

## Designers Light Forum

Spec it Like You Mean It!

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March 13, 2019



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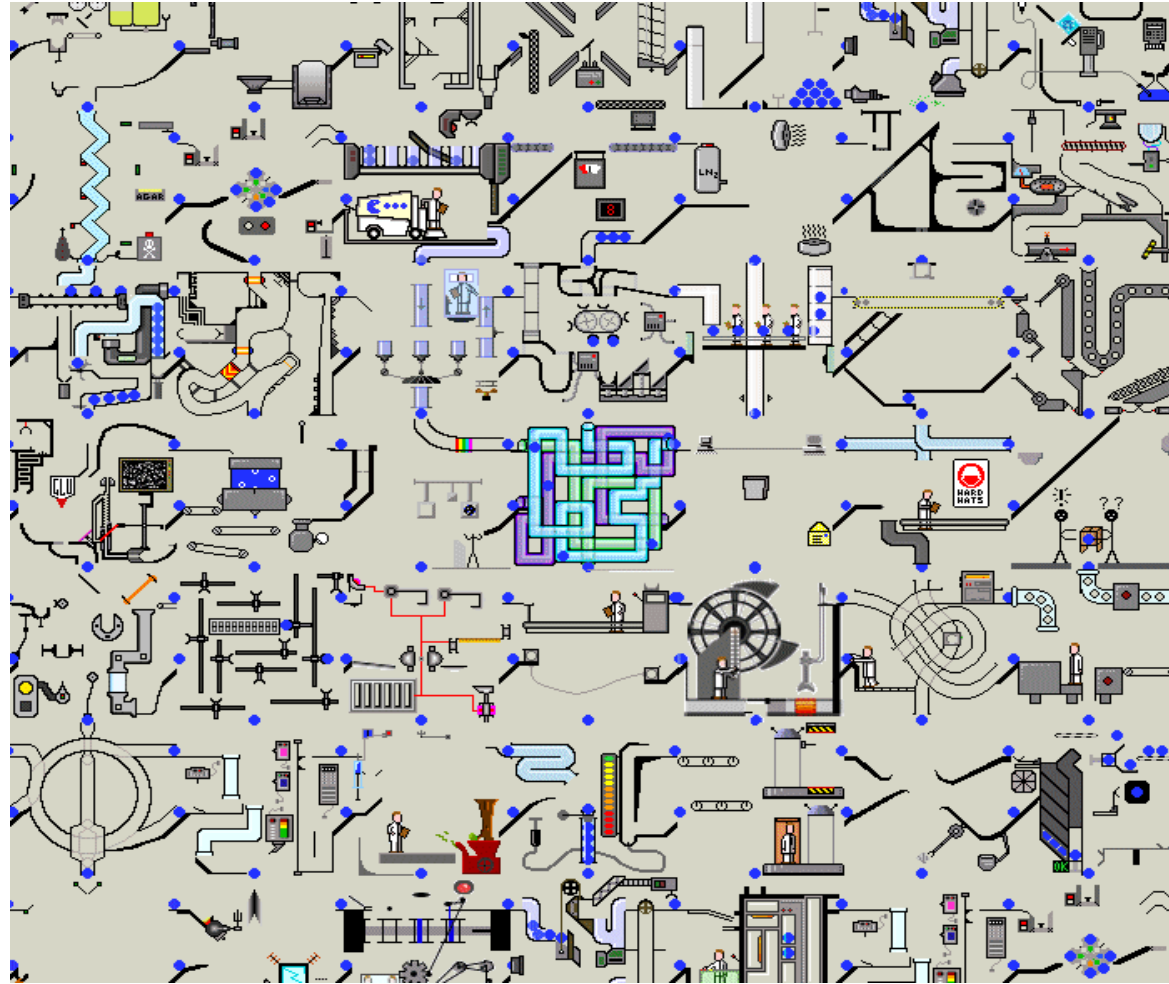
Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

# Learning Objectives

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At the end of the this course, participants will be able to:

- Identify common areas of potential confusion in control specification documentation
- Identify important considerations in developing components of control specification documentation
- Identify role of SOO in documentation and commissioning
- Recognize the components of a successful narrative specification



**LIGHTING CONTROL  
SPECIFICATION IS COMPLICATED!**

JUST BECAUSE YOU WRITE IT

DOESN'T MEAN THEY'LL READ IT!



**TYPES OF CONTROL**

**“ARCHITECTURAL COMPLIANCE”** - OCCUPANCY/VACANCY/TIME CLOCK AS REQUIRED TO MEET NJ ENERGY CONSERVATION CODES. MAY INCLUDE TUNABLE WHITE TO SUPPORT A VISUAL CONNECTION TO THE OUTSIDE. OPEN OFFICE PENDANTS WILL BE WIRED TO ALLOW DIRECT & INDIRECT OUTPUTS TO BE CONTROLLED SEPARATELY

