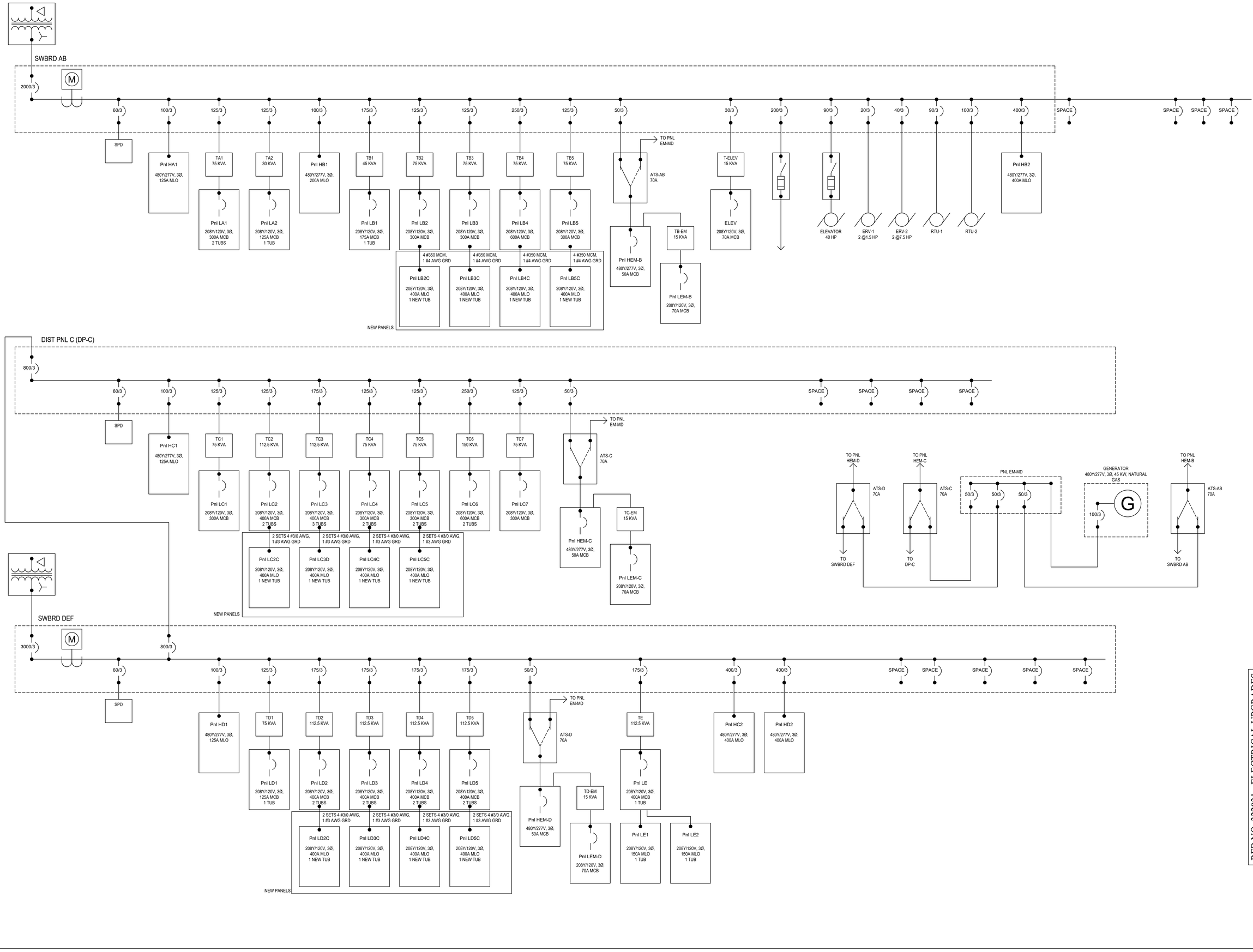
ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

FIRST FLOOR ELECTRICAL PLAN - AREA 'C SOUTH' - BLD 2

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER: 22005
DATE: 08-11-2022
DRAWN BY: TP
CHECKED BY: BK
SHEET NUMBER: E206

Issued for Bidding Set



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Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
1	08-22-2022	Issued for Bidding

RFB NO. 322031 - ELECTRICAL UPGRADES

ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

FIRST FLOOR ELECTRICAL PLAN – AREA 'D SOUTH' – BLD 2

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER: 22005
DATE: 08-11-2022
DRAWN BY: TP
CHECKED BY: BK
SHEET NUMBER: E206

