

MICHIGAN STATE
U N I V E R S I T Y

ELECTRONIC BIDDING

MSU BASE CONTRACTORS ONLY
SPECIFICATION FOR

Library – Alterations to Second Floor

PROJECT NUMBER
CP22075

Wednesday, March 08, 2023

AT

MICHIGAN STATE UNIVERSITY
EAST LANSING, MICHIGAN

Infrastructure Planning and Facilities
Planning, Design and Construction

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

ADVERTISEMENT FOR BIDS

INSTRUCTIONS TO BIDDERS

CONTRACT AND GENERAL CONDITIONS [ConsensusDocs 200 – Standard Agreement and General Conditions between Owner and Constructor.](#)

The following project documents are available at the MSU Capital Project Delivery Procedures website:
<http://procedures.ipf.msu.edu/procedures.ipf.msu.edu/index.cfm/capital-project-delivery-procedures/index.html>

[CONTRACTOR'S AFFIDAVIT, WAIVER OF LIEN AND WAGE STATEMENT](#)

[MBE WBE VERIFICATION FORM](#)

[GUARANTEES](#)

[CHANGE ORDER QUOTATION FORMAT](#)

[CERTIFICATE OF INSURANCE FOR PURCHASE ORDER PROJECTS](#)

SCHEDULE OF DRAWINGS

Project Title: **Library – Alterations to Second Floor**

Capital Project Number: **CP22075**

No. of Sheets: **18**

ADVERTISEMENT FOR BIDS

DATE: **March 8, 2023**

PROJECT TITLE: **Library – Alterations to Second Floor**

PROJECT NUMBER: **CP22075**

for

MICHIGAN STATE UNIVERSITY

located at

EAST LANSING, MICHIGAN

OWNER: **BOARD OF TRUSTEES
MICHIGAN STATE UNIVERSITY**

ENGINEER/ARCHITECT: **PLANNING, DESIGN AND CONSTRUCTION
Infrastructure Planning and Facilities
Michigan State University**

DESIGN REPRESENTATIVE: **Jeff Kasdorf**

CONSTRUCTION
REPRESENTATIVE: **Tony Gibson**

**C2AE
211 E. Water Street Suite 213L
Kalamazoo, MI 49007**

BID DUE DATE: Until 3:30 p.m. on **Tuesday, April 11, 2023**, the Owner will receive bids for the work as set forth in the Bidding Documents at via the Owner's Oracle Primavera Unifier Bid Manager, at which time and place all proposals will be publicly opened. Bidders are responsible for properly registering for this process and familiarizing themselves with the system and its requirements. Registration information can be found at <https://ipf.msu.edu/construction/partners/prospective-partners>.

Proposals are invited for the following work:
Proposal 1 – General Construction Work

AB-2
ADVERTISEMENT
FOR BIDS

This project involves renovation to the Library office area on the 2nd floor, approximately 10,000 SF, including demountable partitions (by owner) and associated HVAC, lighting and other upgrades.

The substantial construction completion date for the project, as set forth in the project manual and drawings is **August 1, 2023**. See applicable start date and interim completion dates in the General Requirements (Division One) – Part 1 Work Sequence section.

LIQUIDATED DAMAGES:

☐ Shall, or ☒ Shall not be assessed for Substantial Completion at:
\$_____PER DAY

☐ Shall, or ☒ Shall not be assessed for Final Completion at:
\$_____PER DAY

EXCLUSIONS FROM MUTUAL WAIVERS OF CONSEQUENTIAL DAMAGES:

DEFAULT IS NONE. (If exclusions apply, project team to insert applicable exclusions below).

The complete set of documents is also available for viewing through our new [MSU Plan Room](#) or via the MSU Planning, Design and Construction (PDC) web page at <https://ipf.msu.edu/construction/partners/prospective-partners>, and then select “Construction projects out to bid”.

PLAN ROOMS

The Bidding documents are on file and may be examined at the following locations during regular business hours, Monday through Friday:

Builders Exchange of Lansing &
Central Michigan
1240 East Saginaw
Lansing, MI 48906

Dodge Data & Analytics
25330 Telegraph Road, Suite 350
Southfield, MI 48009

Dodge Data & Analytics
914 E. Vine Street
Kalamazoo, MI 49001

Dodge Data & Analytics
1311 South Linden Road, Suite B
Flint, MI 48532

Builders Exchange
P.O. Box 2031
Grand Rapids, MI 49501

Tri-City Builders & Traders Exchange
334 South Water
Saginaw, MI 48607

Construction Association of Michigan
43636 Woodward Avenue
P. O. Box 3204
Bloomfield Hills, MI 48302-3204

Builders Exchange
3431 East Kilgore
Kalamazoo, MI 49001

CNS Construction News Service
of West Michigan, Inc.
1793 R. W. Berends Dr. SW.
Wyoming, MI 49509-4993

MMSDC Michigan Minority Supplier
Development Council.
100 River Place STE 300
Detroit, MI 48207

Builders Exchange of NW MI, Inc.
1373 Barlow St., Suite 4
Traverse City, MI 49686

Capital Imaging
2521 East Michigan Avenue
Lansing, MI 48912

AB-4
ADVERTISEMENT
FOR BIDS

A pre-bid site inspection will be held on **Tuesday, March 28, 2023 at 10:00 a.m.** All interested Contractors or Bidders are encouraged to attend. Interested parties should meet at the **lobby of the Library Building, located at 366 W. Circle Dr. East Lansing, MI 48824.** All Contractors submitting bids for the work will be held to have visited the site prior to submitting bids.

Each proposal shall be accompanied by a bid security as set forth in the Instructions to Bidders.

The Owner reserves the right to reject any or all proposals either in whole or in part and to waive any irregularities.

Withdrawal of any proposal is prohibited for a period of 120 days after the actual date of the opening thereof.

Performance and Labor and Material Bonds are required as set forth in the Instructions to Bidders.

All prospective Bidders, their Subcontractors and suppliers must be awardable by and in compliance with the directives and guidelines of the Contract Compliance Division of the Michigan Civil Rights Commission.

SUBCONTRACTING AND SUPPLIER DIVERSITY

The University makes a continuous effort to broaden its business relationships with Minority Business Enterprise (MBE) contractors, Women Business Enterprise (WBE) contractors, and small business concerns (including veteran-owned small business, service-disabled veteran owned small business, HUB Zone small business, and small disadvantaged business concerns certified by the U.S. Small Business Administration). For the purposes of this provision, suppliers are considered subcontractors. If third parties are needed to fulfill contractual obligations to the University, you are strongly encouraged to consider all qualified sources, including WBE, MBE, and small business subcontractors. For purposes of this paragraph, MBE is defined as a business enterprise of which more than 50% of the voting shares or interest in the business is owned, controlled, and operated by individuals who are members of a minority and with respect to which more than 50% of the net profit or loss attributable to the business accrues to shareholders who are members of a minority. WBE is defined as a business enterprise of which more than 50% of the voting shares or interest in the business is owned, controlled, and operated by women and with respect to which more than 50% of the net profit or loss attributable to the business accrues to the women shareholders.