**“OCCUPANCY/VACANCY”** - CLOSETS, STORAGE AREAS, BATHROOMS. ENCLOSED SPACES WITH INTERMITTENT USE

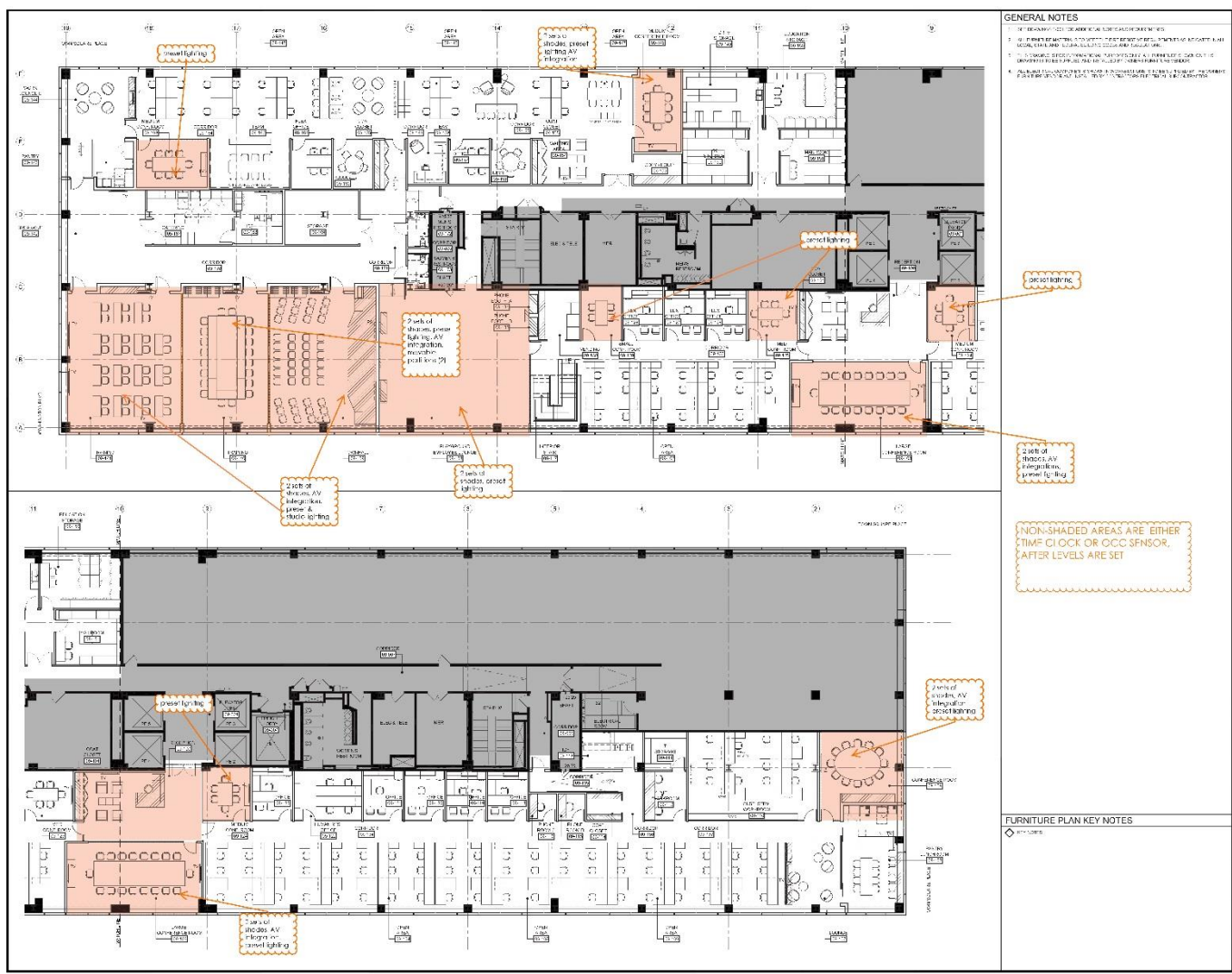
**“ENHANCED ARCHITECTURAL CONTROL”** - MULTIPLE CONTROL ZONES BASED ON PROJECTED USAGE MAY INTERFACE WITH A/V OR OTHER TECHNOLOGY EX: TOWN HALL, PLAYGROUND, ETC.

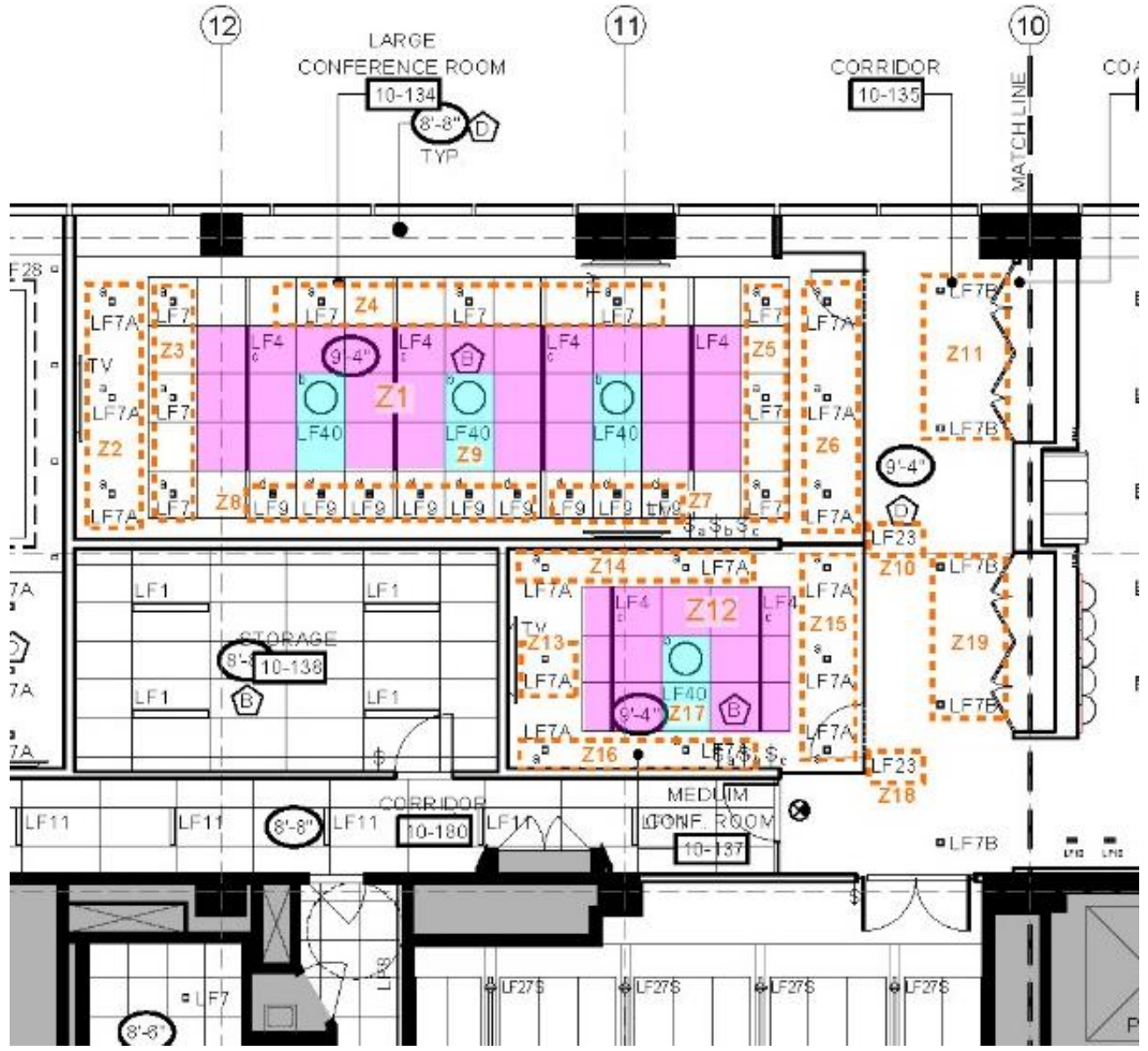
**“ARCHITECTURAL CONTROL”** - MULTIPLE CONTROL ZONES AS NECESSARY FOR AREA FUNCTION MAY INCLUDE AREAS OF SPECIAL FOCUS AND/OR INTERFACE WITH AV. EX: EXEC. OFFICES, CONF. RMS, LOBBIES, ETC.

