

October 2, 2014

**Duluth City Hall Interior Renovations**  
**Phase 1: First Floor**  
**Bid Number: 14-0459**  
**Project Number: 14-02-TR**

**Bids Close Tuesday, October 14, 2014, 2:00 p.m.**

**NOTICE TO BIDDERS**

The following addendum shall be appended to and shall become a part of the plans and specifications for Duluth City Hall Interior Renovations, Phase 1: First Floor, Duluth, Minnesota.

This addendum supersedes and supplants all previous reference to similar items.

JOHN IVEY THOMAS ASSOCIATES INC.

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**ADDENDUM #1**

**General**

1. Bid Request Form: A revised bid request form is being issued with this addendum. Alternate #2 has been deleted from project and three (3) unit prices have been added to form.
2. Section 01 23 00 – Alternates: Delete Alternate #2 from project requirements. See also revised bid form.
3. Dumpster Location: The City will allow placement of the dumpster on the lawn/sidewalk area on 1<sup>st</sup> Street side and in 2<sup>nd</sup> Street parking lot, as directed by City, to minimize or eliminate hauling of debris through public corridors. Contractor is responsible to repair damage caused by dumpster placement.
4. Parking: No parking is available on site. Contractor is responsible for parking of all employees or subcontractors.
5. Clean Up/Dust Protection: Contractor must provide adequate dust protection and clean up of public corridors as required for safe passage. Contractor is to take note of and remove any dust build up on floor surfaces that might become slippery.
6. Noise: Contractor to provide schedule of noise producing operations to owner one week in advance of work.
7. Existing Ceiling Plaster Removal – Demolition Note “L” and “N”:
  - a. Contractor is to remove all components of suspended acoustical tile ceiling system and remove all loose plaster from underside of existing floor construction above. Existing plaster that is firm and well bonded to structure may remain.
  - b. Contractor to re-secure existing mechanical or electrical to remain to existing floor structures as required.

- c. Contractor to include in base bid removal of 4,100 sq.ft. There will be a unit price for an increase or decrease in area. See Section 01 22 00 and revised proposal form attached.
8. Original plans of City Hall have been posted to the ShelDon website for contractor's information.
  9. Asbestos/Hazardous Materials: Preliminary testing of the project areas has been conducted and it was found that the existing plaster does not contain asbestos. All existing wall and plaster ceilings tested positive for lead based paint. Testing Company reported that full abatement is not required. Contractor is to follow certified lead based paint removal best practices for all demolition and construction work. The full hazardous material testing report will be included in a future addendum.
  10. Demolition:
    - a. Contractor to include demolition of ground floor generator room in bid price.
    - b. All wood doors, casings, trims, chair rails, baseboards, etc. removed for construction and not reused are to be stored as directed on site.

**Product Approvals**

The following manufacturers are approved subject to final review of conformance to plans, specifications, and project requirements.

<u>Section</u>	<u>Product</u>	<u>Manufacturer</u>
08 14 00	Wood Doors	TruStile TS Series matching profile of existing doors

**Mechanical/Electrical**

1. Section 26 09 23: Revise specification section 26 09 23 Complete and Operational Lighting Control System, see attached.
2. Sheet E2.1: Add numbered note 2 as follows:  
Existing wall mounted data rack is to be disconnected and removed. Route all cabling serving areas not affected by demolition to data rack located on second floor.
3. Sheets E2.1 and E2.2: Addition to note #1 on Sheets E2.1 and E2.2 as follows:  
Disconnect and remove existing cable tray to facilitate plaster ceiling demolition. Re-install in new lay-out as indicated on plan. Provide additional components as required for complete system. Coordinate final lay-out with mechanical systems. Cable tray located above hard lid ceiling not included in demolition work is to be abandoned in place.
4. Sheet E4.1: Remove bid alternate per detail 6/E4.1 general note 'B' in its entirety.

**END OF ADDENDUM**

- Attachments: Revised Bid Request Form  
Section 01 22 00 – Unit Prices  
Section 26 09 23  
List of Pre-Bid Meeting Attendees



**REVISED REQUEST FOR BID**

Date: October 14 , 2014  
Project #: 14-02-TR  
Bid #: 14-0459

**CITY OF DULUTH**

RETURN BY BID OPENING TIME TO:

PURCHASING DIVISION  
100 City Hall, Duluth, MN 55802  
Duluth, Minnesota 55802  
(218) 730-5000  
[dsears@duluthmn.gov](mailto:dsears@duluthmn.gov)

**Duluth City Hall Interior Renovations Phase 1: First Floor**

**BID OPENING AT: 2:00 PM on October 14, 2014**

NOTE: All bids must be written, signed and transmitted in a sealed envelope, plainly marked with the Subject Matter and Opening Date. The City of Duluth reserves the right to split award where there is substantial savings to the City, waive informalities and to reject any and all bids. Bidder shall state in proposal if Bid price is based on acceptance of total order. All applicable sales and/or use tax are to be included in the bid pricing. Bid will not be the only consideration for award of Bid. All pages shall be signed or initialed by authorized bidder's representative as indicated at the bottom of the page(s) of the request for bid forms. City Project Contact: Tari Rayala, City of Duluth Architect, (218)730-4434 & [trayala@duluthmn.gov](mailto:trayala@duluthmn.gov). The City of Duluth is an Equal Opportunity Employer.

RETURN BID IN DUPLICATE WITH DUPLICATE DESCRIPTIVE LITERATURE

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**BID DEPOSIT REQUIREMENTS:** 5% of Bid Amount  
Deposit shall mean cash, cashier's check, or corporate surety bond payable to or in favor of City of Duluth.

**PERFORMANCE and PAYMENT BONDS:** Shall be required of the successful bidder. Bonds shall BOTH be in the full amount of the Contract amount.

**INSURANCE CERTIFICATE:** Shall be required per specified requirements.

*Designated F.O.B. Point:*  
*City Architect*  
*Jobsite(s)*

*Tax: Federal Excise Exemption*  
*Account Number: 41-74-0056 K*

NAME \_\_\_\_\_  
ADDR1 \_\_\_\_\_  
ADDR2 \_\_\_\_\_  
ADDR3 \_\_\_\_\_

BASE BID \$ \_\_\_\_\_

Base bid includes all work related to Duluth City Hall Interior Renovations, Phase 1: First Floor.

BY: \_\_\_\_\_  
(Print) Title

ADD ALTERNATE BID #1 \$ \_\_\_\_\_  
Alt Bid #1 includes all work related to a complete and operational MIS area cooling system.

