



Design prepared for:
 Madison Library

Hawthorne Library
 Lighting Upgrade

Location:
 2707 E Washington Ave.
 Madison, WI 53704

Contract: 1234
 Project: 12345
 Common Council Approval:

Lighting Design:
 Kay Schindel, P.E.

Civil Design:
 NA

Landscaping Design:
 NA

Electrical Design:
 NA

Plumbing Design:
 NA

HVAC Design:
 NA

Structural Design:
 NA

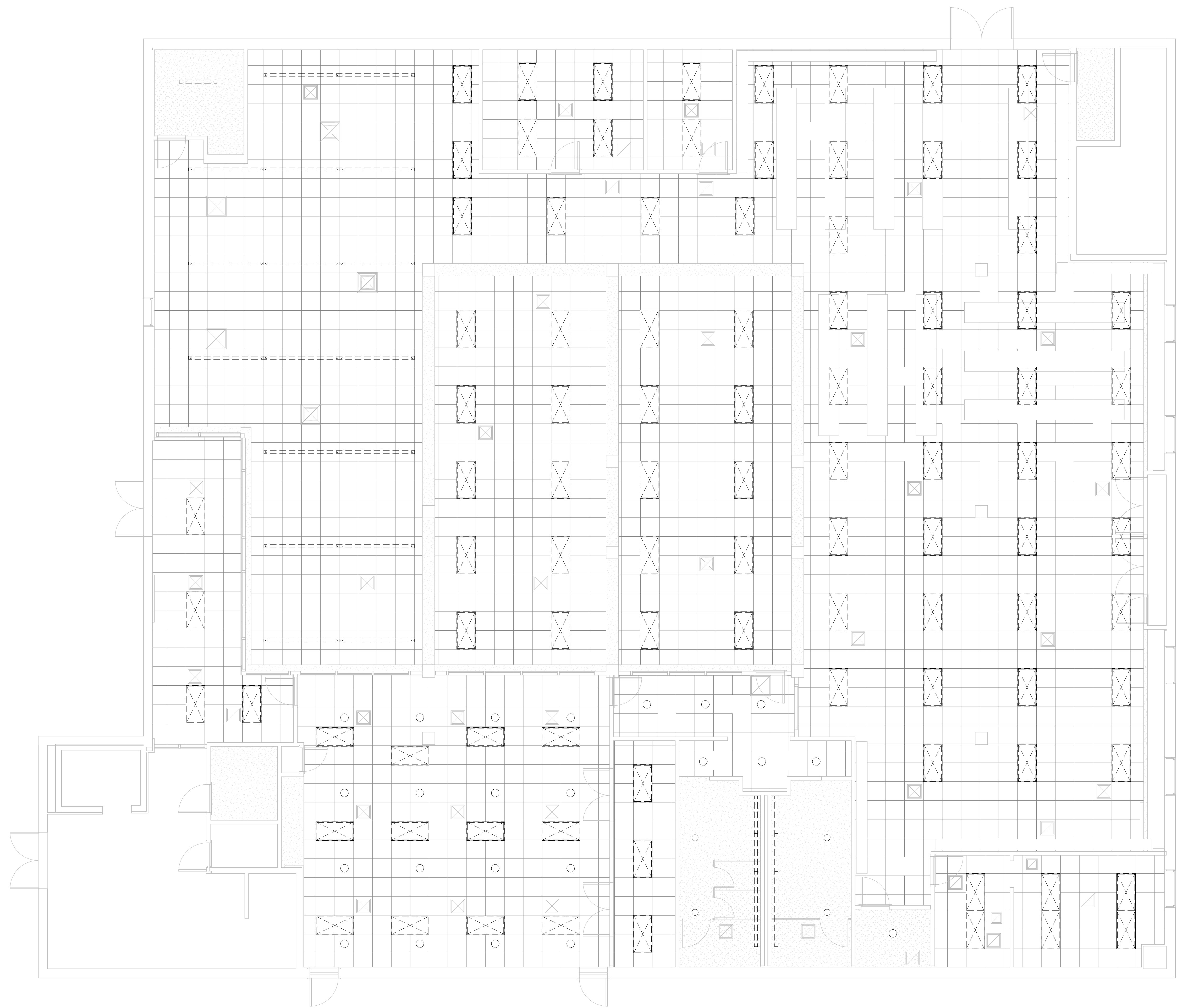
Fire Protection Design:
 NA

Architectural Design:
 NA

Revisions

No.	Description	rev. by

Keynote Legend	
Key Value	Keynote Text





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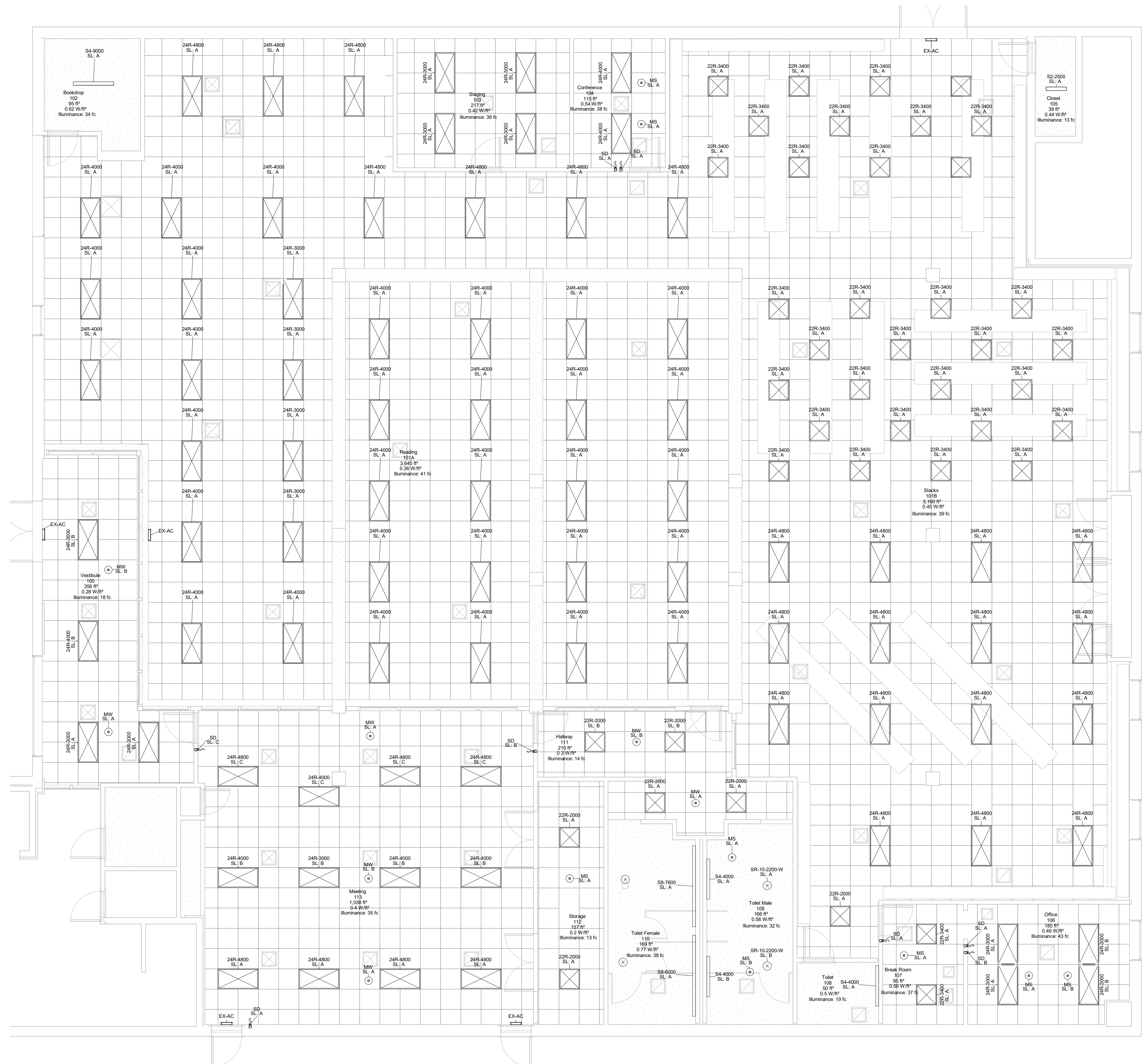
Architectural Design:
 NA