The apparent Low Bidder shall, within 24 hours, after receipt of bids, provide the names of any MBE/WBE/small business subcontractors, description of work to be done by each, dollar value of work, and percentage of contract price. This information shall be included with the contract breakdown specified in Section 012000.1.4 of the specifications.

The Michigan State University Purchasing Department maintains a list of known Minority and Women Business Enterprises in the region for informational purposes. Bidders can obtain a copy of this list by calling (517) 355-0357. This list is not intended to be comprehensive. Similarly, it does not constitute an endorsement or certification of acceptability of the contractors and vendors included.

INSTRUCTION TO BIDDERS

ARTICLE 1

DEFINITIONS

- 1.1 Bidding Documents include the Advertisement or Invitation to Bid, Instruction to Bidders, the Bid Form, other sample bidding and Contract forms and the proposed Contract Documents including any Addenda issued prior to receipt of Bids.
- 1.2 All definitions set forth in ConsensusDocs 200- Standard Agreement and General Conditions Between Owner and Constructor (as modified by MSU) and in other Contract Documents are applicable to the Bidding Documents.
- 1.3 **Addenda** are written or graphic instruments, issued by the Architect prior to the receipt of Bids, which modify or interpret the Bidding Documents by addition, deletions, clarifications or corrections.
- 1.4 A **Bid** is a complete and properly signed proposal to do the Work or designated portion thereof, for the sums stipulated therein, supported by data called for by the Bidding Documents.
- 1.5 **Base Bid** is the sum stated in the Bid for which the Bidder offers to perform the Work described as the base, to which Work may be added or deducted for sums stated in Alternate Bids.
- 1.6 An **Alternate Bid** (or Alternate) is an amount stated in the Proposal to be added to or deducted from the amount of the Base Bid if the corresponding change in project scope or materials or methods of construction described in the Bidding Documents is accepted.
- 1.7 A **Unit Price** is an amount stated in the Bid as a price per unit of measurement for materials or services as described in the Contract Documents.
- 1.8 A **Bidder** is one who submits a Bid for a prime Contract with the Owner for the Work described in the proposed Contract Documents.
- 1.9 A **Sub-bidder** is one who submits a Bid to a Bidder for materials or labor for a portion of the Work.
- 1.10 **Bid Manager** is the Oracle Primavera Unifier Bid Manager application used the by the Owner to received competitive bids for this project.

ARTICLE 2

BIDDER'S REPRESENTATION

- 2.1 Each Bidder, by making his/her Bid, represents that:
- 2.1.1 They have read and understand the Bidding Documents and their Bid is made in accordance therewith.
 - 2.1.2 They have visited the site and are familiar with the local conditions under which the Work is to be performed.
 - 2.1.3 Their Bid is based upon the materials, systems and equipment described in the Bidding Documents, without exceptions.

ARTICLE 3

BIDDING DOCUMENTS

3.1 COPIES

3.1.1 Bidders may obtain complete sets of the Bidding Documents via the MSU PLANNING, DESIGN AND CONSTRUCTION web page at <https://ipf.msu.edu/construction/partners/prospective-partners>, or as outlined in the Advertisement for Bids, page AB-2.

- 3.1.2 Complete sets of Bidding Documents shall be used in preparing Bids; neither the Owner nor the Architect assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 3.1.3 The Owner or Architect, in making copies of the Bidding Documents available on the above terms, does so only for the purpose of obtaining Bids on the Work and does not confer a license or grant for any other use.

3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

- 3.2.1 Bidders shall promptly notify the Architect of any ambiguity, inconsistency or error which they may discover upon examination of the Bidding Documents or of the site and local conditions.
- 3.2.2 Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to be received by the Architect at least fourteen days prior to the date for receipt of Bids.
- 3.2.3 Any interpretation, correction or change of the Bidding Documents will be made by Addendum. Interpretations, corrections or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections and changes.

3.3 SUBSTITUTIONS

- 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.
- 3.3.2 No substitution will be considered unless written request for approval has been submitted by the Bidder and has been received by the Architect at least fourteen days prior to the date for receipt of Bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cuts, performance and test data, and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. It is the burden of the bidder proposing the substitution to establish its merits. The Architect's decision of approval or disapproval of a proposed substitution shall be final.
- 3.3.3 If the Architect approves any proposed substitution, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

3.4 ADDENDA

- 3.4.1 The Architect and Owner will endeavor to notify all known plan holders of addenda issued, but it is the Bidder's responsibility to verify receipt of all addenda.
- 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.
- 3.4.3 Normally Addenda will not be issued later than five days prior to the date for receipt of Bids except an Addendum, if necessary, postponing the date for receipt of Bids or withdrawing the request for Bids.
- 3.4.4 Each Bidder shall ascertain prior to submitting their Bid that they have received all Addenda issued, and receipt of all Addenda shall be acknowledged on their bid.

ARTICLE 4

BIDDING PROCEDURE

4.1 FORM AND STYLE OF BIDS

- 4.1.1 Bids shall be submitted via the Bid Manager on the form specified.
- 4.1.2 All fields on the Bid Form shall be completed.
- 4.1.3 All requested Alternates shall be listed and quoted in the Bid Manager. Failure to quote a requested Alternate will be cause to reject the Bid.

4.1.3.1 If an alternate is added via Addendum, bidders will include by [adding new line to bid form, clearly labeling ALTERNATE X(x being the number)] or [providing pricing on an attachment, also clearly labeling pricing for Alternate.]

4.1.4 All requested Unit Prices shall be listed and quoted via attachment in the Bid Manager. Failure to quote a requested Unit Price will be cause to reject the Bid.

4.1.5 Acknowledge the receipt of the last Addendum on the Bid Form. By acknowledging this addendum, Bidder also acknowledges receipt of all prior consecutive addenda (e.g., acknowledging Addendum 3 also acknowledges Addendum 1 and 2).

4.1.6 Bidder shall make no additional stipulations on the Bid Form nor qualify its Bid in any manner.

4.1.7 By submitting a Bid via the Bid Manager, the Bidder has committed the offer to perform the Work. The Owner will rely on this document as properly signed by the Bidder. The Owner may rely on this commitment, including submitting a claim on the Bidder's Bid Bond if they fail to enter into a contract per the project manual.