\_\_\_\_\_  
(SIGNATURE)

\_\_\_\_\_  
Telephone #

\_\_\_\_\_  
Email

Initial: \_\_\_\_\_

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**Duluth City Hall Interior Renovations, Phase 1: First Floor  
Duluth, MN**

The undersigned, having become familiar with the existing conditions on the project affecting the cost of the work, and with the Contract Documents which include the Invitation to Bid, the Contract Agreement Form, the Non-Collusion Affidavit, any/all Addenda, General Conditions (parts I & II), the Special Conditions, Technical Specifications, Drawings (as listed in the schedule of drawings), EEO Affirmative Action Policy Statement & Compliance Certificate, and Form of Surety Bond or Bond as prepared by the City of Duluth and on file in the office of the City Architect and City Purchasing Agent, and hereby proposes to furnish all supervision, technical personnel, labor, materials, machinery, tools, appurtenances, equipment & services, including utilities and transportation services required to complete this project in a timely manner.

**LUMP SUM BASE BID:**

All work as described in specifications and/or shown on the plans for a sum of \$ \_\_\_\_\_

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(In words - See Additional Page(s) as required)

Contractor is requested to furnish the following information:

Amount to furnish and install sliding automatic door (Section 084229): \$ \_\_\_\_\_

**ADD ALTERNATE #1:** (As described in Section 01 23 00) \$ \_\_\_\_\_

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(In words - See Additional Page(s) as required)

**UNIT PRICES:** (As described in Section 01 22 00)

Unit prices are Additions/Deletions to the Lump Sum Bid and include all labor, material and equipment to furnish and install requested item. Bidder must enter all unit prices.

Unit Price 1: For changes in quantity of loose plaster to be removed (over or below 4100 S.F.):

Add \$ \_\_\_\_\_ per sq.ft.      Deduct \$ \_\_\_\_\_ per sq.ft.

Unit Price 2: For changes in quantity of demolition of low voltage cabling (over or below 5000 L.F.):

Add \$ \_\_\_\_\_ per lin.ft.      Deduct \$ \_\_\_\_\_ per lin.ft.

Unit Price 3: For changes in quantity of demolition of conduit and wire (over or above 5000 L.F.):

Add \$ \_\_\_\_\_ per lin.ft.      Deduct \$ \_\_\_\_\_ per lin.ft.

Initial: \_\_\_\_\_

**Revised Request for Bid**

CITY OF DULUTH

Date: October 14, 2014

Project #: 14-02-TR

Bid #: 14-0459

Completion Time:

The undersigned hereby affirms & agrees, if awarded a contract, to begin work immediately upon receipt of Notice to Proceed and to substantially complete the work within the time schedule indicated in Contractor's completion shedule.

Security in the sum of \$ \_\_\_\_\_ in the form of \_\_\_\_\_ is submitted herewith in accordance with the Instructions to Bidders, payable without condition to the City of Duluth which is agreed shall be retained as liquidated damages for the delay and extra expense caused the Owner if the undersigned fails to execute the contract and furnish bonds required by the contract documents.

Signed: \_\_\_\_\_ for

\_\_\_\_\_ a partnership (or)

\_\_\_\_\_ a corporation incorporated under the laws of the State of

President: \_\_\_\_\_ Vice President: \_\_\_\_\_

Secretary: \_\_\_\_\_ Treasurer: \_\_\_\_\_

Address(es): \_\_\_\_\_

\_\_\_\_\_, being duly sworn, deposes and says that there are no other persons comprising above company or firm than the above names, and that there are no persons or corporations interested in the forgoing proposals, either as principal or subcontractor, other than the above names; also that the proposals are made without any connection with any person or persons acting in any official capacity whatever for the City of Duluth is directly or indirectly interested therein, or any portion of the profit thereof.

Subscribed and Sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ A.D., \_\_\_\_\_,

\_\_\_\_\_ Notary Public.

Stamp/Seal

Addendum Receipt Acknowledgments:

Addendum #: _____	Dated: _____	_____ (initial)
Addendum #: _____	Dated: _____	_____ (initial)
Addendum #: _____	Dated: _____	_____ (initial)
Addendum #: _____	Dated: _____	_____ (initial)
Addendum #: _____	Dated: _____	_____ (initial)