9 WEST



9 EAST







## LIGHTING CONTROL ZONE SCHEDULE

ZONE	LOAD (WATTS)	TYPE	QUANTITY	CONTROL TYPE
<b>ROOM 10-134</b>				
1	153.6	LF4	24	0-10V
2	60	LF7	3	0-10V
3	60	LF7	3	0-10V
4	60	LF7	3	0-10V
5	60	LF7	3	0-10V
6	60	LF7	3	0-10V
7	60	LF9	3	0-10V
8	120	LF9	6	0-10V
9	96	LF40 -VPI SPEC	3	TBD
10	47.28	LF23	24	0-10V
<b>ROOM 10-137</b>				
12	76.8	LF4	12	0-10V
13	20	LF7	1	0-10V
14	40	LF7	2	0-10V
15	60	LF7	3	0-10V
16	40	LF7	2	0-10V
17	TBD	LF52-LED REPLACEMENT BULB TBD	2	TBD
18	41.37	LF23	21	0-10V
<b>ROOM 10-135</b>				
11	40	LF7	2	0-10V
19	40	LF7	2	0-10V

PROJECT: [REDACTED]  
PROJ #: [REDACTED]  
2018

LIGHTING CONTROL NARRATIVE  
INDICATES CHANGES TO PREVIOUS ISSUE

ISSUE: ~~Addendum 1~~ BULLETIN 001  
DATE: ~~31 August 2018~~ 21 DECEMBER

## RELATED DOCUMENTS

Contract Documents and related addenda and changes relate to the content of this narrative. In addition, the following lighting specific documents, schedules, sketches and drawings apply to the content of this narrative:

- Lighting Fixture Schedules, Cut Sheets, & Specifications
- Electrical and Architectural drawings which identify, locate, or detail lighting fixture installation.
- Audio Visual specifications, drawings, and schedules for rooms involving AV and lighting integration.
- Details describing construction or manufacture of custom components
- Zoning diagrams or control system component diagrams or risers
- Manufacturer's installation and mounting instructions
- Manufacturer's shop drawings and/or submittal packages with relevant design team members' approval stamps and/or comments.
- CSI MASTERSPEC GENERAL CONDITIONS AND SUB-SECTIONS:
  - 26 09 36
  - 26 09 61
  - 26 51 13
  - 26 55 61

## NON-INCLUDED COMPONENTS

Contractor is responsible for providing any and all electrical and data components required for a fully functioning installation, including material and components as noted in manufacturers' shop drawings or submittal packages as "by others". These may include but shall not be limited to junction boxes, specialized power or data wire (i.e.:



**CLARIFY WANTS vs NEEDS +  
HELP PRIORITIZE =  
LISTS ARE GOOD!**



**I think all good architecture should challenge you, make you start asking questions. You don't have to understand it. You may not like it. That's OK.**

**- Thom Mayne -**

[quoteparrot.com](http://quoteparrot.com)

## WHY CONTROL?

**CODE COMPLIANCE – ASHRAE 90.1, CA TITLE 24, IECC**

**WHY CONTROL?**

**TO SUPPORT SPACE FUNCTIONALTY**

**CODE COMPLIANCE**

**WHY CONTROL?**



**TO MANAGE LUMINAIRE OUTPUT**

**TO SUPPORT SPACE FUNCTIONALTY**

**CODE COMPLIANCE**

**WHY CONTROL?**



AESTHETICS

WHY CONTROL?

WHY CONTROL?

**WHICH SPACES OR FUNCTIONS?**

WHICH SPACES OR FUNCTIONS?

WHY CONTROL?

**WHAT TYPES OF TECHNOLOGIES?**

WHAT TYPES OF TECHNOLOGIES?  
WHICH SPACES OR FUNCTIONS?  
WHY CONTROL?

**HOW WILL THE LUMINAIRES INTERACT WITH  
OTHER ASPECTS OF THE SPACE?**

WHAT TYPES OF INTERACTIONS?

WHAT TYPES OF TECHNOLOGIES?

WHICH SPACES OR FUNCTIONS?

WHY CONTROL?

**HOW WILL PEOPLE INTERACT WITH THE  
SYSTEM?**

HOW WILL PEOPLE INTERACT WITH THE SYSTEM?

WHAT TYPES OF INTERACTIONS?

WHAT TYPES OF TECHNOLOGIES?

WHICH SPACES OR FUNCTIONS?

WHY CONTROL?

**HOW WILL I KNOW IF ITS WORKING?**

HOW WILL I KNOW IF ITS WORKING?

HOW WILL PEOPLE INTERACT WITH THE SYSTEM?

WHAT TYPES OF INTERACTIONS?