4.2 BID SECURITY

4.2.1 Any base bid greater than \$50,000 shall be accompanied by a Bid Security in the form of a bid bond made payable to the Board of Trustees, Michigan State University, in the amount of not less than five percent (5%) of the Base Bid, as a proposal guarantee, pledging that the Bidder will enter into a Contract with the Owner on the terms stated in its Bid, and will furnish bonds as described hereunder in Article 8 covering the faithful performance of the Contract and the payment of all obligations arising thereunder. Bidder shall attach a scanned copy of the bid bond to the bid in Unifier Bid Manager.

As an alternative to a bid bond, Bidders may provide certified check, cashiers' check, or money order made payable to the Board of Trustees, Michigan State University, in the amount of not less than five percent (5%) of the Base Bid, to be delivered to MSU Infrastructure Planning and Facilities, 1147 Chestnut Road, Room 101, East Lansing, MI 48824. The proposal guarantee of Bidders under consideration will be returned immediately after approval of contracts by the Owner; those of all others will normally be returned upon request within 48 hours after bid opening.

Should the Bidder refuse to enter into a Contract or fail to furnish such bonds within 30 days of notification of intent to award, the amount of the Bid Security shall be forfeited to the Owner as liquidated damages, not as penalty.

4.2.2 The bonding firm must be listed on the current U.S. Department of Treasury Circular 570, rated A- or better by Best, and be licensed to do business in the State of Michigan. The bonds are to be made out to "Michigan State University, Board of Trustees."

4.2.3 The Owner will have the right to retain the Bid Security of Bidders under consideration until either (a) the Contract has been executed and bonds have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn, or (c) all Bids have been rejected.

4.3 SUBMISSION OF BIDS

- 4.3.1 Bids shall be completed prior to the time and date for receipt of Bids indicated in the Advertisement or Invitation to Bid, or any extension thereof made by Addendum. Bids received after the time and date for receipt of Bids will not be considered.
- 4.3.2 Bidder shall assume full responsibility for timely delivery at location designated for receipt of Bids.
- 4.3.3 Oral, telephone, paper, or faxed Bids are invalid and will not receive consideration.

4.4 MODIFICATION OR WITHDRAWAL OF BID

- 4.4.1 A Bid may not be modified, withdrawn, or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and Bidder so agrees in submitting his/her Bid.
- 4.4.2 Prior to the time and date designated for receipt of Bids, Bids submitted early may be modified or withdrawn only by withdrawing current Bid, and resubmitting within the Bid Manager.
- 4.4.3 Bid security shall be in an amount sufficient for the Bid as modified or resubmitted.

4.5 BIDDER REGISTRATION

- 4.5.1 The Owner will only receive Bids via the Bid Manager, which requires prior registration and invitation. The Bidder is responsible to familiarize itself with this system and request access in a timely manner.
- 4.5.2 The Owner will endeavor to maintain a list of all interested bidders and invite to all public bids. Bidders interested in being added to this list must register. Registration information can be found at <https://ipf.msu.edu/construction/partners/prospective-partners>.
- 4.5.3 Bidders are encouraged to continue to monitor projects via plan rooms and other advertising venues. They must express interest to bid on MSU projects by request at least 7 days prior to a bid opening. Owner takes no responsibility for inviting a bidder after that date.

ARTICLE 5

CONSIDERATION OF BIDS

5.1 OPENING OF BIDS

- 5.1.1 Unless stated otherwise in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be opened publicly and will be read aloud. Opening will generally take place in MSU Infrastructure Planning and Facilities Building, 1147 Chestnut Road, East Lansing, Michigan 48824.

5.1.1.1 Unless stated otherwise in the Advertisement or Invitation to Bid, the Owner will endeavor to share bid results within 24 hours of opening.

5.1.1.2 The Owner will endeavor to stream the bid opening, and will share details in the bid invitation

5.2 REJECTION OF BIDS

5.2.1 The Owner shall have the right to reject any or all Bids.

5.3 ACCEPTANCE OF BID (AWARD)

5.3.1 The Owner shall have the right to waive any informality or irregularity in any Bid received.

5.3.2 If the University accepts any alternates, it will do so in the order representing the Owner's opinion of the best value to Michigan State University. The Owner shall be the sole judge of value. The low bidder will be determined on the basis of the sum of the base bid and the alternates accepted.

5.4 ACCEPTANCE OF CONTRACTOR AND SUBCONTRACTORS

5.4.1 Each portion of the Work shall be performed by an organization equipped and experienced to do the Work in each particular field, and no portion shall be reserved by the Contractor unless they are so equipped and experienced. Within 24 hours after the receipt of Bids, the successful Contractor shall submit a list of each Subcontractor proposed for each section of the Work. Subcontractors shall be satisfactory to the Owner. Unless authorized to the contrary in writing from the Owner, Subcontracts shall be awarded to the firms named in this list. Acceptance of the Bid does not imply approval of the Subcontractors subsequently named, but each Subcontractor shall be approved individually.

ARTICLE 6

QUALIFICATION OF CONTRACTORS

6.1 SUBMISSION OF QUALIFICATION STATEMENT

6.1.1 Bidders to whom award of a Contract is under consideration shall submit to the Architect upon his/her request, a properly executed Contractor's Qualification Statement, Consensus Docs 221 – Constructor's Statement of Qualifications for a Specific Project, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

6.2 NONDISCRIMINATION

- 6.2.1 In performing under this Contract, the Contractor agrees not to discriminate against any employee, or applicant for employment, with respect to hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height or weight, marital status or handicap. Subcontracts with each Subcontractor will contain a provision requiring nondiscrimination in employment, as herein specified. Any breach of this covenant may be regarded as a material breach of this Contract. The foregoing is included as a part of the University's institutional Affirmative Action/Equal Opportunity commitment.

6.3 APPROVED ASBESTOS ABATEMENT CONTRACTORS

- 6.3.1 The Department of Environmental Health and Safety (EHS) annually prequalifies asbestos abatement contractors to perform asbestos abatement work on Campus. Asbestos abatement work shall only be performed by one of the asbestos abatement contractors on the approved list. The current list is available from the PDC Project Representative, the Environmental Coordinator for EHS, and at <https://ehs.msu.edu/assets/docs/asbestos/2022-asbestos-contractors.pdf>.

ARTICLE 7

POST-BID INFORMATION

7.1 SUBMISSIONS

- 7.1.1 Unless waived by the Architect, the apparent low Bidder shall, within 24 hours after receipt of bids, submit the following information to the Architect:
- 7.1.1.1 A designation of the Work to be performed by the Bidder with their own forces.
 - 7.1.1.2 The proprietary names and the suppliers of principal items or systems of material and equipment proposed for the Work.
 - 7.1.1.3 A list of names of the Subcontractors or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for each division and/or major subdivision, for the Owner's approval.
 - 7.1.1.4 The names of the MBE/WBE and a description of work to be done by each, dollar value of Work and percentage of Contract price.
 - 7.1.1.5 List of representatives authorized to perform Unifier functions on behalf of the contractor using the Unifier New Company Request, available at [Unifier System Vendor Information Form](#).
 - 7.1.1.6 Certificate of Insurance demonstrating compliance with project requirements.
- 7.1.2 At the option of the Owner, the Bidder may be required to establish to the satisfaction of the Architect and the Owner the capability, reliability, and responsibility of the proposed Contractor and Subcontractors to furnish and perform the Work.