Initial: \_\_\_\_\_

# PURCHASE ORDER TERMS AND CONDITIONS

1. **ACCEPTANCE.** ACCEPTANCE OF THIS ORDER BY SELLER IS EXPRESSLY LIMITED TO THE TERMS AND CONDITIONS CONTAINED IN THIS ORDER. ANY TERM OR CONDITION STATED BY THE SELLER IN ANY PRIOR PROPOSAL, OR SELLER'S ACKNOWLEDGEMENT FORM, OR IN OTHERWISE ACKNOWLEDGING OR ACCEPTING THIS ORDER IS DEEMED BY BUYER TO BE A MATERIAL ALTERATION OF THIS ORDER AND IS HEREBY OBJECTED TO BY BUYER. ANY SUCH TERM OR CONDITION SHALL BE TOTALLY INAPPLICABLE TO THIS ORDER UNLESS SPECIFICALLY AGREED TO IN A WRITING SIGNED BY AN AUTHORIZED REPRESENTATIVE OF BUYER. ACCEPTANCE OF THE GOODS OR SERVICES COVERED BY THIS ORDER WILL NOT CONSTITUTE ACCEPTANCE BY BUYER OF SELLER'S TERMS AND CONDITIONS. ANY OF THE FOLLOWING ACTS BY SELLER SHALL CONSTITUTE ACCEPTANCE OF THIS ORDER AND ALL OF ITS TERMS AND CONDITIONS SIGNING AND RETURNING A COPY OF THIS ORDER; DELIVERY OF ANY OF THE GOODS ORDERED; INFORMING THE BUYER IN ANY MANNER OF COMMENCEMENT OF PERFORMANCE; OR RETURNING SELLER'S OWN FORM OF ACKNOWLEDGEMENT.
2. **PRICE.** If price (either fixed price or hourly rate[s] in case of a time and material order) and/or delivery is not specified by Buyer on the face of this order, Seller shall immediately submit its best price, delivery date and/or schedule which shall be subject to Buyer's approval and acceptance. Seller warrants that the prices and other terms for the articles sold to Buyer under this order are not less favorable than those extended to all other customers for the same or like articles in equal or less quantities. In the event Seller reduces its price for such articles during the term of this order, Seller agrees to reduce the prices hereof accordingly. If this order is on a time and material basis, the following shall apply: price shall be (a) material at Seller's cost, less scrap, without any charge for handling or otherwise, plus (b) time at agreed hourly rate(s). If both engineering work and manufacturing work are involved, separate hourly rates shall be specified for each thereof. No overtime shall be employed in the performance of this order without Buyer's prior consent and unless separate overtime hourly rate(s) have been specified and agreed upon. No substantial portion of the order shall be subcontracted by Seller without Buyer's written consent. Seller shall maintain adequate accounting records in accordance with generally accepted accounting practice to substantiate all costs, which records shall be open to examination by Buyer at all reasonable times.
3. **PACKING AND SHIPPING.** If Goods are to be delivered under this order, the cost and fee negotiated for this order are deemed to include all packaging and/or storage cost. All Goods shall be packaged, marked, and otherwise prepared in accordance with good commercial practices to obtain lowest shipping rates. On containers, Seller shall mark handling and loading instructions, shipping information, order number, item and account number, shipment date, and names and addresses of Seller and Buyer. An itemized packing list shall accompany each shipment. Overshipments shall be returned to Seller at Seller's risk and expense. Early shipments may, at option of Buyer, be returned to Seller at Seller's risk and expense or may be retained by Buyer and Buyer shall not be liable for payment until the time originally scheduled hereon.
4. **F.O.B. AND RISK OF LOSS.** Unless otherwise specified on the face of this order, the F.O.B. point shall be Buyer's location designated on the face of this order. If transportation is F.O.B. Seller's location, Seller shall bear all risk of loss or damage to the Goods until delivery of the Goods to the carrier. If transportation is F.O.B. Buyer's location, Seller shall bear all risk of loss or damage to the Goods until delivery of the Goods to Buyer's location.
5. **INVOICING.** All invoices shall be rendered in duplicate unless otherwise specified and shall be rendered within 24 hours after each shipment. Taxes, freight and similar charges shall be shown separately. Each invoice shall be accompanied by bill of lading or express receipt. Payments shall be subject to adjustment for errors, shortages, rejections and other causes. Discount period, if any, shall commence on the date invoice is received or goods are received, whichever is later. Buyer secures blanket coverage on all inbound freight. Invoice charges for additional insurance will not be honored unless otherwise specified.
6. **INSPECTION.** All material and workmanship shall be subject to inspection and test by Buyer, both at plant of Seller and of Buyer. Payment shall be subject to final inspection at Buyer's plant. Buyer shall have the right to reject all goods not conforming to specifications or containing defective material or workmanship. Rejected goods shall be returned at Seller's expense and risk, including transportation both ways, promptly after notification of rejection. Buyer may elect to retain defective goods and to remedy defects and deduct cost of remedying same from amount due Seller. Seller warrants that goods shall be produced under a quality control system that provides at a minimum for the prevention and ready detection of discrepancies and for timely and positive corrective action. Seller warrants that he has or is able to obtain the best facilities necessary to meet the technical and regulatory requirements specified. Seller warrants that quality control records are maintained on file for a minimum of one year from date of shipment or as otherwise specified by contract. Buyer reserves the right, upon 72 hours notice, to audit the Seller's facilities and inspection records in connection with this order.
7. **WARRANTY.** In addition and without prejudice to all other warranties expressed or implied by law, Seller warrants that all material or goods covered by this order shall conform to drawings, specifications and other defects. All warranties, both expressed and implied, also constitute conditions and shall survive inspection, acceptance and payment and shall inure to the benefits of Buyer and its customers. Without limitation of any rights by reason of any breach of warranty or otherwise, material or goods which are not as warranted may at any time be returned to Seller at Seller's expense for credit, correction or replacement as Buyer may direct.
8. **COMPLIANCE WITH LAWS.** Seller shall comply with all federal, state, and local laws, ordinances, rules and regulations in the manufacture and sale of the Goods and performance of the Services, including but not limited to the Occupational Safety and Health Act, the Truth In Negotiation Act, the Resources Conservation and Recovery Act and all applicable requirements of the Fair Labor Standards Act. Seller will defend and hold Buyer harmless from any loss, damages, or costs arising from or caused in any way by any actual or alleged violation of any federal, state, or local law, condition, rule, or regulation, or failure by the Seller to (i) have any chemical substances sold hereunder included in the list of approved chemical substances published by the Environmental Protection Agency pursuant to the Toxic Substances Control Act or (ii) provide a completed Material Safety Data Sheet (OSHA Form 20 equivalent) for any chemical substances sold hereunder as required by any federal, state or local law, ordinance, rule or regulation.
9. **CHANGES.** Buyer may, at any time by written order, make changes in drawings, designs, specifications, method of shipment or packing, time or place of delivery, require additional work, or direct the omission of work covered by this order. If any such change causes an increase or decrease in the price under this order, or in the time required for performance, an equitable adjustment shall be made and this order shall be modified in writing accordingly. Any claim for adjustment under this provision must be asserted within 10 days from date this change is ordered and the amount of such claim must be stated in writing within 30 days thereafter.
10. **BUYER'S PROPERTY, MATERIALS, AND EQUIPMENT.** If Buyer furnishes Seller material or "equipment" ("Equipment" is defined as special dies, molds, jigs, tools, gages, test equipment, masks, etc), or pays for such material or "equipment", title thereto shall remain or vest in Buyer, and Seller shall identify, maintain and preserve such material and "equipment" and shall dispose of it (including scrap) in accordance with Buyer's direction. Such material and "equipment", and whenever practical such individual item thereof shall be plainly marked or otherwise adequately identified by Seller as "property of the City of Duluth" and shall be safely stored separate and apart from Seller's property. Seller shall not substitute any property for Buyer's property. Unless otherwise authorized in writing by Buyer, Seller shall use such material or "equipment" only in the performance of purchase orders for Buyer. Seller shall be responsible for any loss, damage, or destruction to such material or "equipment" but Seller shall not include any insurance costs therefore in the cost charged under this order. Also, the "equipment" required to produce the supplies under this order is for the exclusive use of the City of Duluth and is subject to recall upon written notice.
11. **ASSIGNMENT.** Seller shall not assign this order or any rights under this order without the prior written consent of Buyer, and no purported assignment by Seller shall be binding on Buyer without such written consent.
12. **NOTICE OF LABOR DISPUTES.** Whenever an actual or potential labor dispute delays, or threatens to delay, the timely performance of this order, Seller shall immediately notify Buyer in writing of all relevant information with respect to such dispute.
13. **TERMINATION.** (a) Termination Without Cause. Buyer shall have the right, without cause, at any time to terminate all or any part of the undelivered portion of this order by written notice. If Seller has and desires to assert any claim on account of any such termination, Seller shall submit its termination claims to Buyer, in form and with evidence satisfactory to Buyer, promptly, but no later than 90 days after the effective date of the termination. If Seller fails to submit a termination claim within that time, Buyer shall have no liability to Seller on account of the termination. If Seller's termination claim is not acceptable to Buyer and cannot be settled by negotiation, the claim shall be submitted to arbitration. (b) Termination With Cause. If Seller fails to make any delivery in accordance with the agreed delivery date or schedule or terms or conditions applicable to this order, Buyer shall have the right (in addition to any other right or remedy at law or under this agreement) by written notice to terminate all or any part of the undelivered portion of this order without any liability to Seller on account thereof, in the articles elsewhere on such terms and in such manner as Buyer may deem appropriate and Seller shall be liable to Buyer for all excess costs occasioned Buyer thereby.
14. **PATENTS AND COPYRIGHTS.** Seller shall defend, at its own expense, any suit or claim that may be instituted against Buyer or any customer of Buyer for alleged infringement of patents or copyrights relating to the maintenance, sale, or use of the Goods, except for any such infringement resulting from Seller's compliance with detailed designs provided by Buyer, and Seller shall indemnify Buyer and its customers for all costs and damages arising out of such alleged infringement. Buyer shall have the right, at no additional charge, to use and/or reproduce the Seller's applicable literature, such as operating and maintenance manuals, technical publications, prints, drawings, training manuals, and other similar supporting documentation and sales literature. Seller shall advise Buyer of any updated information relative to the foregoing literature and documentation with timely notification in writing.
15. **PUBLIC LIABILITY INSURANCE.** Seller shall hold Buyer and its customer harmless from all injuries, damages and claims arising from performance of work or services covered by this order. Seller shall maintain such insurance as will protect the Seller, the Buyer and his customer from claims under Worker's Compensation Acts and from all other claims for damages, personal injury, or death to employees of the Seller, the Buyer or his Customer, or any other persons which may arise from performance of work or services covered by this order whether performed by the Seller or any Subcontractor or any one directly or indirectly employed by either of them. Certificates of such insurance shall be filed with the Buyer and shall be subject to Buyer's approval for adequacy of protection.
16. **DELAYS.** Time is of the essence. All actual or potential delays of whatever nature must be reported to the Buyer when and as they occur if the event can be expected to result in a delivery later than that shown on the face of this order. Seller agrees to indemnify Buyer for all losses, costs and damages resulting from Seller's delay or failure to deliver.
17. **GENERAL.** This order is formed under and shall be interpreted according to, and governed by, Minnesota law. No waiver by Buyer of any of its rights or remedies hereunder shall be construed as a waiver of any other rights or remedies.