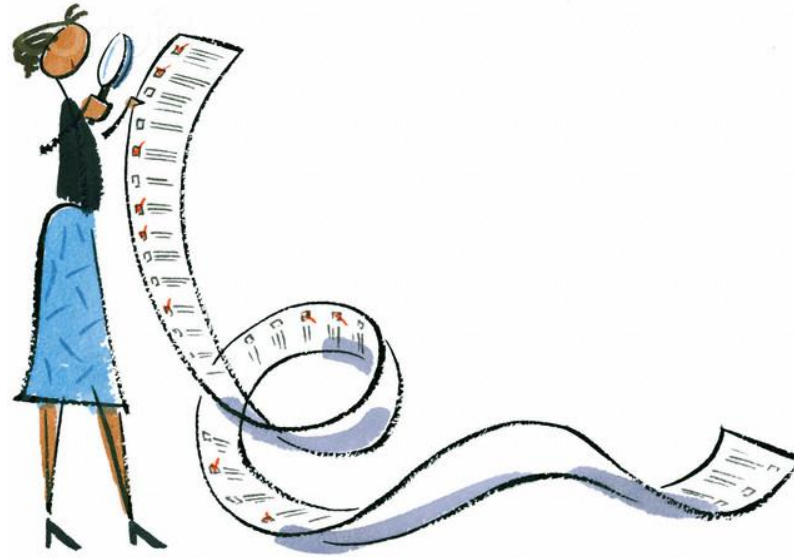
WHAT TYPES OF TECHNOLOGIES?

WHICH SPACES OR FUNCTIONS?

WHY CONTROL?

**HOW WILL SOMEONE ELSE?**





# START WITH A LIST

**PRIVATE OFFICES (TYPICAL)**

PRIVATE OFFICES (EXECUTIVE)