- 7.1.3 Subcontractors and other persons and organizations proposed by the Bidder and accepted by the Owner and the Architect must be used on the Work for which they were proposed and accepted and shall not be changed except with the written approval of the Owner and the Architect.

ARTICLE 8

PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

8.1 OWNER'S RIGHT TO REQUIRE BONDS

- 8.1.1 Each Bidder under a proposal in which the base bid exceeds \$50,000, shall include the premiums for furnishing a Performance Bond and also Labor Material Bond, each in the full amount of the proposal sum as specified in the Owner / Constructor Agreement.
- 8.1.2 The bonding firm must be listed on the current U.S. Department of Treasury Circular 570, rated A- or better by Best, and be licensed to do business in the State of Michigan. The bonds are to be made out to "Michigan State University, Board of Trustees."
- 8.1.3 In assuming assigned Subcontractor by the successful Bidder for general building work as specified, each assigned Subcontractor for each Subcontract shall reimburse the General Contractor his/her proportionate share of the premiums for bonds.

8.2 TIME OF DELIVERY AND FORM OF BONDS AND INSURANCE

- 8.2.1 The Bidder shall deliver two (2) copies of the required bonds and insurance to the Owner not later than the date of execution of the Contract.
- 8.2.2 The Bidder shall require the Attorney-In-Fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his/her Power of Attorney.

ARTICLE 9

FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

9.1 FORM TO BE USED

- 9.1.1 The Agreement for the Work will be governed by the project manual, and by the terms and conditions of ConsensusDocs 200- Standard Agreement and General Conditions Between Owner and Constructor (as modified by MSU).
- 9.1.2 If the project is under \$250,000, an MSU Purchase Order will be used and the terms and conditions of ConsensusDocs 200- Standard Agreement and General Conditions Between Owner and Constructor (as modified by MSU), will serve as the applicable General Conditions for administration of the Work.

- 9.1.3 If the project is over \$250,000, the ConsensusDocs 200- Standard Agreement and General Conditions Between Owner and Constructor will be used and the terms and conditions of that Agreement will be formalized through the execution of a Contract Finalization Form.

ARTICLE 10

APPLICATION FOR PAYMENT

10.1 FORM TO BE USED

- 10.1.1 Applications for Payment shall be submitted in Unifier in accordance with the Pay Apps (Pay Applications) business process. Refer to the MSU IPF website for more information

ARTICLE 11

ELECTRONIC TRANSACTIONS

11.1 UNIFIER

- 11.1.1 The Owner reserves the right to require that any or all transactions and submissions be conducted and delivered electronically through [Unifier](#), a web-based project management software system. Unifier functions on most popular web browsers. If the owner requires the use of Unifier, the owner will provide the necessary licenses for access into Unifier and the initial training necessary to use Unifier. Access to Unifier will be password restricted, and any proposal, acceptance, quote or other information submitted through Unifier through the use of a party's password shall be deemed to be the submission of such party and any proposal, acceptance, quote or other information in the submission shall be binding on such party as if such proposal, acceptance, quote or other information was in a writing signed by such party. Owner shall not be required to verify the validity of any such submission or inquire as to the authority of the user gaining access to Unifier through the use of a party's password. The following are the minimum Unifier user software and hardware requirements. It is the responsibility of the vendor to verify compatibility of their systems with Unifier. For more information, see [Unifier System Vendor Information Form](#).

11.2 CONTRACT EXECUTION

- 11.2.1 The Owner may choose to accept a scanned signed contract, provided through Unifier, as acceptance of the agreement. The Owner will rely on this document as properly signed by the Constructor.

SECTION 260943 - NETWORK LIGHTING CONTROLS – LUTRON QUANTUM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Digital-network lighting control system and associated components:
 - 1. LED drivers.
 - 2. Power interfaces.
 - 3. Lighting control modules (Lutron Energi Savr Node).
 - 4. Lighting management hubs.
 - 5. Lighting management system computers.
 - 6. Lighting management system software.
 - 7. Control stations.
 - 8. Low-voltage control interfaces.
 - 9. Wired sensors.
 - 10. Accessories.

1.2 REFERENCE STANDARDS

- A. 47 CFR 15 - Radio Frequency Devices; current edition.
- B. ANSI/ESD S20.20 - Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices); 2014.
- C. ASTM D4674 - Standard Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments; 2002a (Reapproved 2010).
- D. CSA C22.2 No. 223 – Power Supplies with Extra-low-voltage Class 2 Outputs; 2015.
- E. IEC 61000-4-2 - Electromagnetic Compatibility (EMC) - Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test; 2008.
- F. IEC 61000-4-5 - Electromagnetic Compatibility (EMC) - Part 4-5: Testing and Measurement Techniques - Surge Immunity Test; 2014, with Amendments, 2017.
- G. IEEE 1789 - Recommended Practice for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers; 2015.
- H. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Cor 1, 2012).
- I. ISO 9001 - Quality Management Systems-Requirements; 2008.
- J. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- K. NECA 130 - Standard for Installing and Maintaining Wiring Devices; National Electrical Contractors Association; 2010.

- L. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; National Electrical Manufacturers Association; 2015.
- M. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association; 1999 (R 2015).
- N. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- O. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances; Current Edition, Including All Revisions.
- P. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- Q. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- R. UL 1310 – Class 2 Power Units; Current Edition, Including All Revisions.
- S. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.
- T. UL 1598C - Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits; Current Edition, Including All Revisions.
- U. UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces; Current Edition, Including All Revisions.
- V. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of sensors and wall controls with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate the placement of wall controls with actual installed door swings.
 - 3. Coordinate the work to provide luminaires and lamps compatible with the lighting controls to be installed.
 - 4. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.
- B. Preinstallation Meeting: Conduct on-site meeting with lighting control system manufacturer prior to commencing work as part of manufacturer's standard startup services. Manufacturer to review with installer:
 - 1. Low voltage wiring requirements.