## **SECTION 01 22 00**

### **UNIT PRICES**

#### **PART 1 – GENERAL**

##### 1.1 SUMMARY

- A. Related Requirements:
  - 1. Instructions to Bidders
  - 2. AIA A201 General Conditions
- B. Definition: Unit price is an amount incorporated in the agreement, applicable during the duration of the work, as a price per unit of measurement for materials, equipment, or services, or a portion of the work, added to or deducted from the contract sum by appropriate modification if the scope of work or estimated quantities of work required by the contract documents are increased or decreased.
- C. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

#### **PART 2 – PRODUCTS (not used)**

#### **PART 3 – EXECUTION**

##### 3.1 SCHEDULE

- A. Unit Price #1: Cost to increase/decrease removal of loose plaster per square foot. 4100 S.F. included in base bid.
- B. Unit Price #2: Cost to increase or decrease removal of low voltage wiring. 5000 L.F. included in base bid.
- C. Unit Price #3: Cost to increase or decrease demolition of conduit and removal. 5000 L.F. of ¾" conduits with five (5) conductors.

## SECTION 260923 – COMPLETE AND OPERATIONAL LIGHTING CONTROL SYSTEM

### PART 1 – GENERAL

#### 1.1 SUMMARY

- A. The intent of this set of specifications is to provide a complete, functional, intelligent, low-voltage lighting control system for the control of incandescent, LED.
- B. Where shown on the drawings, the contractor shall furnish and install a complete low-voltage lighting control system consisting of, but not limited to, relays, contactors, controllers, enclosures, switch station and miscellaneous components as required for a complete, operable lighting control system.
- C. Where applicable standards have been established, all items of equipment, individual components and installation methods shall meet the requirements of these standards, including, but not limited to, Underwriter Laboratories (UL), the National Electrical Code (NEC), Federal Communications Commission (FCC) and any local or state codes that may be applicable.
- D. The products specified herein are those of Intelligent Lighting Controls, Inc. Low-voltage lighting control systems manufactured by the following manufacturers or pre-approved equivalent shall be considered provided they meet the requirements of these specifications and provide the quality and performance specified herein.
  - 1. ILC — Intelligent Lighting Controls, Inc.
- E. Listing of a manufacturer as acceptable does not in any way relieve the contractor from the responsibility for providing a lighting control system that meets all the requirements of these specifications.
- F. All manufacturers shall submit to the specifying engineer a line-by-line compliance comparison between each specifications requirement and the system being proposed.
- G. Any ambiguities in the drawings or specifications shall be brought to the attention of the specifying engineer for clarification.

#### 1.2 QUALITY ASSURANCE

- A. Factory Assembly: All relays, contactors, controllers, enclosures, switch station and miscellaneous components shall be factory assembled and tested. All system components shall arrive at the job site completely pre-wired and ready for installation, requiring only the connection of lighting circuits and low-voltage control stations and/or network terminations. All connections shall be made to clearly and permanently labeled termination points. Systems that require field assembly shall not be acceptable.

- B. Component Testing: All system components and assemblies shall be individually tested prior to assembly. Once assembled, all finished products shall be tested for proper operation of all control functions per specifications prior to shipment.
- C. NEC Compliance: All system components shall comply with all applicable sections of the National Electrical Code (NEC) as required.
- D. NEMA Compliance: All system components shall comply with all applicable portions of NEMA standards pertaining to types of electrical equipment and enclosures.
- E. UL Approval: All applicable equipment shall be UL listed under section 916 / 508 and shall bear labels indicating compliance.
- F. FCC Emissions: All applicable equipment shall comply with FCC emissions standards specified in Part 15, for commercial applications and shall bear labels indicating compliance testing. Equipment that does not meet these standards shall not be acceptable.

### 1.3 SUBMITTALS

- A. Manufacturer shall provide 5 copies of submittal drawings and data for approval prior to beginning manufacture of equipment.
- B. Submittal package shall include, but not be limited to, the following. Submittals that do not contain all the information listed below will not be considered for approval.
  1. Specifications Compliance: Submit a line-by-line comparison that describes the differences between each specifications requirement and the equipment / systems being proposed. Comparison shall include a complete listing of how the proposed equipment / systems differ from that specified with regard to size, quantity, quality, method of control, features and functions, control software functions and installation requirements.
  2. System Description: Supply as part of the submittal package a brief description of the lighting control system's major features and functions.
  3. Bill of Materials: Provide as part of the submittal package a detailed itemized listing of all proposed equipment, including quantities and capacities for all major system components.
  4. Product Data Sheets: Provide as part of the submittal package detailed product data sheets for all major system components.
  5. Riser Drawing: Provide as part of the submittal package a system riser drawing of sufficient detail to indicate relative placement of major system components and the required connections between each.
  6. Shop Drawings: Submittal shall include shop drawings that accurately represent the system or systems specified herein. Shop drawings shall include the name of the project, quantity and physical dimensions of all major system components, wire sizes and counts for all required connections between system components.

## 1.4 WARRANTY

- A. **Manufacturer's Warranty:** Manufacturer shall provide a written warranty that shall cover all lighting control equipment. Manufacturer shall agree to repair or replace any equipment that fails due to material or workmanship for a period of 1 year.
- B. **Relay Warranty:** Manufacturer shall provide a separate written warranty that shall cover all lighting control relays within the lighting control system. Manufacturer shall agree to repair or replace any relay that fails due to material or workmanship for a period of 3 years.
- C. **Warranty Period:** The warranty period shall begin after the completion of the installation and the systems start-up and training, the point at which the system owner receives beneficial use of the control system or 1 year after shipment from the manufacturer, whichever occurs first.