Issued for Bidding Set

LB2C

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR.			LOAD	CIRCUIT		PHASE LOADS			CIRCUIT		LOAD		CIRCUIT BKR.	
AMPS	POLES	CIRCUIT DESCRIPTION	TYPE	WATTS	#	A	B	C	#	WATTS	TYPE	CIRCUIT DESCRIPTION	AMPS	POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		2400		58	1200	R			
			R	1200	59			2400	60	1200	R	Cord Drop	20	3
			R	1200	61	2400			62	1200	R			
20	1	Cord Drop Outlet	R	1200	63		2400		64	1200	R	Cord Drop Outlet	20	1
20	1	Spare			65			0	66			Spare	20	1
20	1	Spare			67	0			68			Spare	20	1
20	1	Spare			69		0		70			Spare	20	1
20	1	Spare			71			0	72			Spare	20	1
20	1	Spare			73	0			74			Spare	20	1
20	1	Spare			75		0		76			Spare	20	1
20	1	Spare			77			0	78			Spare	20	1
20	1	Spare			79	0			80			Spare	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						26400	26400	24000				PANEL TOTAL LOAD =	76.8	KW
													213.2	AMP

NOTES:

ALTERNATE #1

LB3C

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR.			LOAD	CIRCUIT		PHASE LOADS			CIRCUIT		LOAD		CIRCUIT BKR.	
AMPS	POLES	CIRCUIT DESCRIPTION	TYPE	WATTS	#	A	B	C	#	WATTS	TYPE	CIRCUIT DESCRIPTION	AMPS	POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		2400		58	1200	R			
			R	1200	59			2400	60	1200	R	Cord Drop	20	3
			R	1200	61	2400			62	1200	R			
20	1	Cord Drop Outlet	R	1200	63		2400		64	1200	R	Cord Drop Outlet	20	1
20	1	Spare			65			0	66			Spare	20	1
20	1	Spare			67	0			68			Spare	20	1
20	1	Spare			69		0		70			Spare	20	1
20	1	Spare			71			0	72			Spare	20	1
20	1	Spare			73	0			74			Spare	20	1
20	1	Spare			75		0		76			Spare	20	1
20	1	Spare			77			0	78			Spare	20	1
20	1	Spare			79	0			80			Spare	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						26400	26400	24000				PANEL TOTAL LOAD =	76.8	KW
													213.2	AMP

NOTES:

ALTERNATE #1

LB4C

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR.			LOAD	CIRCUIT		PHASE LOADS			CIRCUIT		LOAD		CIRCUIT BKR.	
AMPS	POLES	CIRCUIT DESCRIPTION	TYPE	WATTS	#	A	B	C	#	WATTS	TYPE	CIRCUIT DESCRIPTION	AMPS	POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		2400		58	1200	R			
			R	1200	59			2400	60	1200	R	Cord Drop	20	3
			R	1200	61	2400			62	1200	R			
20	1	Cord Drop Outlet	R	1200	63		2400		64	1200	R	Cord Drop Outlet	20	1
20	1	Spare			65			0	66			Spare	20	1
20	1	Spare			67	0			68			Spare	20	1
20	1	Spare			69		0		70			Spare	20	1
20	1	Spare			71			0	72			Spare	20	1
20	1	Spare			73	0			74			Spare	20	1
20	1	Spare			75		0		76			Spare	20	1
20	1	Spare			77			0	78			Spare	20	1
20	1	Spare			79	0			80			Spare	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						26400	26400	24000				PANEL TOTAL LOAD =	76.8	KW
													213.2	AMP

NOTES:

ALTERNATE #1

LB5C

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR.			LOAD	CIRCUIT		PHASE LOADS			CIRCUIT		LOAD		CIRCUIT BKR.	
AMPS	POLES	CIRCUIT DESCRIPTION	TYPE	WATTS	#	A	B	C	#	WATTS	TYPE	CIRCUIT DESCRIPTION	AMPS	POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		2400		58	1200	R			
			R	1200	59			2400	60	1200	R	Cord Drop	20	3
			R	1200	61	2400			62	1200	R			
20	1	Cord Drop Outlet	R	1200	63		2400		64	1200	R	Cord Drop Outlet	20	1
20	1	Spare			65			0	66			Spare	20	1
20	1	Spare			67	0			68			Spare	20	1
20	1	Spare			69		0		70			Spare	20	1
20	1	Spare			71			0	72			Spare	20	1
20	1	Spare			73	0			74			Spare	20	1
20	1	Spare			75		0		76			Spare	20	1
20	1	Spare			77			0	78			Spare	20	1
20	1	Spare			79	0			80			Spare	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						26400	26400	24000				PANEL TOTAL LOAD =	76.8	KW
													213.2	AMP

NOTES:

ALTERNATE #1

NOTE:
ALL PANEL SCHEDULES NOTED ARE NEW PANELS. THERE ARE NO EXISTING PANELS NOTED OR INCLUDED IN THESE DRAWINGS UNLESS NOTED OTHERWISE.