OPEN OFFICE SPACES

CONFERENCE ROOMS

STORAGE SPACES & CLOSETS

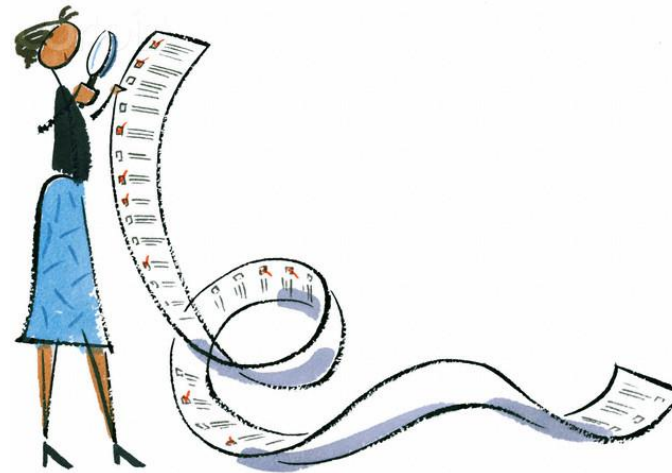
BREAKOUT SPACES & PANTRIES

RECEPTION

SPECIALIZED USE AREAS

BATHROOMS

**SPACES TO BE CONTROLLED**



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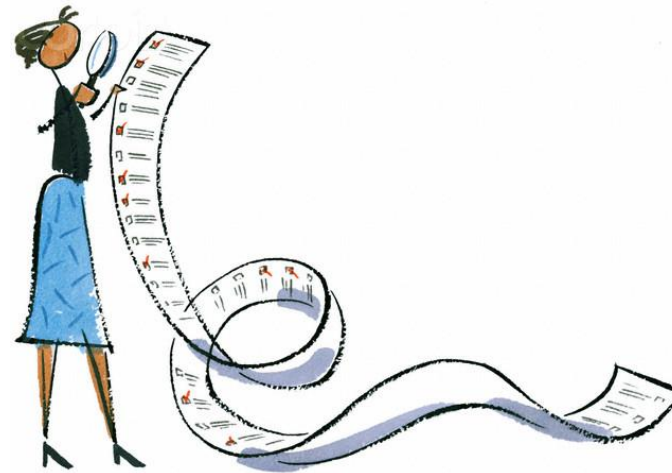
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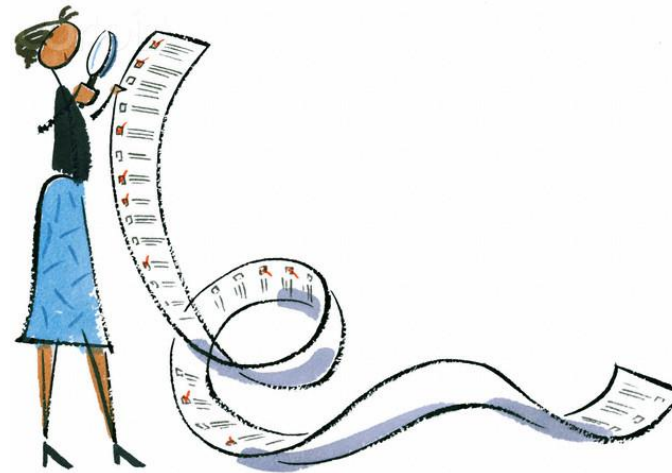
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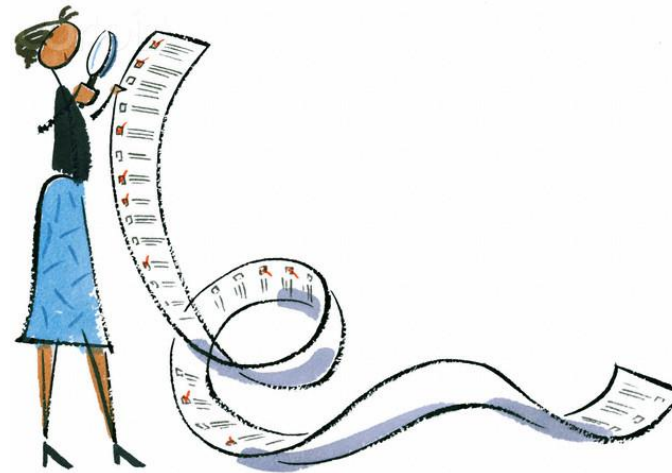
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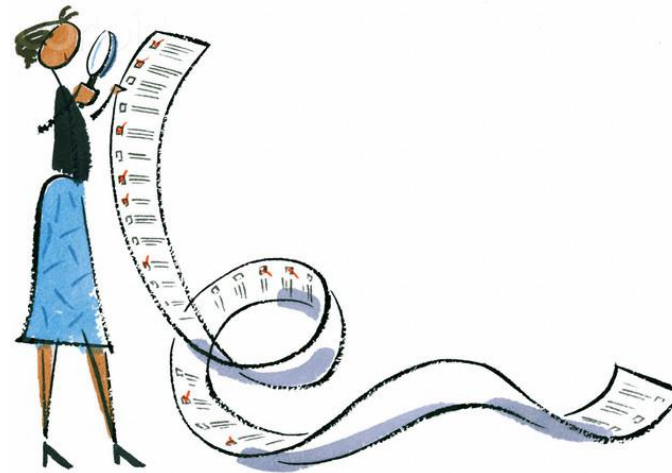
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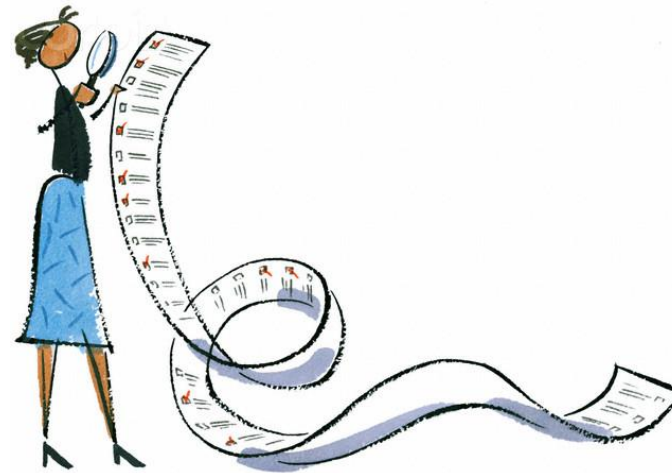
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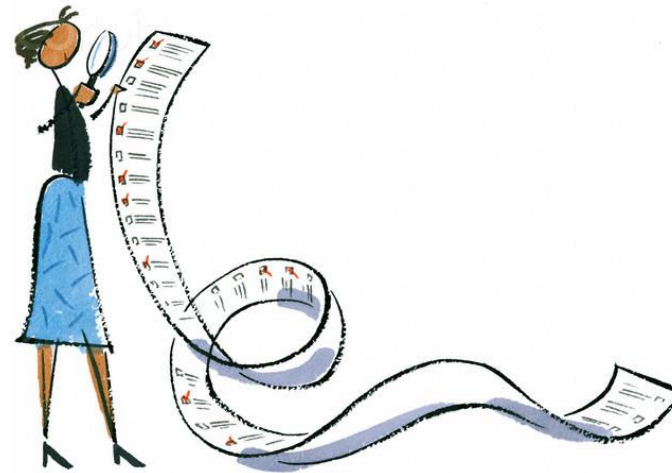
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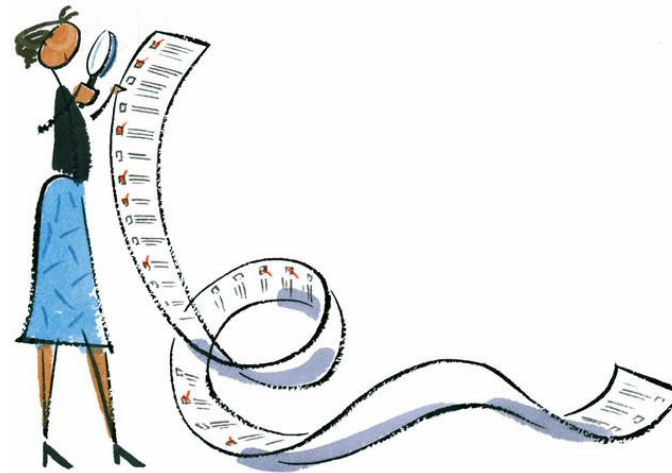


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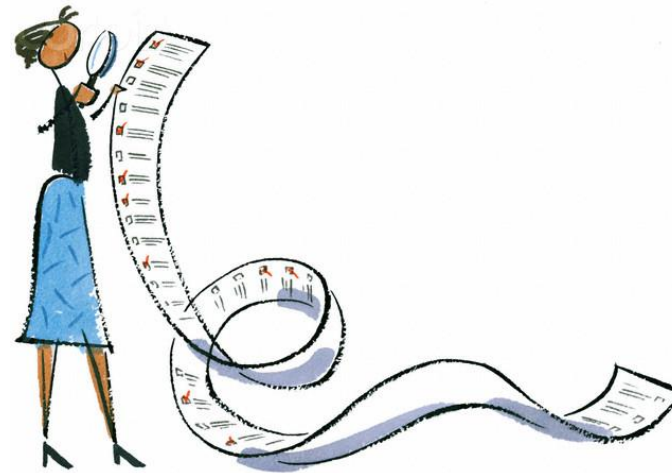




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SPACES TO BE CONTROLLED





## TYPES OF CONTROL

**“THEATRICAL”** - CONTROL OF MULTIPLE FIXTURE ATTRIBUTES INCLUDING INTENSITY, DIRECTION, COLOR, AND BEAM ANGLE. MULTIPLE ZONES OF CONTROL BASED ON VISUAL EFFECT. PROPRIETARY BLUETOOTH WIRELESS MESH NETWORK DESIGNED TO INTERFACE WITH VARIOUS TECHNOLOGIES INCLUDING VIDEO PRODUCTION