## PART 2 - PRODUCTS

### 2.1 PROGRAMMABLE LIGHTING CONTROLLER(S)

- A. Where shown on the drawings, the contractor shall furnish and install a programmable lighting control system consisting of programmable lighting controllers, switches and other devices in the quantities, sizes and types shown on the drawings and specified herein.
- B. Programmable lighting controllers shall contain relays, contactors and other devices of the sizes and quantities indicated on the drawings and specified herein.
- C. **Hardware Features:**
  - 1. **Controller Back-Box:** Each programmable lighting controller shall be provided with a factory furnished; UL listed NEMA 1 enclosure designed for wall mounting. Back-box must be capable of being shipped ahead of controller chassis insert to allow for rough-in of all electrical connections prior to receipt of the controller chassis insert.
  - 2. **Controller Chassis Insert:** Each programmable lighting controller shall be provided with a factory or field installable controller chassis insert. Controller chassis insert shall contain all controller electronics, power supplies, relays, contactors and other required components. Controller chassis inserts shall arrive at the project site completely pre-wired and requiring only the connection of lighting circuits and control devices.
  - 3. **Line Voltage / Control Voltage Separation:** Each programmable lighting controller shall be provided with a mechanical barrier that separates all line voltage components and wiring from all control voltage components and wiring. An additional barrier may be installed within the line voltage section that shall provide isolation between normal and emergency circuits where required.
  - 4. **Controller Covers:** Each programmable lighting controller shall be provided with a dead front screw-held or hinged locking cover that is designed for either surface or flush mounting.

5. Controller Capacity/Configurations: Controllers shall be available in sizes to accommodate 4, 8, 16, 24, 32, 40, and 48 switch inputs and relay outputs. Controllers shall be available in either the standard configuration in which the electronics are to the left of the voltage barrier with the line voltage compartment on the right or with the electronics in the center and two line/low voltage dividers with the lighting relays on the right and left sides.

D. Electrical:

1. Controller Power Supply: Each programmable lighting controller shall be provided with two dual-rated, UL listed Class 2 transformers capable of either 120 VAC primary (50 to 60 Hz). It shall contain an internal self-resetting fuse.
2. Connections: All connections shall be made to clearly and permanently labeled termination points.

E. Controller Electronics:

1. Controller CPU: Each programmable controller shall be provided with a CPU (Central Processing Unit) that shall provide all the programming and control functions for the entire controller. CPU shall be protected against loss of memory during a power outage through nonvolatile RAM for a period of up to 10 years without power of any type. The power input shall be protected against surges and transients.
2. Real-Time Clock: Real-Time Clock shall be used to perform all time-controlled functions. Clock accuracy shall be displayed to the second. Real-Time Clock functions shall include time of day, day of week, date and automatic daylight savings and leap year adjustments. Time clock shall be protected against loss of time during a power outage for a period of up to 45 days without power of any type.
3. I/O Controller: I/O (input/output) cards shall be provided to expand the controller capability from 8 to 48 switch inputs and relay outputs in increments of 8. Electronics shall feature surge protection and opto-isolation.
4. Switch Input Characteristics: Each switch input shall be designed to be actuated by dry contact from 2 or 3 wire momentary or maintained switches or their logical equivalents (Photo-cell contacts, Building Automation System Outputs, Time clocks etc.)
5. Input LEDs: For each input there shall be three LEDs: ON input contact status (hardwired), OFF input contact status (hardwired) and Programmable Pilot Output. The LEDs reflect the true status of the relay controlled by the switch input. Normally these Pilot LEDs track with the status LED(s) of the affected relays. (If the switch turns on relay output 5 for example, relay 5 output LED will light.) However the user has the option of programming the LED to indicate the status of any relay, group or preset.

6. Relay Output Characteristics: Each Relay Output shall control either a latching lighting relay rated for 120 @ 20 full load amps, or a dry contact output that shall provide pulsed or maintained switching of the Class 2 circuits of other devices such as two pole relays, contactors etc. Each output is equipped with manual ON and OFF buttons that shall be used to control the output regardless of programming and with the CPU off if desired. In addition, each output has a status LED that indicates the current status of the output.
7. Communications: The controller shall be equipped with a serial (RS232) port and also may be provided a modem or TCP/IP for monitoring and programming purposes.

F. Optional LightSync Switching Devices:

1. Device Node Capacity: The lighting controller network shall support switch input control of up to 256 data line LightSync device nodes. The first 8 device nodes shall be powered by the lighting controller. The addition of a power supply or power supply/repeater is required for each additional 20 device nodes up to the maximum of 256. Each LightSync device shall have a unique address and shall be capable of being programmed to the applicable functions described in the Switched Input Types heading in this specification. Momentary push buttons are required to implement the momentary switch types and maintained switches are required to execute the maintained switch types.
2. Data Line Media: The data line shall consist of RS485 communications protocol transmitted over CAT-6 Cable. The controller and the data line devices shall each be equipped with two RJ45 female connectors to facilitate cable connection. Both daisy chain and "T" (3 direction branching) of cable runs shall be permitted. "T" branching shall be accomplished by the addition of power supply/repeaters. It shall be able to be wired in a home run configuration for LightSync devices by the addition of a LightSync Hub.
3. LightSync Switch Stations: LightSync data line switch stations shall be available in momentary push button (1-6 switches and pilots) and each switch shall have a pilot light. The LightSync switch pilot lights shall be programmable to track the status of relays (default pilot 1 to relay 1), relay groups and presets. The pilot lights may also be programmed to be always OFF or always ON. The 1-6 push button stations shall be designed for single gang mounting.
4. LightSync Photocell Controllers: The photo controller shall be provided with 256 light to dark levels (0- 1800fc). It shall allow selection of 8 individual set points for OFF and ON and includes a selectable range of dead-band. It shall have a settable filter. It shall be programmable to any relay(s) on the network.
5. LightSync Dry Contact Switch Module: The LSIB-4 module shall provide 4 inputs that accepts momentary, momentary PB and maintained switch closures. Each input shall control any or all of the relays in the lighting controllers on the network. It shall provide four pilot outputs that provide true status of relays, groups and presets.