TAILORED ENGINEERING
1600 N High Point Rd, Middleton, WI 53562
P:608.440.9594 W:www.tailoredeng.com

Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
1	08-25-2022	Issued for Bidding

RFB NO. 322031 - ELECTRICAL UPGRADES

ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

ELECTRICAL PANEL SCHEDULES

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER: 22005
DATE: 08-11-2022
DRAWN BY: TP
CHECKED BY: BK
SHEET NUMBER: E401

Issued for Bidding Set

LC2C

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR AMPS	CIRCUIT BKR POLES	CIRCUIT DESCRIPTION	LOAD TYPE	CIRCUIT WATTS	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT WATTS	LOAD TYPE	CIRCUIT DESCRIPTION	CIRCUIT BKR AMPS	CIRCUIT BKR POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		1200		58			Spare	20	1
			R	1200	59			1200	60			Spare	20	1
			R	1200	61	1200			62			Spare	20	1
20	1	Cord Drop Outlet	R	1200	63		1200		64			Spare	20	1
20	1	Spare			65			0	66			Spare	20	1
20	1	Spare			67	0			68			Spare	20	1
20	1	Spare			69		0		70			Spare	20	1
20	1	Spare			71			0	72			Spare	20	1
20	1	Spare			73	0			74			Spare	20	1
20	1	Spare			75		0		76			Spare	20	1
20	1	Spare			77			0	78			Spare	20	1
20	1	Spare			79	0			80			Spare	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						25200	24000	22800				PANEL TOTAL LOAD =	72.0	KW
													199.9	AMP

NOTES:

ALTERNATE #1

LC3D

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR AMPS	CIRCUIT BKR POLES	CIRCUIT DESCRIPTION	LOAD TYPE	CIRCUIT WATTS	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT WATTS	LOAD TYPE	CIRCUIT DESCRIPTION	CIRCUIT BKR AMPS	CIRCUIT BKR POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		1200		58			Spare	20	1
			R	1200	59			1200	60			Spare	20	1
			R	1200	61	1200			62			Spare	20	1
20	1	Cord Drop Outlet	R	1200	63		1200		64			Spare	20	1
20	1	Spare			65			0	66			Spare	20	1
20	1	Spare			67	0			68			Spare	20	1
20	1	Spare			69		0		70			Spare	20	1
20	1	Spare			71			0	72			Spare	20	1
20	1	Spare			73	0			74			Spare	20	1
20	1	Spare			75		0		76			Spare	20	1
20	1	Spare			77			0	78			Spare	20	1
20	1	Spare			79	0			80			Spare	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						25200	24000	22800				PANEL TOTAL LOAD =	72.0	KW
													199.9	AMP

NOTES:

ALTERNATE #1

LC4C

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR AMPS	CIRCUIT BKR POLES	CIRCUIT DESCRIPTION	LOAD TYPE	CIRCUIT WATTS	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT WATTS	LOAD TYPE	CIRCUIT DESCRIPTION	CIRCUIT BKR AMPS	CIRCUIT BKR POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		2400		58	1200	R			
			R	1200	59			2400	60	1200	R	Cord Drop	20	3
			R	1200	61	2400			62	1200	R			
20	1	Cord Drop Outlet	R	1200	63		2400		64	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	65			2400	66	1200	R			
			R	1200	67	2400			68	1200	R	Cord Drop	20	3
			R	1200	69		2400		70	1200	R			
20	1	Cord Drop Outlet	R	1200	71			2400	72	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	73	2400			74	1200	R			
			R	1200	75		2400		76	1200	R	Cord Drop	20	3
			R	1200	77			2400	78	1200	R			
20	1	Cord Drop Outlet	R	1200	79	2400			80	1200	R	Cord Drop Outlet	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						33600	31200	31200				PANEL TOTAL LOAD =	96.0	KW
													266.5	AMP

NOTES:

