2.4 LIGHTING MANAGEMENT HUBS

a. Products:
1. Lutron Athena Light Management Hub (QP5).
a. 2–link hub; Lutron Model QP5–2L–POE; one Athena Edge processor and two QS links.
b. Supports connection to QS wired devices via QS links; supports connection to Athena Edge processors and Athena Clear Connect Gateway – Type X wireless gateways via system Ethernet link.
c. Supports communication with Clear Connect – Type X wireless devices, including Ketra intelligent light sources, via Athena Clear Connect Gateway – Type X wireless gateways.
d. Supports internet connection for automated firmware updates and remote access, diagnostics, and service.
e. Provided in pre–assembled NEMA listed enclosure with terminal blocks listed for field wiring.
f. Connects to controls via RS485.
g. Integrates control station devices, shades, and external inputs into 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.
h. Furnished with astronomical time clock.
i. Maintains backup of programming in non–volatile memory capable of lasting more than ten years without power.

2.5 LIGHTING MANAGEMENT SYSTEM SOFTWARE

a. Mobile Application:
1. Product: Lutron App.
2. General Requirements:
a. Constant internet connection to Lutron Athena processors and gateways.
b. Support multiple platforms and devices; runs from tablet or mobile phone.
c. Provide functionality listed below available via single application.
3. System Navigation and Operation:
a. Support on–site and remote programming and control of multiple systems from iOS or Android mobile device.
b. Does not require LAN connection to operate. Operates locally or remotely with internet connection to device (e.g., laptop).
c. Navigate between Lutron Athena lighting control systems for control.
4. Administration:
a. Users: Allows new user accounts to be created and existing user accounts to be edited.
b. Share access to Lutron Athena lighting control system for one day, one week, or permanently.
5. Control of Lights:
a. Modify lighting zone levels and activate scenes, reflected in space in real time.
b. Make and save adjustments to scenes.
c. Rename scenes and zones.
d. Ketra Intelligent Light Sources:
1) Control intensity, correlated color temperature, saturated color, and vibrancy, reflected in space in real time.
2) Save intensity, correlated color temperature, saturated color, and vibrancy to scenes reflected in space in real time.
e. DALI Type 8 Tunable–White Drivers:
1) Control intensity and correlated color temperature reflected in space in real time.
2) Save intensity and correlated color temperature to scenes reflected in space in real time.
f. Static–White Drivers:
1) Control intensity reflected in space in real time.
2) Save intensity to scenes reflected in space in real time.
6. Load Shedding:
a. Allow building manager to monitor whole building lighting power usage and apply load shed reduction to selected areas, thereby reducing building's power usage; load shedding triggered via Lutron Athena mobile application, BACnet or, RESTful API integration.
7. Scheduling: Schedule time of day and astronomic time clock events to automate functions.
a. Group scheduled events into timeclock groups.
b. Enable and disable entire timeclock groups from single place.
c. Create one–time or recurring scheduled events by day of week, week of month, specific date range.
d. Exclude scheduled events by holidays or other specific date exclusions.
e. Enable or disable individual scheduled events.

2.6 CONTROL STATIONS

a. Provide control stations with configuration as indicated or as required to control loads as indicated.
b. Touchscreen Control Stations:
1. Product: Lutron Athena Touchscreen; Model Q–TOUCH5.
2. Touchscreen Interface: 5–inch (127 mm) capacitive touch display; 800 x 400 resolution; touch gesture navigation support; dark and light user interface mode options.
3. Connects to lighting management hubs via system Ethernet link; powered by Athena QP5 hub or Q–POE–PNL Ethernet range extender; up to 5 touchscreens per processor; maximum of 328 ft (100 m) between touchscreen and lighting management hub with PoE switch or Ethernet range extender.
4. Control:
a. Lighting Control: Area, scene, and zone–level control, including intensity, color temperature, and full color with fine–tune adjustment.
b. Supports access control via admin and user PINs.
5. Programming: On–screen setup through user–guided interface; requires no additional software.
c. Wired Control Stations:
a. Wired Keypads; Lutron seeTouch QS Keypads:
1) Communications: Utilize RS485 wiring for low–voltage communications link.
2) Mounting: Wall box or low voltage mounting bracket; provide wall plates with concealed mounting hardware.
3) 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.
4) Design keypads to allow field–customization of button color, configuration, and engraving using field–changeable replacement kits.
5) 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.
6) Terminal block inputs to be over–voltage and miswire–protected against wire reversals and shorts.