Revisions

No.	Description	rev. by

Lighting

EL 210
 Print Date:
 10/8/2020 14:57:24 PM



① EL - Ceiling Level 1
 3/16" = 1'-0"

Key Value	Keynote Text



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Architectural Design:
NA

Revisions

Table with columns: No., Description, rev. by

Details and Schedules

EL 300

Print Date:
10/8/2020 14:57:24 PM

Emergency Power Battery Inverters

Table with columns: Type Mark, Description, Est. Count, Manufacturer Model, URL, Output Rating @ 90 Minutes, In/Out Voltage, Weight, Specifications

Lighting Device Schedule

Table with columns: Type Mark, Description, Est. Count, Model, URL, Specification

Lighting Fixture Schedule

Table with columns: Type Mark, Description, Est. Count, Model, URL, Apparent Load, Luminous Flux, Color Temperature, Efficacy, Lumen Maintenance, Specification

Interior Lighting Levels

Table with columns: Space Number, Space Name, Area, Workspace Height, Min. Required Average Illumination, Actual Average Illumination, Maximum Illumination, Minimum Illumination, Average / Minimum, Maximum / Minimum, Uniformity, Max. Allowed Power Density IEC 2015, Actual Power Density, Actual Power Density compared to Code, Allowed Lighting Load, Actual Lighting Load, Model

PROGRAMMING INSTRUCTIONS

- 1. Enter a programming function by pressing button the number of times as the desired function number from the tables below (e.g., press twice for function 2, occupancy time delay).
2. LED will flash back the selected function's current setting. To set the current function or to change to a different function, wait for sequence to repeat 3 times then return to step 1.
3. Press to turn the number of times indicated in the particular function's detailed table for the NEW desired setting (e.g., press 3 times for 5 min). As confirmation of setting change, LED flashes back the NEW setting 3 times before exiting.

PROGRAMMING FUNCTIONS

Table with columns: FUNCTIONS, UNIT, P, ADC, D

DETAILED FUNCTION TABLES

- 2 = Occupancy Time Delay: 1 30 sec, 4 7.5 min, 7 15.0 min, 10 30 min
3 = Dim to Off Time Delay: 1 30 sec, 4 7.5 min, 7 15.0 min, 10 30 min, 11 infinite
4 = Test Mode / 100/hr Burn-In / Auto Set-Point: 1 Normal, 2 Run 100 hr Burn-In, 5 Blink back Set-Point, 8 Test Mode
5 = Ten's Digit of Set-Point: 1 10 fc, 4 40 fc, 7 200 fc, 10 1000 fc
6 = One's Digit of Set-Point: 1 1 fc, 4 4 fc, 7 7 fc, 10 10 fc
7 = Sunlight Discount Factor: 1 x/1, 4 x/4, 7 x/7, 10 x/10