ALTERNATE #1

LC5C

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR AMPS	CIRCUIT BKR POLES	CIRCUIT DESCRIPTION	LOAD TYPE	CIRCUIT WATTS	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT WATTS	LOAD TYPE	CIRCUIT DESCRIPTION	CIRCUIT BKR AMPS	CIRCUIT BKR POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		2400		58	1200	R			
			R	1200	59			2400	60	1200	R	Cord Drop	20	3
			R	1200	61	2400			62	1200	R			
20	1	Cord Drop Outlet	R	1200	63		2400		64	1200	R	Cord Drop Outlet	20	1
20	1	Spare			65			0	66			Spare	20	1
20	1	Spare			67	0			68			Spare	20	1
20	1	Spare			69		0		70			Spare	20	1
20	1	Spare			71			0	72			Spare	20	1
20	1	Spare			73	0			74			Spare	20	1
20	1	Spare			75		0		76			Spare	20	1
20	1	Spare			77			0	78			Spare	20	1
20	1	Spare			79	0			80			Spare	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						26400	26400	24000				PANEL TOTAL LOAD =	76.8	KW
													213.2	AMP

NOTES:

ALTERNATE #1

NOTE:
ALL PANEL SCHEDULES NOTED ARE NEW PANELS. THERE ARE NO EXISTING PANELS NOTED OR INCLUDED IN THESE DRAWINGS UNLESS NOTED OTHERWISE.

TAILORED ENGINEERING
1600 N High Point Rd, Middleton, WI 53562
P:608.440.9594 W:www.tailoredeng.com
Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
1	08-22-2022	Issued for Bidding

RFB NO. 322031 - ELECTRICAL UPGRADES

ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

ELECTRICAL PANEL SCHEDULES

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER: 22005
DATE: 08-11-2022
DRAWN BY: TP
CHECKED BY: BK
SHEET NUMBER: E402

Issued for Bidding Set

LD2C

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR. AMPS	CIRCUIT BKR. POLES	CIRCUIT DESCRIPTION	LOAD TYPE	CIRCUIT WATTS	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT WATTS	LOAD TYPE	CIRCUIT DESCRIPTION	CIRCUIT BKR. AMPS	CIRCUIT BKR. POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		1200		58			Spare	20	1
			R	1200	59			1200	60			Spare	20	1
			R	1200	61	1200			62			Spare	20	1
20	1	Cord Drop Outlet	R	1200	63		1200		64			Spare	20	1
20	1	Spare			65			0	66			Spare	20	1
20	1	Spare			67	0			68			Spare	20	1
20	1	Spare			69		0		70			Spare	20	1
20	1	Spare			71			0	72			Spare	20	1
20	1	Spare			73	0			74			Spare	20	1
20	1	Spare			75		0		76			Spare	20	1
20	1	Spare			77			0	78			Spare	20	1
20	1	Spare			79	0			80			Spare	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						25200	24000	22800				PANEL TOTAL LOAD =	72.0	KW
													199.9	AMP

NOTES:

ALTERNATE #1

LD3C

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR. AMPS	CIRCUIT BKR. POLES	CIRCUIT DESCRIPTION	LOAD TYPE	CIRCUIT WATTS	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT WATTS	LOAD TYPE	CIRCUIT DESCRIPTION	CIRCUIT BKR. AMPS	CIRCUIT BKR. POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		1200		58			Spare	20	1
			R	1200	59			1200	60			Spare	20	1
			R	1200	61	1200			62			Spare	20	1
20	1	Cord Drop Outlet	R	1200	63		1200		64			Spare	20	1
20	1	Spare			65			0	66			Spare	20	1
20	1	Spare			67	0			68			Spare	20	1
20	1	Spare			69		0		70			Spare	20	1
20	1	Spare			71			0	72			Spare	20	1
20	1	Spare			73	0			74			Spare	20	1
20	1	Spare			75		0		76			Spare	20	1
20	1	Spare			77			0	78			Spare	20	1
20	1	Spare			79	0			80			Spare	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						25200	24000	22800				PANEL TOTAL LOAD =	72.0	KW
													199.9	AMP

NOTES:

ALTERNATE #1

LD4C

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR. AMPS	CIRCUIT BKR. POLES	CIRCUIT DESCRIPTION	LOAD TYPE	CIRCUIT WATTS	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT WATTS	LOAD TYPE	CIRCUIT DESCRIPTION	CIRCUIT BKR. AMPS	CIRCUIT BKR. POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		2400		58	1200	R			
			R	1200	59			2400	60	1200	R	Cord Drop	20	3
			R	1200	61	2400			62	1200	R			
20	1	Cord Drop Outlet	R	1200	63		2400		64	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	65			2400	66	1200	R			
			R	1200	67	2400			68	1200	R	Cord Drop	20	3
			R	1200	69		2400		70	1200	R			
20	1	Cord Drop Outlet	R	1200	71			2400	72	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	73	2400			74	1200	R			
			R	1200	75		2400		76	1200	R	Cord Drop	20	3
			R	1200	77			2400	78	1200	R			
20	1	Cord Drop Outlet	R	1200	79	2400			80	1200	R	Cord Drop Outlet	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						33600	31200	31200				PANEL TOTAL LOAD =	96.0	KW
													266.5	AMP