2. Separation of power and low voltage/data wiring.
 3. Wire labeling.
 4. Lighting management hub locations and installation.
 5. Where Lighting Control Manufacturer Sensor Layout and Tuning service is specified in Part 2 under "DIGITAL-NETWORK LIGHTING CONTROL SYSTEM - GENERAL REQUIREMENTS", sensor locations to be reviewed in accordance with layout provided by Lighting Control Manufacturer. Lighting Control Manufacturer may direct Contractor regarding sensor relocation should conditions require a deviation from locations indicated.
 6. Control locations.
 7. Computer jack locations.
 8. Load circuit wiring.
 9. Network wiring requirements.
 10. Connections to other equipment.
 11. Installer responsibilities.
 12. Power panel locations.
- C. Remote Prewire Visit; Lutron LSC-PREWIRE-RMTE: Include as part of base bid; additional costs for Lighting Control Manufacturer to provide one 4-hour session(s) of additional remote prewire support.
- D. Sequencing:
1. Do not install sensors and wall controls until final surface finishes and painting are complete.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Design Documents: Where Lighting Control Manufacturer Sensor Layout and Tuning service is specified in Part 2 under "DIGITAL-NETWORK LIGHTING CONTROL SYSTEM - GENERAL REQUIREMENTS", Lighting Control Manufacturer to provide plans indicating occupancy/vacancy and/or daylight sensor locations.
- C. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.
1. Occupancy/Vacancy Sensors: Include detailed basic motion detection coverage range diagrams.
- D. Shop Drawings:
1. Provide schematic system riser diagram indicating component interconnections. Include requirements for interface with other systems.
 2. Provide detailed sequence of operations describing system functions.
- E. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

- F. Warranty: Submit sample of manufacturer's Warranty or Enhanced Warranty as specified in Part 1 under "WARRANTY". Submit documentation of final execution completed in Owner's name and registered with manufacturer.
- G. Software: One copy of software provided under this section.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications:
 - 1. Company with not less than ten years of experience manufacturing lighting control systems of similar complexity to specified system.
 - 2. Registered to ISO 9001, including in-house engineering for product design activities.
 - 3. Qualified to supply specified products and to honor claims against product presented in accordance with warranty.
- D. Maintenance Contractor Qualifications: Manufacturer's authorized service representative.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.7 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.
 - 1. System Requirements - Lutron, Unless Otherwise Indicated:
 - a. Ambient Temperature:
 - 1) Lighting Control System Components, Except Those Listed Below: Between 32 and 104 degrees F (0 and 40 degrees C).
 - 2) Lighting Management System Computer: Between 50 and 90 degrees F (10 and 35 degrees C).
 - b. Relative Humidity: Less than 90 percent, non-condensing.

1.8 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

- B. Manufacturer's Standard Warranty, With Manufacturer Start-Up; Lutron Standard 2-Year Warranty; Lutron LSC-B2:
 - 1. Manufacturer Lighting Control System Components, Except Lighting Management System Computer, Ballasts/Drivers and Ballast Modules:
 - a. First Two Years:
 - 1) 100 percent replacement parts coverage, 100 percent manufacturer labor coverage to troubleshoot and diagnose a lighting issue.
 - 2) First-available on-site or remote response time.
 - 3) Remote diagnostics for applicable systems.
 - b. Telephone Technical Support: Available 24 hours per day, 7 days per week, excluding manufacturer holidays.
 - 2. Lighting Management System Computer: One year 100 percent parts coverage, one year 100 percent manufacturer labor coverage.
 - 3. Ballasts/Drivers and Ballast Modules: Five years 100 percent parts coverage, no manufacturer labor coverage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: Lutron Electronics Company, Inc; www.lutron.com.
 - 1. Products by listed manufacturers are subject to compliance with specified requirements and prior approval of Architect.
- B. Substitutions:
 - 1. All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by Architect a minimum of 10 working days prior to the bid date and must be made available to all bidders. Proposed substitutes must be accompanied by a review of the specification noting compliance on a line-by-line basis.
 - 2. Any proposed substitutions to be reviewed by Architect at Contractor's expense.
- C. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.2 DIGITAL-NETWORK LIGHTING CONTROL SYSTEM - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) as suitable for the purpose indicated.
- B. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the control intent indicated.
- C. Design lighting control equipment for 10-year operational life while operating continually at any temperature in an ambient temperature range of 32 degrees F (0 degrees C) to 104 degrees F (40 degrees C) and 90 percent non-condensing relative humidity.

- D. Electrostatic Discharge Tolerance: Design and test equipment to withstand electrostatic discharges without impairment when tested according to IEC 61000-4-2.

2.3 POWER INTERFACES

- A. Provide power interfaces as indicated or as required to control the loads as indicated.
- B. General Requirements:
 - 1. Phase independent of control input.
 - 2. Rated for use in air-handling spaces as defined in UL 2043.
 - 3. Utilize air gap off to disconnect the load from line supply.
 - 4. Diagnostics and Service: Replacing power interface does not require re-programming of system or processor.
- C. Product(s):
 - 1. Phase-Adaptive Power Module; Lutron PHPM-PA: Provides interface for phase control input to provide full 16 A circuit output of forward/reverse phase control for compatible loads.

2.4 LIGHTING CONTROL MODULES (LUTRON ENERGI SAVR NODE)

- A. Provide lighting control modules as indicated or as required to control the loads as indicated.
- B. General Requirements:
 - 1. Listed to UL 508 as industrial control equipment.
 - 2. Delivered and installed as a listed factory-assembled panel.
 - 3. Passively cooled via free-convection, unaided by fans or other means.
 - 4. Mounting: Surface.
 - 5. Connection without interface to wired:
 - a. Occupancy sensors.
 - b. Daylight sensors.
 - c. IR receivers for personal control.
 - 6. Connects to lighting management hub via RS485.
 - 7. LED status indicators confirm communication with occupancy sensors, daylight sensors, and IR receivers.
 - 8. Contact Closure Input:
 - a. Directly accept contact closure input from a dry contact closure or sold-state output without interface to:
 - 1) Activate scenes.
 - a) Scene activation from momentary or maintained closure.
 - 2) Enable or disable after hours.
 - a) Automatic sweep to user-specified level after user-specified time has elapsed.
 - b) System will provide occupants a visual warning prior to sweeping lights to user-specified level.
 - c) Occupant can reset timeout by interacting with the lighting system.