8 = Incremental Set-Point Adjustment

- 1 Decrease 1 fc, 2 Increase 1 fc
10 = Minimum On Time: 1 0 min, 3 30 min, 5 60 min, 2 15 min, 4 45 min
11 = Photocell Mode: 1 Full On/Off, 2 Inhibit Only Ctd, 3 Total Switches / 1000, 4 Total Time On (hrs), 5 Reset Total Switch and Total Time On Statistics, 6 Reset LampMaximizer+ Value
12 = Dual Technology (Microphonics™): 1 Normal, 2 Off, 3 Medium, 4 Low
14 = Lamp Information: 1 Enable LampMaximizer+, 2 Disable LampMaximizer+, 3 Total Switches / 1000, 4 Total Time On (hrs)
15 = Dimming Range (High Trim): 1 0, 4 3 Volts, 7 6 Volts, 10 9 Volts
16 = Dimming Range (Low Trim): 1 0, 4 3 Volts, 7 6 Volts, 10 9 Volts

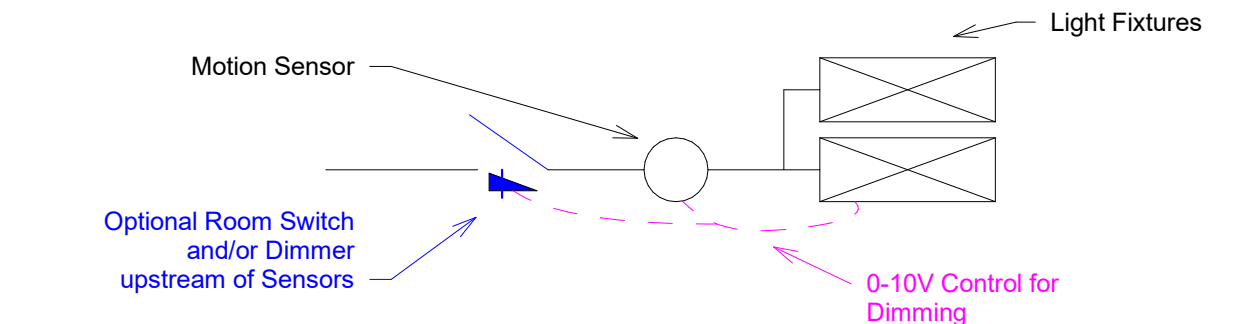
* PTD SENSORS ONLY

Sensor Programming Instructions
1. Above instructions are based on Sensorswitch Instructions at the time of design. Amend as required if different sensors are used or if manufacturer changes procedure. Confirm any deviation with engineer.
2. Sensorswitch support#: 1-800-535-2465
3. Sensors shall be programmed in two ways depending on availability of daylight:
A. No daylight available:
a. Motion control only: Disable Photocell (Function #5 - Setting 8)
b. Occupancy Delay: 15 Minutes (Function #2 - Setting 7)
c. Dim to Off Delay: 5 Minutes (Function #3 - Setting 3)
d. Dimming Range shall be 0-10 Volt (Function #15 - Setting 11; Function #16 - Setting 1)
B. Daylight available (inc. spaces with overhead doors, skylights, windows)
a. Photo Control enabled (do NOT disable Photocell under Function 5)
b. Ensure Normal photocell mode is activated (Function #11 - Setting 1)
c. Set Auto Set-Point (Function #4 - Setting 4) and step away from sensor while it calibrates day and artificial light (will turn lights on and off multiple times)
d. Delay and dimming range options same as above.
e. Sunlight discount factor (Function #7) and incremental set point (Function #8) may have to be adjusted.
4. After programming, all functions shall be read out to verify proper control. Adjust as required for intended function. Discuss problems with engineer.