2.7 LOW–VOLTAGE CONTROL INTERFACES

a. Provide low–voltage control interfaces as indicated or as required to control loads as indicated.
b. UL listed.
c. Contact Closure Interface:
1. Product: Lutron Model QSE–IO.
2. Connects to lighting management hub via RS485.
3. The contact closure input device to accept both momentary and maintained contact closures.
4. The contact closure output device can be configured for maintained or pulsed outputs.
5. Contact closure can be programmed using conditional logic off of state variable such as time of day or partition status.
d. RS232 and Ethernet Interface:
1. Product: Lutron Model QSE–CI–NWK–E.
2. Connects to lighting management hub via RS485.
3. Provide ability to communicate via Ethernet or RS232 to audiovisual equipment, touchscreens, etc.
4. Provide control of:
a. Light scene selections.
b. Fine–tuning of light scene levels with raise/lower.
c. Shade group presets.
d. Fine–tuning of shade preset levels with raise/lower.
e. Simulate system wall station button presses and releases.
5. Provide status monitoring of:
a. Light scene status.
b. Wall station button presses and releases.
c. Wall station LEDs.
6. Provide ability to send custom output strings.
e. Sensor Modules:
1. Products:
a. Sensor module with both wired and wireless inputs; Lutron Model QSM2–4W–C.
2. Connects to lighting management hub via RS485.
3. Wired Modules:
a. Provide wired inputs for:
1) Occupancy sensors.
2) Daylight sensors.
3) Wired wall stations.
4. Wireless Modules:
a. Provide wireless communication inputs for:
1) Occupancy sensors.
2) Daylight sensors.
3) Manual controls.
b. RF Range: 30 feet (9 m) between sensor module and compatible RF transmitting devices.
c. RF Frequency: 434 MHz; operates in FCC governed frequency spectrum for periodic operation; continuous transmission spectrum is not permitted.
5. Communicate sensor information to wired low–voltage digital link for use by

2.8 WIRED SENSORS

a. Wired Occupancy Sensors:
1. General Requirements:
a. Connects directly to compatible ballasts and modules without need of power pack or another interface.
b. Turns off or reduces lighting automatically after reasonable time delay when room or area is vacated by last person to occupy space.
c. Accommodates conditions of space utilization and 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 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 nonvolatile memory and not lost should power be interrupted and subsequently restored.
h. Furnished with 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 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. Products, Without Isolated Relay and Integral Photocell:
1) Ceiling–Mounted Dual Technology Sensor, 2000 square feet (186 sq m); Lutron Model LOS–CDT–2000–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; self–adaptive.
2) Wall–Mounted Dual Technology Sensor; Lutron Model LOS–WDT–WH Coverage of 1600 square feet (149 sq m) with ceiling height of 8 to 12 feet (2.4 to 3.7 m); 110–degree field of view; self–adaptive.
b. Power Packs for Wired Sensors:
1. Products:
1) 120–277 VAC power input/24 VDC, 150 mA power output; 16 A lighting (120–177 V), 1 HP motor (120–277 V) relay contact rating; Lutron Model PP–DV Power Pack
2. Provide sensor power packs where required for power connection to sensors.
3. For ease of mounting, installation and future service, power pack(s) to be able to mount through 1/2 inch (16 mm) trade size knockout in standard electrical enclosure and be integrated, self–contained unit consisting internally of isolated load switching control relay and transformer to provide low–voltage power. Transformer to provide power to minimum of three sensors.
4. Plenum–rated.
5. Control Wiring Between Sensors and Control Units: Class 2, 18–24 AWG, stranded UL Classified, PVC insulated or TEFLON jacketed cable suitable for use in plenums, where applicable.
c. Infrared Partition Sensors:
1. Product: Lutron Model GRX–IRPS–WH.
2. Provide contact closure based on status of partition wall (open/close) enabling automatic linking of controls.

2.9 ACCESSORIES

a. Provide power supplies as indicated or as required to power system devices and accessories.
1. Products:
a. Power supply for keypads and accessories (not for shades/window treatments), and for providing additional low voltage power to communication link; Lutron Model QSPS–DH–1–75.

PART 3

3.1 EXAMINATION

a. Verify that field measurements are as shown on drawings.
b. Verify that ratings and configurations of system components are consistent with indicated requirements.
c. Verify that mounting surfaces are ready to receive system components.
d. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

a. Perform work in accordance with NECA 1 and, where applicable, NECA 130.
b. Install products in accordance with manufacturer's instructions.
c. Define each dimmer/relay load type, assign each load to zone, and set control functions.
d. Sensor Locations:
1. Sensor locations indicated are diagrammatic. Within design intent, reasonably minor adjustments to locations may be made to optimize coverage and avoid conflicts or problems affecting coverage, in accordance with manufacturer's recommendations.
e. LED Light Engine/Array Lead Length: Do not exceed 100 feet.
f. Identify system components.

3.3 FIELD QUALITY CONTROL

a. Manufacturer's Startup Services; Lutron Standard Startup Services:
1. Manufacturer's authorized Service Representative to conduct minimum of two site visits to ensure proper system installation and operation.
2. Conduct Pre–Installation visit to review requirements with installer as specified in Part 1 under "Administrative Requirements".
3. Conduct second site visit upon completion of lighting control system to perform system startup and verify proper operation:
a. Verify connection of power wiring and load circuits.
b. Verify connection and location of controls.
c. Energize lighting management hubs and download system data program.
d. Address devices.
e. Verify proper connection of panel links (low voltage/data) and address panel.
f. Verify system operation control by control.
g. Verify proper operation of manufacturer's interfacing equipment.
h. Configure initial groupings of ballasts/drivers for wall controls, daylight sensors and occupancy sensors.
i. Provide initial rough calibration of sensors; fine–tuning of sensors is responsibility of Contractor.
j. Train Owner's representative on system capabilities, operation, and maintenance, as specified in Part 3 under "Closeout Activities".
k. Obtain sign–off on system functions.

3.4 CLEANING

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

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JOB NUMBER	22–168
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CHECKED BY	MPA
DATE	03.06.23

REVISION DATES

JOB TITLE
CLEVELAND COUNTY
LEGRAND CENTER LIGHTING

SHEET TITLE
ELECTRICAL
SPECIFICATIONS

SHEET
E402