- 3) Activate or deactivate demand response (load shed).
 - a) Load shed event will reduce lighting load by user-specified amount.
 9. Emergency Contact Closure Input:
 - a. Turn all zones to full output during emergency state via direct contact closure input from UL 924 listed emergency lighting interface, security system or fire alarm system.
 - b. Allow configurable zone response during emergency state.
 - c. Disable control operation until emergency signal is cleared.
 10. Supplies power for control link for keypads and control interfaces.
 11. Distributes sensor data among multiple lighting control modules.
 12. Capable of being controlled via wireless sensors and controls.
- C. 0-10V Lighting Control Modules:
 1. Product(s):
 - a. Lutron 0-10V Energi Savr Node; Model QSN-4T16-S: 16 A continuous-use per channel.
 2. Coordination Between Low Voltage Dimming Module and Line Voltage Relay: Capable of being electronically linked to single zone.
 3. Single low voltage dimming module; capable of controlling following light sources:
 - a. 0-10V analog voltage signal.
 - 1) Provide Class 2 isolated 0-10V output signal conforming to IEC 60929.
 - 2) Sink current per IEC 60929.
 - b. 10V-0V analog voltage signal.
 - 1) Provide Class 2 isolated 0-10V output signal conforming to IEC 60929.
 - 2) Sink current per IEC 60929.
 4. Switching:
 - a. Rated Life of Relay: Typical of 1,000,000 cycles at fully rated 16 A for all lighting loads.
 - b. Load switched in manner that prevents arcing at mechanical contacts when power is applied to and removed from load circuits.
 - c. Fully rated output continuous duty for inductive, capacitive, and resistive loads.
 - d. Module to integrate up to four individually controlled zones.
 - e. Utilize air gap off, activated when user selects "off" at any control to disconnect the load from line supply.

2.5 LIGHTING MANAGEMENT HUBS

- A. Product: Lutron Quantum Light Management Hub.
- B. Provided in a pre-assembled NEMA listed enclosure with terminal blocks listed for field wiring.
- C. Connects to controls and power panels via RS485.

- D. Enables light management software to control and monitor compatible dimming ballasts and ballast modules, power panels, power modules, and window treatments.
 - 1. Utilizes Ethernet connectivity to light management computer utilizing one of the following methods:
 - a. Dedicated network.
 - b. Dedicated VLAN.
 - c. Shared network with Building Management System (BMS).
 - d. Corporate network where managed switches are configured to allow multicasting and use of IGMP.
- E. Integrates control station devices, power panels, shades, preset lighting controls, and external inputs into a single customizable lighting control system with:
 - 1. Multiple Failsafe Mechanisms:
 - a. Power failure detection via emergency lighting interface.
 - b. Protection: Lights go to full on if ballast wires are shorted.
 - c. Distributed architecture provides fault containment. Single hub failure or loss of power does not compromise lights and shades connected to other lighting management hubs.
 - 2. Manual overrides.
 - 3. Automatic control.
 - 4. Central computer control and monitoring.
 - 5. Integration with BMS via BACnet.
- F. Furnished with astronomical time clock.
- G. Maintains a backup of the programming in a non-volatile memory capable of lasting more than ten years without power.
- H. BACnet Integration License:
 - 1. Provide ability to communicate by means of native BACnet IP communication (does not require interface) to lighting control system from a user-supplied 10BASE-T or 100BASE-T Ethernet network.
 - 2. Requires only one network connection per system.
 - 3. Lighting control system to be BACnet Test Laboratory (BTL) listed.
 - 4. Basic BACnet integration license:
 - a. The BACnet integrator can command:
 - 1) Area light output.
 - 2) Area enable or disable after hours mode.
 - 3) Area load shed level.
 - 4) Area load shed enable/disable.
 - 5) Enable/Disable:
 - a) Area occupancy sensors.
 - b) Area daylighting.
 - 6) Daylighting level.
 - 7) Area occupied and unoccupied level
 - 8) Occupancy sensor timeouts.
 - b. The BACnet integrator can monitor:
 - 1) Area on/off status.
 - 2) Area occupancy status.

- 3) Area fault.
 - a) Lamp failures.
 - b) Control devices not responding.
 - 4) Area load shed status.
 - 5) Area instantaneous energy usage and maximum potential power usage.
 - 6) Energy savings broken out by strategy (occupancy, timeclock, daylighting, personal control, tuning, load shed) down to the individual area.
 - 7) Enable/Disable:
 - a) Area occupancy sensors.
 - b) Daylighting.
 - c) Timeclocks.
 - 8) Daylighting level.
 - 9) Light levels from photo sensors or Radio Window sensors.
 - 10) Area occupied and unoccupied level.
 - 11) Occupancy sensor timeouts.
- I. Integration with other devices over Ethernet via Telnet using the Lutron Integration Protocol.
- J. Control other devices over Ethernet via TCP or Telnet by sending device specific strings.

2.6 LIGHTING MANAGEMENT SYSTEM COMPUTERS

- A. No computers to be provided. Lighting Control System Manufacturer authorized Service Representative to perform system start-up without on-site computer.
1. Server:
 - a. Suitable for 24 hour per day, 7 day per week programming, monitoring, control, and data logging of digital-network lighting controls.
 - b. Suitable to handle client machine request in multi-computer systems.
 - c. Unless otherwise indicated, computer to be provided by others.
 - d. Minimum Hardware Requirements:
 - 1) Processor: Quad Core Intel® Xeon®.
 - 2) 16 GB Ram.
 - 3) 250 GB hard drive (40 GB for application and database).
 - 4) Two 10/100/1000 Ethernet network interfaces - one for communication with lighting management hubs and one for communication with corporate intranet to allow access from system PCs and/or energy saving display terminals. Only one Ethernet network interface is required if all lighting management hubs and client PCs are on the same network.
 - 5) Monitor with 1280 x 1024 resolution.
 - 6) 4 USB 2.0 ports.
 - 7) Dedicated Graphics Card with 256 MB of memory (only required if running client software from the server).

- e. Minimum Software Requirements:
 - 1) Licensed installation of US English 64-bit Microsoft® Windows® Server 2008 R2, Windows Server 2012 R1, or Windows Server 2012 R2.
 - 2) Microsoft® Internet Information Services (IIS) 7 or later.
 - 3) Microsoft® Internet Explorer 9 or later.
 - 4) Microsoft® .NET Framework 4.5.

2.7 LIGHTING MANAGEMENT SYSTEM SOFTWARE

- A. Provide system software license and hardware that is designed, tested, manufactured, and warranted by a single manufacturer.
- B. Configuration Setup Software:
 - 1. Product: Lutron Q-Design.
 - 2. Suitable to make system programming and configuration changes using a graphical floor plan view or a generic system layout.
 - 3. Windows-based, capable of running on either central server or a remote client over TCP/IP connection.
 - 4. Publish Graphical Floor Plan: Allows the user to publish new graphical floor plan files, allowing users to monitor the status of lights, occupancy of areas, and daylighting status.
 - 5. Back-Up Project Database: Allows the user to back up the project database that holds all the configuration information for the system, including keypad programming, area scenes, daylighting, occupancy programming, emergency levels, night lights, and time clock.
 - 6. Publish Project Database: Allows the user to send a new project database to the server and download the new configuration to the system. The project database holds all the configuration information for the system, including keypad programming, area scenes, daylighting, occupancy programming, emergency levels, night lights, and time clock.
 - 7. Allows end-user (with training) to:
 - a. Capture system design:
 - 1) Geographical layout.
 - 2) Load schedule zoning.
 - 3) Equipment schedule.
 - 4) Equipment assignment to lighting management hubs.
 - 5) Daylighting design.
 - b. Define the configuration for the following in each area:
 - 1) Lighting scenes.
 - 2) Control station devices.
 - 3) Interface and integration equipment.
 - 4) Occupancy/after hours.
 - 5) Partitioning.
 - 6) Daylighting.
 - 7) Emergency lighting.
 - 8) Night lights.
 - c. Startup:
 - 1) Addressing.