EL Sensor Programming - Not to Scale

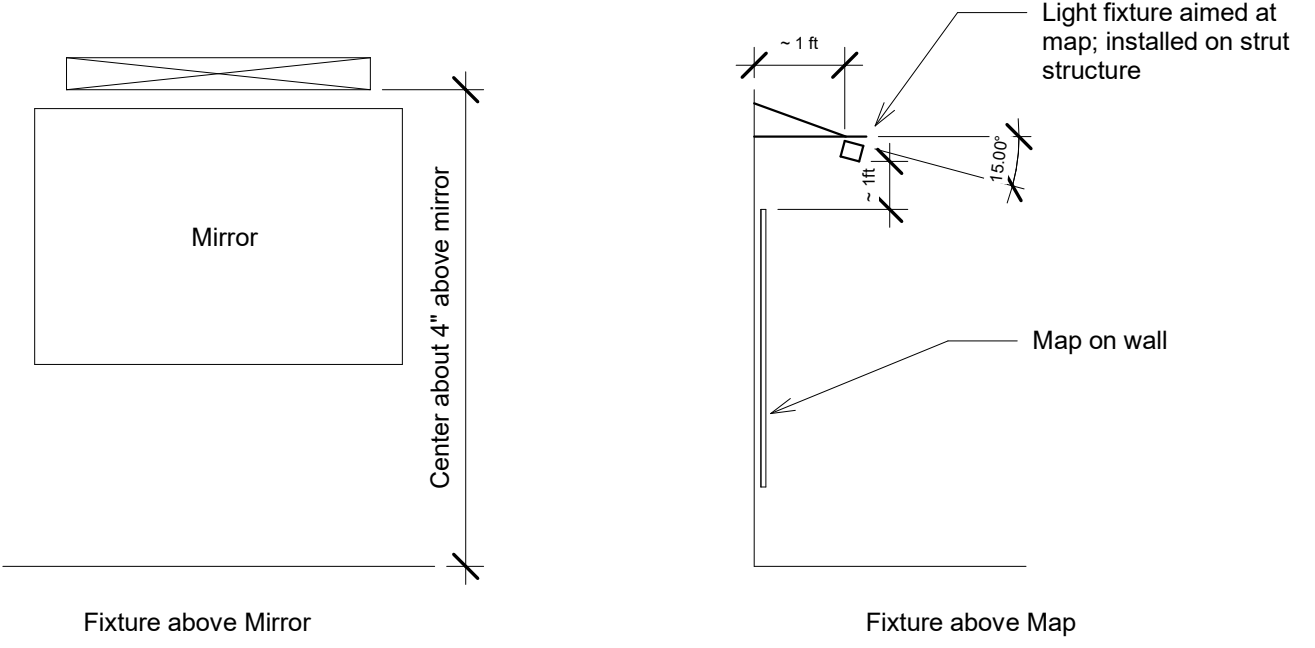
- 1. New installation must match the drawn layout including circuit numbers, lighting control and type of mounting regardless of existing equipment and layout.
2. Existing switches may be reused upon approval by owner. Abandoned switches need to be covered. Provide all switches necessary to enable intended control.
3. Mount fixtures in same height unless noted otherwise. Coordinate exact location and height with engineer.
4. Adjust and repair existing ceiling grid. Provide ceiling grid runners as needed to install new fixtures in existing grid. Install new ceiling tiles (provided by owner) in remaining openings.
5. All openings caused by removal of existing fixtures or other electrical equipment shall be patched with like material and painted to match surroundings.
6. Maintain all fire ratings while penetrating plenums, walls or ceilings. Provide sleeves if necessary to provide existing or specified fire rating.
7. Remove and properly dispose of all abandoned material, equipment and cable.
8. Install all wiring inside ceiling and wall. If wiring can not be fished through, provide surface mounted raceway and/or conduit in surface mounted wiring with approval by owner.
9. In finished spaces, surface mounted raceway or conduit shall be painted to match surroundings finishing in finished spaces. All conduit shall be 3/4" or large. Turns between access boxes should not be more than 270". All low voltage cable shall be plenum rated.
10. Prevent dirt and dust polluting occupied areas and take special care while working in occupied areas and cover equipment and furniture as needed.