6. LightSync BAS Interface Switch Module: The LSD6 module shall provide 6 optically isolated inputs/outputs that accept maintained switch closures from the BAS via a 12-24 VDC signal. Each input shall control any or all of the relays in the lighting controllers on the network. It shall provide six 100mA open collector outputs that provide true status of relays, groups and presets.
  7. LightSync Disable Key Switch: The disable switch shall provide a RJ45 connector that shall disable all LightSync devices down line with the closure of a key switch. It shall also provide two RJ45 connectors to pass data through. It shall indicate with an LED when the disable switch is active.
  8. SwitchVue Graphical Touch Control LCD Switch Station: The Touch switch station shall display the status and control the lighting control panel relay outputs via preprogrammed control objects on standard or custom bitmap screens. It shall be a flush mounted stainless steel LCD touch station. The touch activated screen resolution shall be 240 x 128 pixels. The screen shall be backlit for better visibility. Data connection shall be two RJ45 connectors. It shall be powered by a 24 VA transformer with a 120/277 VAC primary. The control station shall support control of any or all of the relays in any of the lighting control panels making up the lighting control system. It shall also support display of the ON/OFF status of the relays, groups or presets. The station shall support up to 126 custom screens. Screens shall be a Windows bitmap format. Each screen shall, at the user's option, be password protected. Each screen shall support up to 32 control objects. There shall be 16 control object icons. The touch station shall be programmed using software and downloaded from a lap top or PC via RS232 communications linked to the lighting controller master node.
- G. Optional Special Purpose Modules: The following special purpose controller nodes shall be available.
1. DTMF Telephone Control: An optional telephone module shall support Input Status, Relay Status and Control, Preset Control and Group Control in the lighting panel via voice prompted commands and DTMF signals from a touch-tone telephone.
  2. DMX Control: An optional DMX module shall support the control of relays using standard USITT DMX512 protocol used by theatrical lighting systems. Each relay in the lighting panel may be configured to be controlled by any DMX channel. A DMX filter may be set from 1 – 16 frames.
  3. MODBUS Control: An optional module shall communicate directly to the lighting controller through serial communications from the BAS systems using Modicon MODBUS RTU or ASCII protocol. It shall be able to read status of inputs and relays and control single or multiple relays in the lighting controller. It shall also be able to disable/enable hardwired inputs and shall be able to force timer options.

4. N2 Control: An optional module shall communicate directly to the lighting controller through serial communications from the BAS systems using Metasys-N2 protocol. It shall be able to read status of inputs and relays and control single or multiple relays in the lighting controller. It shall also be able to disable/enable hardwired inputs and shall be able to force timer options.
  5. BACnet Control: An optional module shall communicate directly to the lighting controller through serial communications from the BAS systems using BACnet MSTP or BACnet IP protocol. It shall be able to read status of inputs and relays and control single or multiple relays in the lighting controller. It shall also be able to disable/enable hardwired inputs and shall be able to force timer options.
  6. LonWorks Control: An optional module shall communicate directly to the lighting controller through serial communications from the LonWorks network. It shall be able to read status of inputs and relays and control single or multiple relays in the lighting controller. It shall also be able to disable/enable hardwired inputs and shall be able to force timer options.
- H. Programming: Programmable controllers shall be capable of being programmed, monitored or controlled through any of the below methods. All programming changes shall take effect immediately as they are programmed and shall not suspend or disable switches or other system functions. The same functions shall be available for any of the connection types.
1. Local Key Pad and Display: The system user shall be able to program, monitor and control any of the controller features and functions through the use of simple menu-driven self-prompting user interface consisting of a 4-line 20-character backlit LCD display and 6 selection keys that change function based on the current operating mode.
  2. Handheld Key Pad: For clarity and ease of use, programmer shall function identically to the Local Key Pad and Display, but shall be designed to be handheld.
  3. Serial Direct Connect: The system user shall be able to program, monitor or control any of the controller features and functions utilizing LightMaster Pro Windows-based graphical user interface software or the ILC NET open protocol (ASCII) using RS232 serial communications.
  4. Modem: The system user shall be able to remotely program, monitor or control any of the controller features and functions utilizing LightMaster Pro Windows-based graphical user interface software or the ILC NET open protocol (ASCII) using a dial-up modem.
  5. TCP/IP: The system user shall be able to remotely program, monitor or control any of the controller features and functions utilizing LightMaster Pro Windows-based graphical user interface software or the ILC NET open protocol (ASCII) using TCP/IP on a LAN or WAN.

- I. Diagnostic Aids: Each programmable lighting controller shall be provided with an LED that shall indicate that the main power supply is present and operational. Each relay output shall have an LED pilot to indicate the current status of all controlled relay outputs. In addition, the system user shall be able to monitor and control any programmable lighting controller directly and in real time through any of the programming methods listed above. System users shall be able to view the current status of any or all relay outputs, force any relay output ON or OFF, and view the current status of any or all switch inputs.
- J. Data Protection and Storage: All programmed data shall be stored in nonvolatile RAM that shall protect all stored programming data from loss during a power outage for a minimum period of 10 years without power of any type.
- K. Power Failure and Power-Up Options: Each programmable lighting controller shall be provided with circuitry that shall automatically shut down the controller whenever the incoming power fails to be delivered to the controller within required limits. When power is returned to the controller, one of the following power-up modes will be implemented (user selectable) for each controlled relay output in the system.
1. No Action: Upon restoration of incoming control power, the controller electronics shall be restarted and resume normal operations and all circuits will be maintained in the condition they were last in.
  2. Forced ON: Controller will force the selected relay output to the ON state after power-up. Time-scheduled events that were to take place during the power outage will be ignored; however, all future scheduled events will be activated.
  3. Forced ON with Input 1 Closed: Controller will force the selected relay output to the ON state after power-up if input 1 is closed. Time-scheduled events that were to take place during the power outage will be ignored; however, all future scheduled events will be activated.
  4. Forced OFF: Controller will force the selected relay output to the OFF state after power-up. Time-scheduled events that were to take place during the power outage will be ignored; however, all future scheduled events will be activated.
  5. Forced OFF with Input 1 Closed: Controller will force the selected relay output to the OFF state after power-up if input 1 is closed. Time-scheduled events that were to take place during the power outage will be ignored; however, all future scheduled events will be activated.
- L. Manual Push Buttons: Each relay output shall be supplied with an ON and OFF manual push-button with LED pilot that shall allow the system user to view the current status and/or manually turn any relay output to the ON or OFF state.
- M. True Relay Status Feedback: Each controller shall be provided with circuitry that shall monitor the actual current status of each relay via a set of pilot contacts mechanically linked to the relay main contacts.
- N. Staggered or Instant Relay ON/OFF Activation: Programmable lighting controller shall be support user selectable instantaneous or staggered relay activation. (17 or 50 ms duration)