**“THEATRICAL SUPPORT”** - CONTROL OF MULTIPLE FIXTURE ATTRIBUTES INCLUDING INTENSITY AND COLOR, AS NECESSARY TO SUPPORT MEDIA. DESIGNED TO INTERFACE WITH PRODUCTION EQUIPMENT. BASED ON MULTIPLE ZONES IN A GIVEN SPACE EX: GREEN ROOMS, PRODUCTION REVIEW, PRE-PRODUCTION MAY PROVIDE “PLAYBACK” OF CERTAIN ATTRIBUTES IN PRODUCTION SPACES

**“ARCHITECTURAL COMPLIANCE”** - OCCUPANCY/VACANCY AS REQUIRED TO MEET NJ ENERGY CONSERVATION CODES. MAY INCLUDE TUNABLE WHITE TO SUPPORT A VISUAL CONNECTION TO THE OUTSIDE. OPEN OFFICE PENDANTS WILL BE WIRED TO ALLOW DIRECT & INDIRECT OUTPUTS TO BE CONTROLLED SEPARATELY

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**WRITE IT DOWN**

**IN ENGLISH SENTENCES**

**WRITE IT DOWN**

**WHEN PEOPLE LEAVE THEIR OFFICES, THE LIGHTS  
WILL TURN OFF.**

IN ENGLISH SENTENCES

**WRITE IT DOWN**

**WHEN PEOPLE LEAVE THEIR OFFICES, THE LIGHTS WILL  
TURN OFF .**

**= PRIVATE OFFICES HAVE VACANCY SENSORS**

**SPECIFICATIONS ARE COMMUNICATION!**

**WHEN PEOPLE LEAVE THEIR OFFICES, THE LIGHTS WILL  
TURN OFF AFTER 5 MINUTES.**

**= PRIVATE OFFICES HAVE VACANCY SENSORS & A 5 MIN SET  
POINT**

**SPECIFICATIONS ARE COMMUNICATION!**



**WHEN PEOPLE ENTER (OR RETURN TO) THEIR OFFICES, THE LIGHTS SHOULD NOT TURN ON WITHOUT A POSITIVE ACTION.**

**❓ PRIVATE OFFICES HAVE VACANCY SENSORS, A 5 MIN SET POINT, & SMART SWITCHES**

**SPECIFICATIONS ARE COMMUNICATION!**

SPECIFICATIONS ARE COMMUNICATION!

- Rooms with doors shall have ceiling mounted sensors.
- Sensors in rooms with doors (except bathrooms and phone rooms) shall be set to “vacancy” rather than “occupancy”.
- In private offices, luminaires shall de-energize if vacancy is detected for 5 minutes.
- A positive action shall be required to energize luminaires in rooms designated as vacancy (private offices, e.g.) once they have reverted to their standby vacancy mode.

**A SEQUENCE OF OPERATIONS IS BORN!**

- Rooms with doors shall have ceiling mounted sensors. NO WALL MOUNTED SENSORS
- Sensors in rooms with doors (except bathrooms and phone rooms) shall be set to “vacancy” rather than “occupancy”. VACANCY, NOT OCCUPANCY
- In private offices, luminaires shall de-energize if vacancy is detected for 5 minutes. SET POINT
- A positive action shall be required to energize luminaires in rooms designated as vacancy (private offices, e.g.) once they have reverted to vacancy mode. SMART SWITCHES

**A SEQUENCE OF OPERATIONS IS BORN!**

IN OPEN OFFICES, THE LIGHTS SHOULD GO ON AT 8 AM AND OFF AT 6PM, UNLESS THERE IS SOMEONE AT THEIR DESK.

**OPEN OFFICE**

IN OPEN OFFICES, THE LIGHTS SHOULD GO ON AT 8 AM AND OFF AT 6PM, UNLESS THERE IS SOMEONE AT THEIR DESK.

=TIMECLOCK WITH OCCUPANCY OVERRIDE

**OPEN OFFICE**

- Open office spaces shall be controlled by time clock with occupancy override and shall be programmed at start-up to provide the illumination levels appropriate to general office tasks. Once these levels have been established, they shall operate autonomously; energizing to their “preset operating level” at the beginning of the day (as indicated by the system time clock) and reverting to their “night light” levels after normal operating hours.

The intensity of the electric light levels should change to reflect changes in daylight intensity throughout the day, but the light level on the desk should be consistent. **DAYLIGHT SENSOR**

How much the lights change will be related to their distance from the windows or other daylight entries. **MULTIPLE DAYLIGHT ZONES**

In open office spaces, the lights should be on at 8 am and off at 6pm, unless there is someone at their desk; **TIME CLOCK WITH OCCUPANCY OVERRIDE**

## DAYLIGHT INTEGRATION



- During normal operating hours, these areas shall be controlled by time clock with occupancy override and shall be programmed at start-up to provide the illumination levels appropriate to general office tasks. Once these levels have been established, they shall operate autonomously energizing to their “preset operating level” as incident daylight decreases, and reverting to their “night light” levels after normal operating hours. **Additional non-daylight level set during start up**
- In open office spaces with daylight integration electric lights in the first and second daylight zones shall respond to levels of incident daylight as necessary to maintain \_\_\_\_FC on the work surface during operational hours. **Set Point, multiple daylight zones, daylight sensors**
- Occupancy sensors in areas as described above shall override the reduction of general office illumination to night levels.