EL Lighting Retrofit - Not to Scale

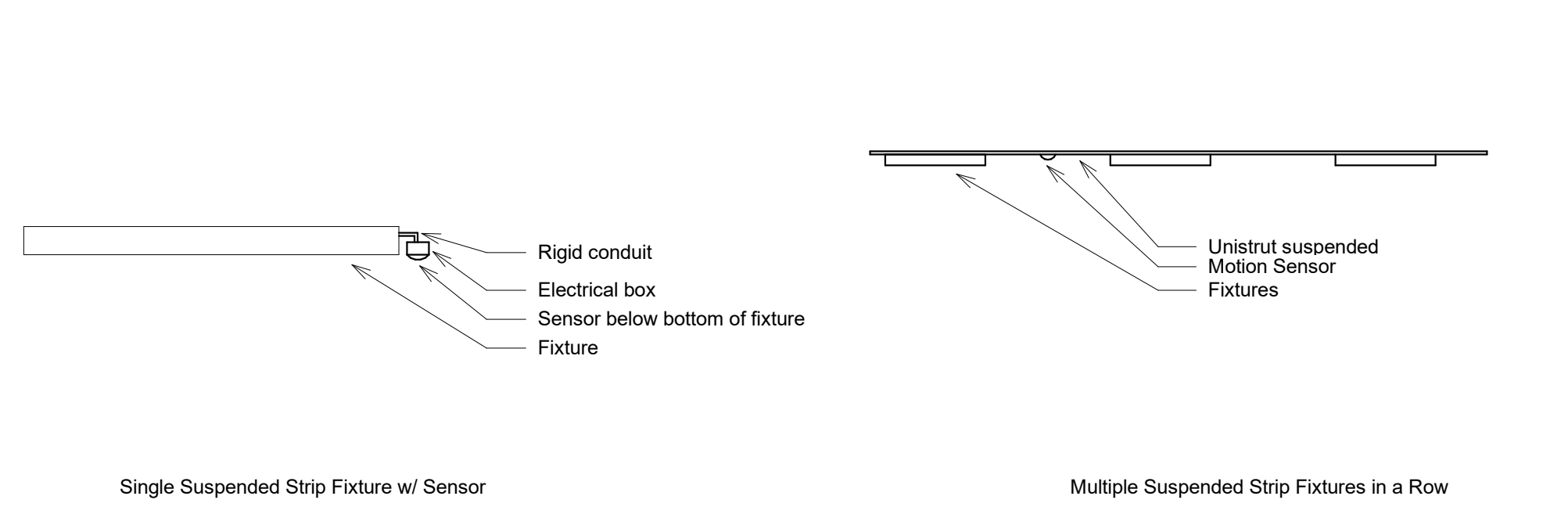


- Motion Sensor w/ Switch
A. Each room lighting device or fixture shows a switch leg (SL) that dedicates a lighting zone.
B. Motion Sensors turns on light upon occupancy and turn off light upon vacancy.
a. Upon detection of motion or upon energizing the sensor will turn on lights at full brightness.
b. After 10 minutes of no detection of motion, sensor will dim lights for 5 minutes and turn them off after.
C. Motion sensor is downstream of local switch and will be de-energized when switch is off.
a. Light will be on upon activation of local switch regardless of actual motion detection (sensor is ON upon power-up)
b. Sensors will not click when local switch is off (nuisance avoidance in quiet rooms)
D. Where daylight is present, sensors dim or turn off lights based on natural lighting levels.
E. Where switches are shown, occupants have the ability to turn off lights.
F. Where dimmers are shown, occupants have the ability to dim lights in addition to dimming control by sensor.
G. Notes on plans or switchleg naming will indicate exceptions. For example:
a. Disable Switchleg: A dimmer will only dim the lighting level to the allowable minimum. The line voltage switch in the dimmer will not be used. This prevents lights turning off entirely. Hallways are an example.
b. One light fixture shall be controlled by switch only; Switchleg parameters indicate that some lights are controlled by switch and sensor, and some lights by switch only. This prevents the latter lights from turning off upon loss of motion detection. Electrical or mechanical rooms are examples.
c. Non-dimmable fixtures (e.g. can lights) in a zone with dimmable fixtures: 0-10V control wiring only extends to the dimmable fixtures. The non-dimmable fixtures will not dim.
H. Coordinate controls with engineer before installation.