NOTES:

ALTERNATE #1

LD5C

400 AMPS MAIN 400A MCB | 208Y/120 VOLT, THREE PHASE, FOUR WIRE | LOCATION:

MOUNTING TYPE: SURFACE | SHORT CIRCUIT INTERRUPTING RATING: 22 K.A.I.C

CIRCUIT BKR. AMPS	CIRCUIT BKR. POLES	CIRCUIT DESCRIPTION	LOAD TYPE	CIRCUIT WATTS	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT WATTS	LOAD TYPE	CIRCUIT DESCRIPTION	CIRCUIT BKR. AMPS	CIRCUIT BKR. POLES
20	3	Cord Drop	R	1200	1	2400			2	1200	R			
			R	1200	3		2400		4	1200	R	Cord Drop	20	3
			R	1200	5			2400	6	1200	R			
20	1	Cord Drop Outlet	R	1200	7	2400			8	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	9		2400		10	1200	R			
			R	1200	11			2400	12	1200	R	Cord Drop	20	3
			R	1200	13	2400			14	1200	R			
20	1	Cord Drop Outlet	R	1200	15		2400		16	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	17			2400	18	1200	R			
			R	1200	19	2400			20	1200	R	Cord Drop	20	3
			R	1200	21		2400		22	1200	R			
20	1	Cord Drop Outlet	R	1200	23			2400	24	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	25	2400			26	1200	R			
			R	1200	27		2400		28	1200	R	Cord Drop	20	3
			R	1200	29			2400	30	1200	R			
20	1	Cord Drop Outlet	R	1200	31	2400			32	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	33		2400		34	1200	R			
			R	1200	35			2400	36	1200	R	Cord Drop	20	3
			R	1200	37	2400			38	1200	R			
20	1	Cord Drop Outlet	R	1200	39		2400		40	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	41			2400	42	1200	R			
			R	1200	43	2400			44	1200	R	Cord Drop	20	3
			R	1200	45		2400		46	1200	R			
20	1	Cord Drop Outlet	R	1200	47			2400	48	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	49	2400			50	1200	R			
			R	1200	51		2400		52	1200	R	Cord Drop	20	3
			R	1200	53			2400	54	1200	R			
20	1	Cord Drop Outlet	R	1200	55	2400			56	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	57		2400		58	1200	R			
			R	1200	59			2400	60	1200	R	Cord Drop	20	3
			R	1200	61	2400			62	1200	R			
20	1	Cord Drop Outlet	R	1200	63		2400		64	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	65			2400	66	1200	R			
			R	1200	67	2400			68	1200	R	Cord Drop	20	3
			R	1200	69		2400		70	1200	R			
20	1	Cord Drop Outlet	R	1200	71			2400	72	1200	R	Cord Drop Outlet	20	1
20	3	Cord Drop	R	1200	73	2400			74	1200	R			
			R	1200	75		2400		76	1200	R	Cord Drop	20	3
			R	1200	77			2400	78	1200	R			
20	1	Cord Drop Outlet	R	1200	79	2400			80	1200	R	Cord Drop Outlet	20	1
20	1	Spare			81		0		82			Spare	20	1
20	1	Spare			83			0	84			Spare	20	1
						33600	31200	31200				PANEL TOTAL LOAD =	96.0	KW
													266.5	AMP

NOTES:

ALTERNATE #1

NOTE:
ALL PANEL SCHEDULES NOTED ARE NEW PANELS. THERE ARE NO EXISTING PANELS NOTED OR INCLUDED IN THESE DRAWINGS UNLESS NOTED OTHERWISE.

TAILORED ENGINEERING
1600 N High Point Rd, Middleton, WI 53562
P:608.440.9594 W:www.tailoredeng.com
Project: #22005

REVISIONS

NO	DATE	DESCRIPTION
1	08-25-2022	Issued for Bidding

RFB NO. 322031 - ELECTRICAL UPGRADES

ALLIANT ENERGY CENTER PAVILIONS #1 AND #2 UPGRADE

ELECTRICAL PANEL SCHEDULES

ADDRESS:
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

PROJECT NUMBER: 22005
DATE: 08-11-2022
DRAWN BY: TP
CHECKED BY: BK
SHEET NUMBER: E403

Issued for Bidding Set