- In conference rooms, the default setting should be off when the room is empty. VACANCY
- There should be multiple pre-set scenes to provide light for different meeting types. GUI or MULTIPLE BUTTON STATION
- VTC functions should interact with the lighting  
INTEGRATION WITH AV
- Black out and view preserving shades should interact with the lighting  
ELECTRIC SHADES-MULTIPLE SETS (probable RS232 interface and/or dry contact)

Conference rooms

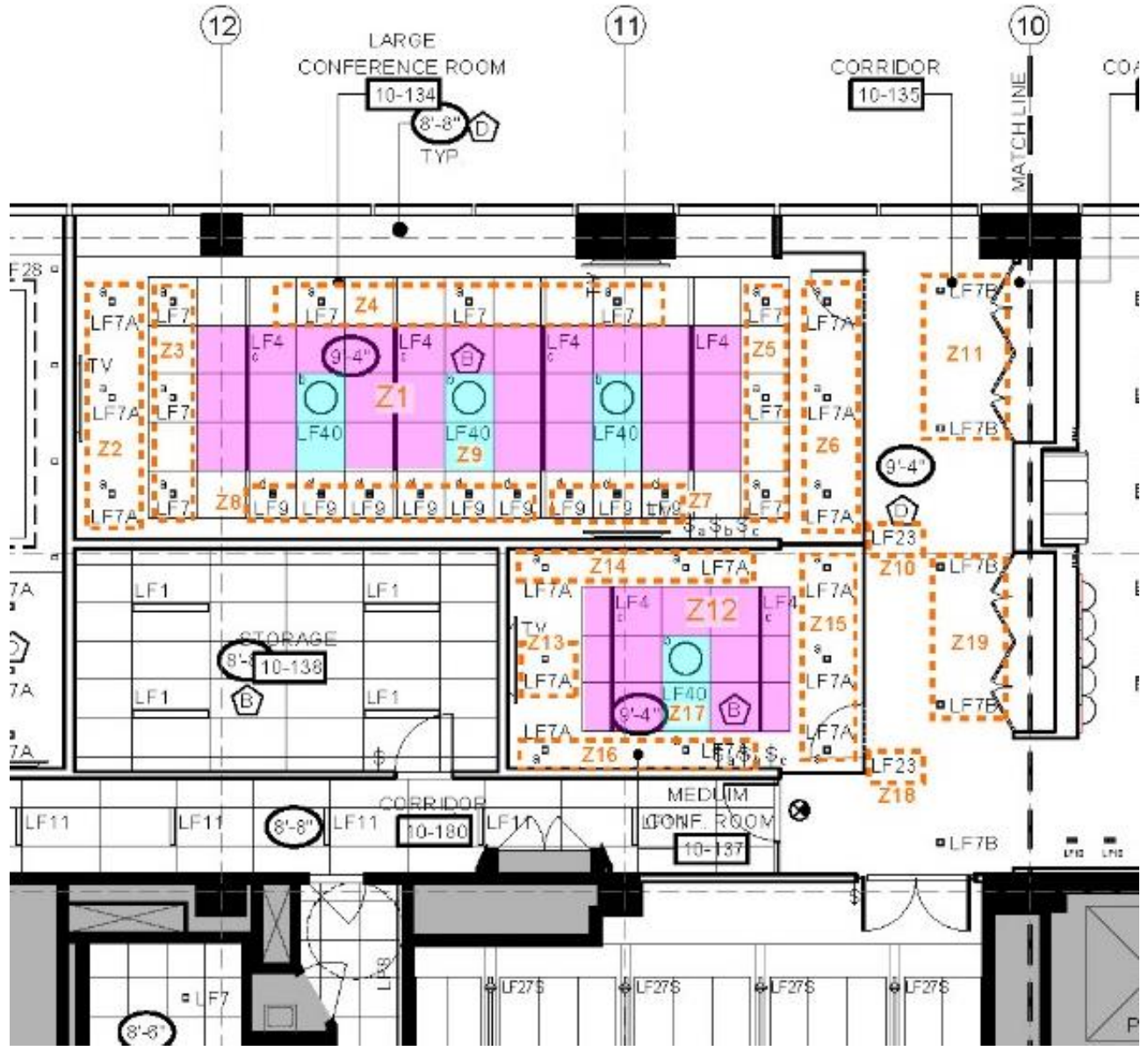
- The system shall allow for the selection of preset lighting scenes within rooms as appropriate to the programmed functions for the space (conference rooms, e.g.).
- The following types of preset lighting scenes are envisioned for spaces as noted. The lighting control system shall provide the ability to control window shades and AV components as necessary for the function of each of these scenes and as described in the specification documentation of each component elsewhere.
  - “Paper-based” Meeting
  - “Tablet/Laptop-based” Meeting
  - VTC
  - Training – in divisible town hall only
  - Video training in open or divisible town hall only
  - “Event” in Playground and Town Hall
  - Cleaning in all controlled spaces

- The keypad controller stations shall have the capacity to initiate and switch among preset scenes designed at start-up for various programmed uses as described above. Each controller shall be equipped with raise/lower inputs which will allow the scene to be manipulated and shall not delete or alter any of the preset or saved scenes without entering a specific programming mode. Keypad controllers shall be permanently engraved as per approved templates. Do not commence engraving prior to receipt of approved, stamped engraving template.
- Access to the programming mode shall be able to be locked out via PIN or security password.



MakeAGIF.com







**IMAGINE THE SENSE OF POWER**





**AND CALM**

# IF YOU KNEW IN ADVANCE

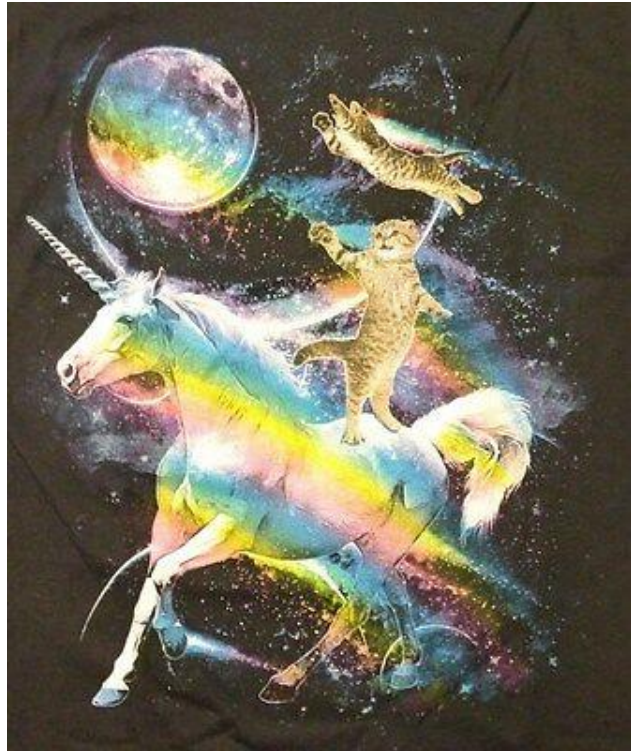


**WHAT THE OWNER ACTUALLY WANTED & NEEDED**



“  
If you will it,  
it is no dream.  
”