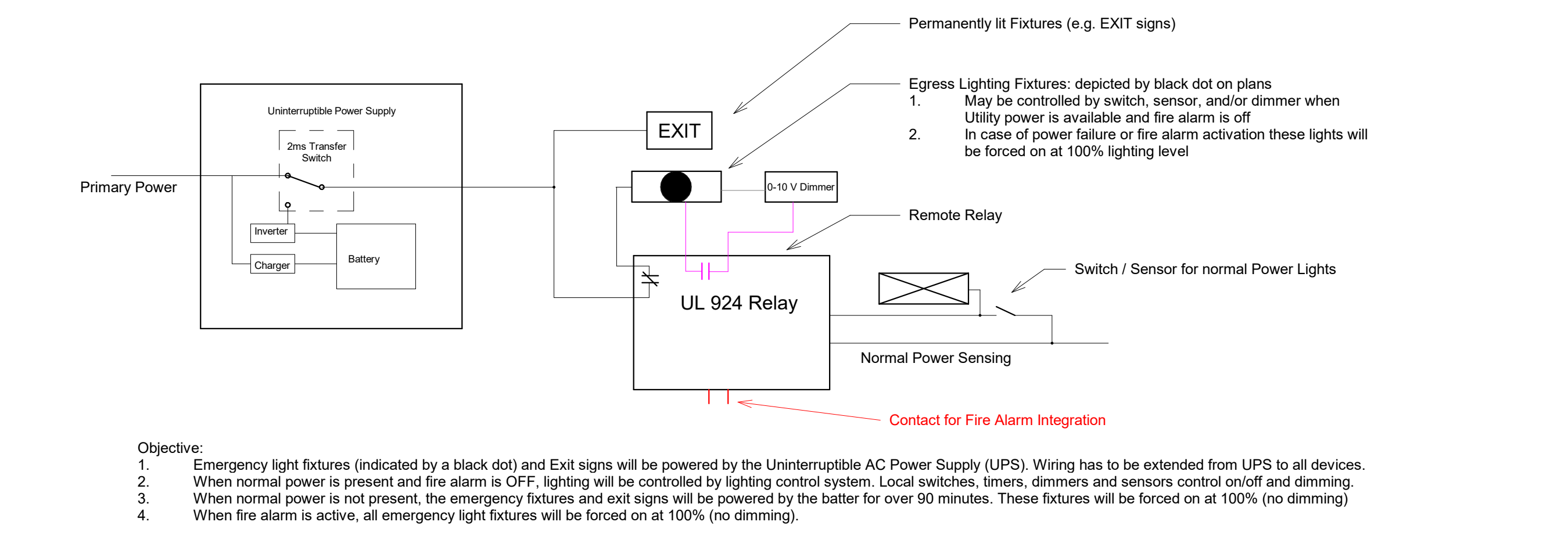
EL Lighting Control - Not to Scale



EL Typical Installation Details - Not to Scale



EL Egress Lighting Control w/ UPS and Fire Alarm Integration - Not to Scale



Objective:
1. Emergency light fixtures (indicated by a black dot) and Exit signs will be powered by the Uninterruptible AC Power Supply (UPS). Wiring has to be extended from UPS to all devices.
2. When normal power is present and fire alarm is OFF, lighting will be controlled by lighting control system. Local switches, timers, dimmers and sensors control on/off and dimming.
3. When normal power is not present, the emergency fixtures and exit signs will be powered by the batter for over 90 minutes. These fixtures will be forced on at 100% (no dimming)
4. When fire alarm is active, all emergency light fixtures will be forced on at 100% (no dimming).