- 2) Daylighting.
 - 3) Provide customized conditional programming.
- C. Control and Monitor Software:
1. Product: Lutron Quantum Vue.
 2. General Requirements:
 - a. Web-based; runs on most HTML5 compatible browsers (including Internet Explorer, Chrome, and Safari).
 - b. Supports multiple platforms and devices; runs from a tablet, desktop, laptop, or smartphone; optimized for displays of 1024 by 768 pixels or higher.
 - c. User interface supports multi-touch gestures such as pinch to zoom, drag to pan, etc.
 - d. Utilizes HTTPS (industry-standard certificate-based encryption and authentication for security).
 - e. All functionality listed below must be available via a single application.
 3. System Navigation and Status Reporting:
 - a. Performed using graphical floor plan view or a generic system layout.
 - b. Graphical Floor Plan View: Utilizes customized CAD based drawing of the building. Pan and zoom feature allows for easy navigation; dynamically adjusts the details presented based on zoom level.
 - c. Area, scene, and zone names can be changed in real time.
 - d. Adjustments can be made based on area type.
 4. Control of Lights:
 - a. Control and monitor zone/area lights.
 - 1) Area lights can be monitored for on/off status.
 - 2) All lights in an area can be turned on/off or sent to a specific level.
 - 3) For areas that have been zoned, these areas may be sent to a predefined lighting scene, and individual zones may be controlled.
 - 4) Area lighting scenes can be renamed and modified in real-time, changing the levels that zones go to when a scene is activated.
 - 5) High and low end of area lighting can be tuned/trimmed.
 - b. Control and monitor area partition status from a graphical floor plan.
 5. Occupancy:
 - a. Area occupancy can be monitored.
 - b. Area occupancy can be disabled to override occupancy control or in case of occupancy sensor problems.
 - c. Area occupancy settings including level that lights turn on to when area is occupied, and level that lights turn off to when area is unoccupied can be changed in real-time.
 - d. Monitor energy savings due to occupancy down to an individual area.
 6. Daylighting:
 - a. Daylighting can be enabled/disabled. Can be used to override the control currently taking place in the space.
 - b. Daylight calibration can be adjusted for each daylit area.
 - c. Daylight status can be monitored.
 - d. Monitor energy savings due to daylight harvesting down to an individual area.

7. Scheduling: Schedule time of day and astronomic time clock events to automate functions.
 - a. Adjust or disable a single occurrence of a repeating scheduled event.
 - b. Easily monitor and adjust scheduled events using a weekly calendar view.
8. Reporting: Provide reporting capability that allows the building manager to gather real-time and historical information about the system as follows:
 - a. Energy Reports: Show a comparison of cumulative energy used over a period of time for one or more areas. Capable of displaying:
 - 1) Current savings in percent and kW.
 - 2) Historic energy savings in kWh saved.
 - 3) Historical views in time periods (days, weeks, months, years).
 - 4) Comparisons of historical periods (days, weeks, months, years).
 - b. Power Reports: Show power usage trend over a period of time for one or more areas.
 - c. Energy Density Report: Show energy usage in W/sq. ft.
 - d. Energy Savings By Strategy Report: Show energy savings for any area broken down by strategy (tuning, occupancy, daylighting, scheduled events, personal control, and load shedding).
 - e. Space Utilization/Occupancy Reports: Show historical occupancy over a period of time for one or more areas using a graphical floor plan, generic system layout, and/or graphs and charts.
9. Administration:
 - a. Users: Allows new user accounts to be created and existing user accounts to be edited.
 - 1) Supports Active Directory (LDAP) tying user accounts to network accounts.
 - b. Area and feature access can be restricted based on login credentials with assigned levels of access rights (Monitor, Control Only, Control and Edit, Admin) and customized access levels available.
 - c. Supports up to 20 concurrent users and 10,000 user accounts.
10. Quick Controls: Create shortcuts to activate customized system-wide actions, such as updating lighting and/or shade levels.
11. Provides control/monitoring of partition status to automatically reconfigure how the space operates based on the partition's open/closed status.
12. Variables: Used for custom program of a system and/or to signal a third party system. Any change may cause a change in the behavior of the system.
 - a. View the current state of system variables across subsystems.
 - b. Update the current variable state across all subsystems.
13. Control and Monitor for Multiple Quantum Vue and/or Vive Vue Systems; Lutron Enterprise Vue:
 - a. Allows user to view aggregate data from multiple connected Quantum Vue and/or Vive Vue systems spanning multiple buildings through a single user account:
 - 1) Space utilization/occupancy.
 - 2) Energy usage/savings.
 - 3) Alerts/alarms.
 - b. Allows user to view details and adjust settings for any connected Quantum Vue or Vive Vue system; supports system navigation through campuses and buildings using graphical floor plans.

2.8 CONTROL STATIONS

- A. Provide control stations with configuration as indicated or as required to control the loads as indicated.
- B. Wired Control Stations:
 - 1. General Requirements:
 - a. Power: Class 2 (low voltage).
 - b. UL listed.
 - c. Provide faceplates with concealed mounting hardware.
 - d. Borders, logos, and graduations to use laser engraving or silk-screened graphic process that chemically bonds graphics to faceplate, resistant to removal by scratching and cleaning.
 - e. Finish: White.
 - 2. Multi-Scene Wired Control:
 - a. General Requirements:
 - 1) Allows control of any devices part of the lighting control system.
 - 2) Allows for easy reprogramming without replacing unit.
 - 3) Replacement of units does not require reprogramming.
 - 4) Communications: Utilize RS485 wiring for low-voltage communication.
 - 5) Engrave keypads with button, zone, and scene descriptions as directed by owner.
 - 6) Software Configuration:
 - a) Customizable control station device button functionality:
 - (1) Buttons can be programmed to perform single defined action.
 - (2) Buttons can be programmed to perform defined action on press and defined action on release.
 - (3) Buttons can be programmed using conditional logic off of a state variable such as time of day or partition status.
 - (4) Buttons can be programmed to perform automatic sequence of defined actions.
 - (5) Capable of deactivating select keypads to prevent accidental changes to light levels.
 - (6) Buttons can be programmed for raise/lower of defined loads.
 - (7) Buttons can be programmed to toggle defined set of loads on/off.
 - 7) Status LEDs:
 - a) Upon button press, LEDs to immediately illuminate.
 - b) LEDs to reflect the true system status. LEDs to remain illuminated if the button press was properly processed or LEDs to turn off if the button press was not processed.
 - c) Support logic that defines when LED is illuminated:
 - (1) Scene logic (logic is true when all zones are at defined levels).
 - (2) Room logic (logic is true when at least one zone is on).