- O. Input Flexibility: Each switch input shall accept the logical equivalent of a dry contact 2 or 3 wire maintained or momentary switch.
- P. Input to Output Programmability: Any switch input may be programmed to control any or all of the controllers relay outputs without limitations in the network.
- Q. Relay Groups: The controller also shall support the grouping of individual relay outputs into 48 relay groups and be controlled network wide. These groups may be controlled by switch or time based signals.
- R. Switch Input Types: Each of the programmable lighting controller switch inputs shall be programmable for one of the below listed switch types.
1. Momentary ON/OFF: When momentary contact is made between the ON and COM, relay outputs controlled by this input are turned ON. When momentary contact is made between OFF and COM, relay outputs controlled by this input are turned OFF.
  2. Momentary Push-Button: When momentary contact is made between the ON and COM, relay outputs controlled by this input are turned ON and OFF alternately, based on current state, each time contact is made.
  3. Maintained ON/OFF: When contact is made between the ON and COM, relay outputs controlled by this input are turned ON. When contact is broken between ON and COM, relay outputs controlled by this input are turned OFF.
  4. Maintained Multi-Way: When contact is either made or broken between the ON and COM, relay outputs controlled by this input will be toggled between ON and OFF conditions. This function shall be similar to that of standard 3 and 4 way switches.
  5. Set Preset: When momentary contact is made between the ON and COM, the selected preset scene will be activated. Controller shall provide 48 user definable presets that can be activated by switch input or timer.
  6. Two-Step Alternating Sequence: The first time the switch is activated, relay outputs programmed as "Group A" are turned ON and relay outputs programmed as "Group B" are turned OFF. The second time the switch is activated, "Group A" relay outputs are turned OFF and "Group B" relay outputs are turned ON. The third time the switch is activated, the pattern begins again at step one.
  7. Four-Step Alternating Sequence: The first time the switch is activated, relay outputs programmed as "Group A" are turned ON and relay outputs programmed as "Group B" are turned OFF. The second time the switch is activated, "Group A" relay outputs are turned OFF and "Group B" relay outputs are turned ON. The third time the switch is activated; both "Group A" and "Group B" relay outputs are turned ON. The fourth time the switch is activated; both "Group A" and "Group B" relays are turned OFF. The fifth time the switch is activated, the process begins again at step one.

8. Timed ON: The timed ON input shall operate either from the input closure or open. If programmed to operate from the closure, the relays turn ON when the input closes and turn OFF after the timed duration. The relays do nothing when the input opens. If programmed to operate from the open, the relays turn ON when the input closes and remain ON. When the input opens, the relays turn OFF after the timed ON duration.
  9. Input Disable: When maintained contact is made between the ON and COM, inputs programmed for disable from this switch input will be ignored.
  10. Timer Disable: When maintained contact is made between the ON and COM, timers programmed for disable from this switch input will be ignored.
  11. Network Disable: When maintained contact is made between the ON and COM, network commands sent to the controller via the control network are ignored.
  12. Output Override: When maintained contact is made between the ON and COM, relay outputs controlled by this input are either turned ON, OFF or HELD in their current state until the input is released. All inputs, timers and network commands are ignored for controlled relay outputs.
  13. Force Timer: When momentary contact is made between ON and COM, the selected timer shall be activated.
- S. Photo / Motion Sensor Inputs: Programmable lighting controllers shall be designed to accept dry contact control inputs from photo or motion sensors and program them to perform any of the available switch input functions.
- T. Fire Alarm System Inputs: Programmable lighting controllers shall be designed to accept dry contact control inputs from fire alarm control systems and program them to perform any of the available switch input functions.
- U. Switch Input Active Times: The system shall support the ability to enable/disable switch inputs according to a user-defined set of times.
- V. Timer Functions: Each of the programmable lighting controllers shall have the described timer options listed below for the relay outputs.
1. Blink Alert: Each relay output within the programmable lighting controller can be individually programmable to blink prior to being turned OFF. The blink alert function shall blink each relay twice prior to turning OFF with a timer OFF sweep to warn occupants of the upcoming OFF event. If an ON command is received during the blink alert time, relay output will be overridden and left ON for the override time. Override times shall be adjustable from 5 to 999 minutes in 1-minute increments.

2. **Astronomical Clock:** Each controller shall contain an astronomical time clock that shall calculate sunrise and sunset times based on the geographical positioning information provided during the programming of the system. Sunrise and sunset times may be used as activation times for any system timer. In addition to sunrise and sunset time activation, the control shall be capable of programming activation time for the system timer for before and after these times based on an offset of 1-999 minutes either before or after the calculated sunrise or sunset event.
3. **Open/Closed Time Control:** The user shall also have the option of controlling relay outputs in relation to the OPEN/CLOSED times of the facility. The open/closed times may vary for different days of the week and may be programmed for each day of the year.
4. **Time-of-Day Scheduling:** Each programmable lighting controller shall be provided with a minimum of 48 available timers (scheduled events) for use in developing time-of-day automated schedules. Each timer shall have the ability to turn any or all relay outputs ON, OFF at any standard time in 1-minute increments or at times calculated by the astronomical clock for sunrise and sunset with offset. Timers shall be day-of-week selectable timers and may be programmed to activate on any combination of days of the week (Sunday through Saturday), on all days, or to activate on a specific date only ("Holiday Schedule"). Each non-holiday timer shall be capable of being programmed to either halt operation on holidays or to ignore holidays and continue normal operations on holidays.
5. **OFF Hour Sweeps:** The system shall also support after hours OFF sweeps of selected relay outputs at user defined one, two, or three hour intervals.
6. **Alarm ON:** Relays shall be capable of performing a momentary ON function. The ON function shall be programmable from 1 to 99 seconds.
7. **Alarm OFF:** Relays shall be capable of performing a momentary OFF function. The ON function shall be programmable from 1 to 99 seconds.
8. **Alarm Pulsed ON:** Relays shall be capable of being cycled ON and OFF at 1 second intervals and returning to the OFF state. It shall be programmable from 1 to 90 seconds.
9. **Alarm Pulsed OFF:** Relays shall be capable of being cycled OFF and ON at 1 second intervals and returning to the ON state. It shall be programmable from 1 to 90 seconds.
- W. **Pre-Sets:** The lighting controller shall support up to 48 user-defined presets (ON/OFF relay patterns). The presets may be invoked by switch or timer actuation.
- X. **Descriptive Names:** The system shall support the optional assignment of descriptive names (up to 10 characters) to the lighting controller, relay outputs, relay groups, inputs, timers, and presets.
- Y. **Password Protection:** Each Programmable controller shall have a user definable 6-number password, which will lock out the keypad programming functions.

Z. Networking:

1. Network Capacities: In addition to the data line devices mentioned in Section F, LightMaster Controllers shall be linked together on the data line to form a Local Area Network (LAN) of up to 128 controller nodes.
2. Network Features: The LightMaster controller addressed as Node 1 shall be the LAN Master and process all communications, command and data with the other controllers. The LAN supports global switching, time based control, and data sharing. Should the Master controller become inactive, the other controllers shall continue to execute their locally programmed parameters.
3. Network Configurations: The Standard Network shall consist of up to 32 lighting controller nodes (a single Master controller and up to 31 Slave controllers). Programming of the LAN shall be done from the master controller screen/keypad or with software. The Extended Network shall support up to the maximum of 128 controller nodes. It shall consist of a Network Manager (which does not count as one of the controller nodes) and Slave controllers. Programming of the Extended Network shall be through the Network Manager and software using a personal computer.
4. Network Options: The following special purpose controller nodes shall be available. Each special purpose node shall be counted as one of the 128 permissible controller nodes and provides network wide control for its specialized function:
  - a. DTMF Telephone Control: An optional telephone Gateway shall support the control of relays, Presets and Groups on the network via voice prompted commands and DTMF signals from a touch-tone telephone. This Gateway is capable of supporting up to 4 lines.
  - b. DMX Control: An optional DMX Gateway shall support the control of relays on the network from a single point connection using standard USITT DMX512 protocol used by theatrical lighting systems.
  - c. MODBUS: An optional Modbus Gateway shall support communications from the BAS systems using Modicon Modbus protocol from a single point connection. All network input status and relay status and control are supported.
  - d. N2: An optional N2 Gateway supports communications from the BAS systems using Metasys-N2 protocol from a single point connection. Node 01 input status and network wide group status and control are supported.
5. BAS System/ LightMaster Operation: Programmable lighting controllers integrated/interfaced to other building control and alarm systems must remain completely functional and continue to process all programmed commands, including time schedules and local switching.