- (3) Pathway logic (logic is true when at least one zone is on).
 - (4) Last scene (logic is true when spaces are in defined scenes).
 - b. Wired Keypads; Lutron see Touch QS Keypads:
 - 1) Style: Architectural Insert Style
 - 2) Communications: Utilize RS485 wiring for low-voltage communications link.
 - 3) Mounting: Wallbox or low-voltage mounting bracket; provide wall plates with concealed mounting hardware.
 - 4) Button/Engraving Backlighting:
 - a) Utilize backlighting for buttons and associated engraving to provide readability under all light conditions.
 - b) Backlight intensity adjustable via programming software.
 - 5) Design keypads to allow field-customization of button color, configuration, and engraving using field-changeable replacement kits.
 - 6) Contact Closure Interface: Provide two contact closure inputs on back of unit which provide independent functions from front buttons; accepts both momentary and maintained contact closures.
 - 7) Terminal block inputs to be over-voltage and miswire-protected against wire reversals and shorts.
 - 8) Provide integral infrared receiver for personal control where indicated.
- 3. Single-Scene or Zoned Wired Control:
 - a. Product: Lutron Pico Wired Control.
 - b. Turn an individual fixture or group of fixtures on and off.
 - c. Raise and lower light levels.
 - d. Recall favorite light levels.

2.9 WIRED SENSORS

- A. Wired Occupancy Sensors:
 - 1. General Requirements:
 - a. Connects directly to compatible ballasts and modules without the need of a power pack or other interface.
 - b. Turns off or reduces lighting automatically after reasonable time delay when a room or area is vacated by the last person to occupy the space.
 - c. Accommodates all conditions of space utilization and all irregular work hours and habits.
 - d. Comply with UL 94.
 - e. Self-Adaptive Sensors: Continually adjusts sensitivity and timing to ensure optimal lighting control for any use of the space; furnished with field-adjustable controls for time delay and sensitivity to override any adaptive features.
 - f. Provide capability to:
 - 1) Add additional timeout system-wide without need to make local adjustment on sensor.
 - 2) Group multiple sensors.

- g. Power Failure Memory: Settings and learned parameters to be saved in non-volatile memory and not lost should power be interrupted and subsequently restored.
- h. Furnished with all necessary mounting hardware and instructions.
- i. Class 2 devices.
- j. Ceiling-Mounted Sensors: Indicate viewing directions on mounting bracket.
- k. Wall-Mounted Sensors: Provide swivel-mount base.
- l. Color: White.
- 2. Wired Dual Technology Sensors:
 - a. Passive Infrared: Utilize multiple segmented lens, with internal grooves to eliminate dust and residue build-up.
 - b. Ultrasonic: Utilize an operating frequency of 32 kHz or 40 kHz, crystal-controlled to operate within plus/minus 0.005 percent tolerance.
 - c. Ceiling-Mounted Sensors: Provide customizable mask to block off unwanted viewing areas.
 - d. Isolated Relay: Provide an internal additional isolated relay with Normally Open, Normally Closed, and Common outputs for use with HVAC control, Data Logging and other control option where indicated.
 - e. Integral Photocell: Provide an integral photocell with adjustable sensitivity to prevent lights from turning on when there is sufficient natural light where indicated.
 - f. Product(s), With Isolated Relay and Integral Photocell:
 - 1) Ceiling-Mounted Dual Technology Sensor, 500 square feet (46 sq. m); Lutron Model LOS-CDT-500R-WH: Coverage of 500 square feet (46 sq. m) with ceiling height of 8 to 12 feet (2.4 to 3.7 m); 180-degree field of view; with isolated relay and integral photocell; self-adaptive.
 - 2) Ceiling-Mounted Dual Technology Sensor, 2000 square feet (186 sq. m); Lutron Model LOS-CDT-2000R-WH: Coverage of 2000 square feet (186 sq. m) with ceiling height of 8 to 12 feet (2.4 to 3.7 m); 360-degree field of view; with isolated relay and integral photocell; self-adaptive.
- B. Wired Daylight Sensors:
 - 1. Digital Interior Daylight Sensor:
 - a. Product: Lutron Model EC-DIR-WH.
 - b. Use Class 2 wiring for low voltage communication.
 - c. Can be replaced without reprogramming.
 - d. Open-loop basis for daylight sensor control scheme.
 - e. Stable output over temperature from 32 degrees F (0 degrees C) to 104 degrees F (40 degrees C).
 - f. Partially shielded for accurate detection of available daylight to prevent fixture lighting and horizontal light component from skewing sensor detection.
 - g. Provide linear response from 0 to 500 footcandles.
 - h. Integral IR receiver for personal control.
 - i. Mountable on lighting fixtures or recessed acoustical ceiling tiles.
 - j. Constructed via sonic welding.
 - k. Color: White.

2. Communicates directly to compatible RF receiving devices through use of a radio frequency communications link.
3. Does not require external power packs, power wiring, or communication wiring.
4. Capable of being placed in test mode to verify correct operation from the face of the unit.
5. RF Range: 30 feet (9 m) between sensor and compatible RF receiving device(s).
6. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits:
Comply with FCC requirements of CFR, Title 47, Part 15, for Class B application.

PART 3 - EXECUTION

3.1 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.2 COMMISSIONING

- A. See Section 019113 for commissioning requirements.

3.3 CLOSEOUT ACTIVITIES

- A. Demonstration:
 1. On-Site Performance-Verification Walkthrough; Lutron LSC-WALK: Include as part of the base bid; additional costs for Lighting Control Manufacturer to provide on-site demonstration of system functionality to facility representative.
- B. Training:
 1. Include services of manufacturer's authorized Service Representative to perform on-site training of Owner's personnel on operation, adjustment, and maintenance of lighting control system as part of standard system start-up services.
 - a. Include training on software to be provided:
 - 1) Configuration software used to make system programming and configuration changes.
 - 2) Control and monitor.
 - 3) Energy savings display software.
 - 4) Personal web-based control software.
 2. Customer-Site Solution Training Visit; Lutron LSC-TRAINING: Include as part of the base bid.

3.4 PROTECTION

- A. Protect installed products from subsequent construction operations.

END OF SECTION 260943