6. Optional Programming Mechanisms: Both the Standard and Extended network configurations support programming from a properly equipped personal computer loaded with LightMaster Pro software. In addition to the software a RS232/RS485 interface and conversion cards are required if the distance between the P.C. and Master node 01 is more than 50 feet.

## 2.2 LIGHTING CONTROL RELAYS

- A. Electrical contractor shall provide quantities of Class 2 lighting control relays as indicated on the drawings and schedules as specified herein.
- B. Class 2 lighting control relays shall be individually UL and CUL listed and shall bear labels indicating compliance.
- C. Class 2 lighting control relays shall be designed and tested to have a minimum cycle life of 200,000 ON/OFF cycles @ FULL LOAD and 1,000,000 ON/OFF cycles at no load.
- D. Class 2 lighting control relays shall be designed for control of 120 VAC lighting control circuits at a full 20 AMPS and motor loads of 1 Hp @ 120 VAC.
- E. Class 2 lighting control relays shall be designed with a magnetic latching mechanism that shall hold the relay in its last activated state indefinitely, with no change of state during an interruption of power. Solid state or electrically held relays are not acceptable.
- F. Each Class 2 lighting control relay shall contain an auxiliary set of contacts (rated at 1 AMP 30 VAC) electrically isolated but mechanically linked to the main contacts for the purpose of true status monitoring and pilot light activation.
- G. Relays shall be capable of panel or remote mounting up to 2,500 feet from the controlling device.

## 2.3 20 AMP 2 POLE CONTACTORS

- A. Electrical contractor shall provide quantities of 20 AMP 2 pole contactors as indicated on the drawings and schedules as specified herein.
- B. 20 AMP 2 pole contactors shall be individually UL and CUL listed and shall bear labels indicating compliance.
- C. 20 AMP 2 pole contactors shall be designed for the control of 208, 240 and 480 VAC loads at a full 20 Amps.

- D. Poles within the contactor shall be electrically isolated but mechanically linked so as to open and close together without the possibility of one pole being closed while the other remains open. Systems that utilize two single-pole relays to accomplish this function are not acceptable.

## 2.4 SWITCH PLATES & CONTROL STATIONS

- A. Standard Switch Plates (NFP): Electrical contractor shall provide and install switch plates and switches of the quantities and types shown on the drawings and specified herein.
  - 1. Switch plates shall consist of a control panel faceplate, switches, LED pilot lights and all mounting hardware.
  - 2. Switch plates shall be manufactured from a single piece of stainless steel or aluminum, finished and labeled as per the plans and specifications or as indicated on approved drawings.
  - 3. Switch plates shall be designed to mount to standard electrical gang boxes supplied by the electrical contractor for either flush or surface mounting.
  - 4. Switch plate labeling and switch identification shall be accomplished through the use of engraved phenolic labels, permanently attached to the switch plate or engraved into the control panel faceplate material. Silk-screened or painted labeling shall not be acceptable.
  - 5. Switch plates shall be supplied with the appropriate number of center OFF momentary rocker switches as indicated on the drawings.
  - 6. Switch shall consist of a single-pole double-throw center OFF momentary switch rated at 6 Amps @ 125 VAC with or without pilot as required.
- B. Key-Switch Switch Stations: Electrical contractor shall provide and install key-switch switch stations of the quantities and types shown on the drawings and specified herein.
  - 1. Key-switch switch plates shall consist of a control panel faceplate, key switches, LED pilot lights and all mounting hardware.
  - 2. Key-switch switch stations shall be manufactured from a single piece of stainless steel or aluminum, finished and labeled as per the plans and specifications or as indicated on approved drawings.
  - 3. Key-switch switch stations shall be designed to mount to standard electrical gang boxes supplied by the electrical contractor for either flush or surface mounting.

4. Key-switch switch station labeling and switch identification shall be accomplished through the use of engraved phenolic labels, permanently attached to the switch plate or engraved into the control panel faceplate material. Silk-screened or painted labeling shall not be acceptable.
5. Key-switch switch stations shall be available in standard configurations of 1 to 8 gangs with 1 key switch per gang.
6. Key switches shall consist of a single-pole double-throw center OFF momentary key switch rated at 6 Amps @ 125 VAC with or without pilot as required.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Where shown on the drawings, the contractor shall furnish and install programmable lighting controllers of the quantities, sizes and types shown on the drawings or specified herein.
- B. All equipment shall be installed in accordance with manufacturer requirements and in compliance with all applicable local and national codes and requirements.
- C. Load circuit wiring shall be sized so that voltage drop shall not exceed 5% at socket of fixture farthest from the power source on any branch circuit.

#### 3.2 MANUFACTURER'S SERVICES

- A. Factory Programming: All controllers shall be factory programmed in accordance with the project specifications prior to shipment. All required firmware and software shall be installed prior to final testing and shipment.
- B. Installation Assistance: During the installation process, the manufacturer shall provide, at no cost, technical support via a toll-free telephone line to the installing contractor or owner's representative to answer questions and supply additional information when required.

- C. System Start-Up (Optional): The system manufacturer shall provide a factory authorized field technician to the project site after installation has been completed and prior to system energization for the purpose of testing and adjustment of the system. Factory field technician shall test and verify all system functions and ensure proper operation of the system components in accordance with the specifications and on-site conditions. The installing contractor shall notify the system manufacturer in writing that the system is completely wired and ready to be energized and tested 2 weeks prior to scheduling a field technician for start-up of the system. Should the field technician arrive on the job site and find the installation incomplete, the installing contractor shall pay the cost of any future visits by the field technician required to complete the system start-up.
- D. On-Site Programming: During the start-up procedure, the factory field technician shall provide programming assistance and guidance to the building operating personnel in order to program the systems for initial operation.
- E. Instruction: During the start-up procedure, the factory field technician shall provide training to the building operating personnel in the operation, programming and maintenance of the lighting control system.
- F. As-Built Drawings: After completion of the system installation and testing, the manufacturer shall provide 3 sets of “as-built” drawings.
- G. Operation and Maintenance Manuals: After completion of the system installation and testing, the manufacturer shall provide 3 sets of Operations and Maintenance Manuals.
- H. Lifetime Toll-Free Telephone Support: The system manufacturer shall provide a toll-free telephone number to the system user and shall allow access to free telephone support for the life of the system.

3/30/14

# CITY HALL RENOVATION PRE BID MTG.

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