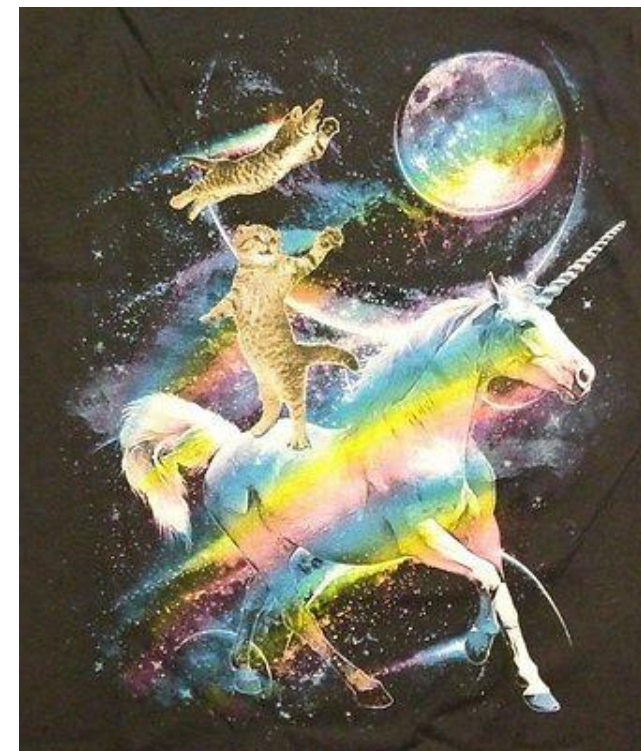
-Theodore Herzl



OPR

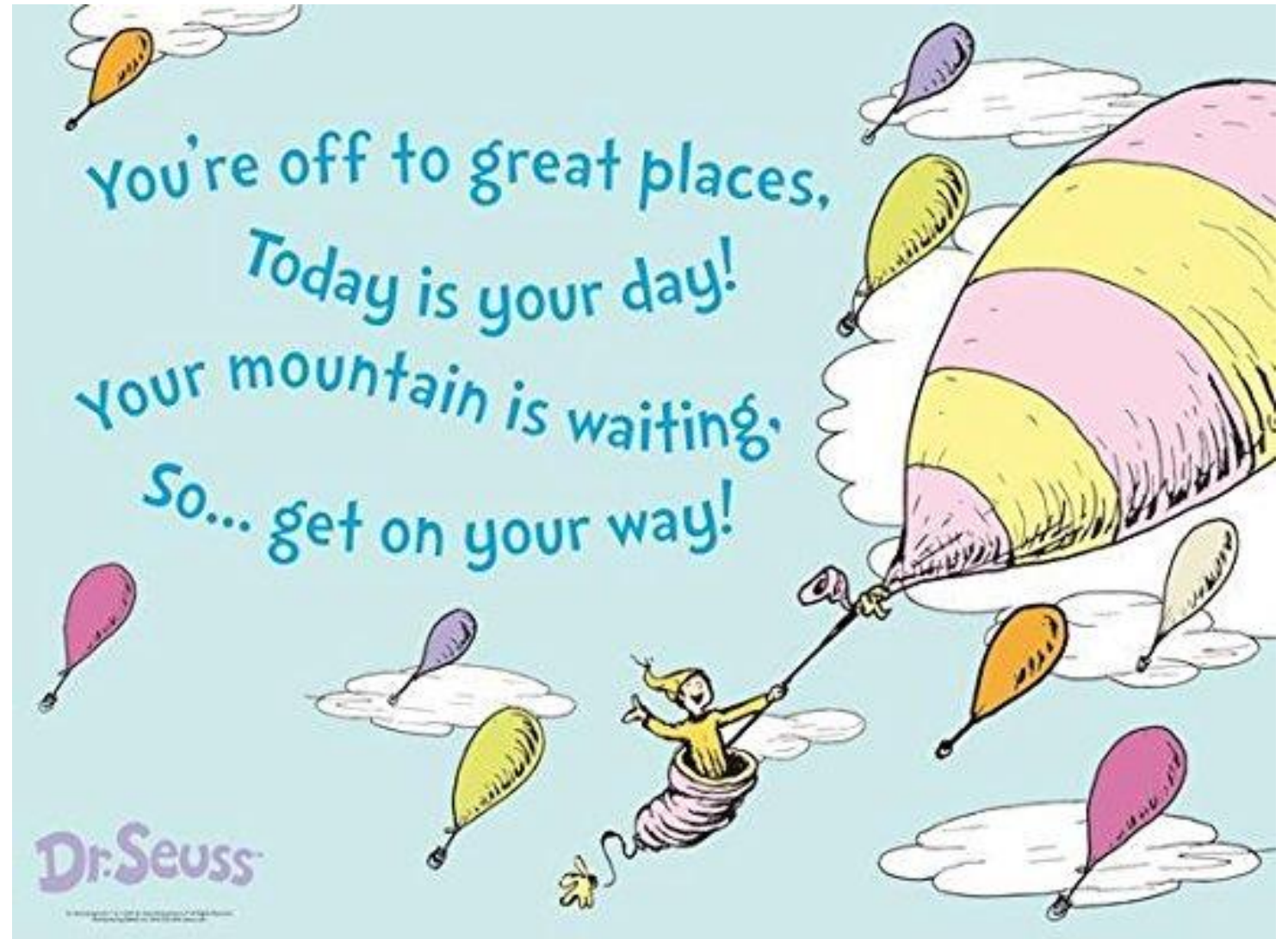
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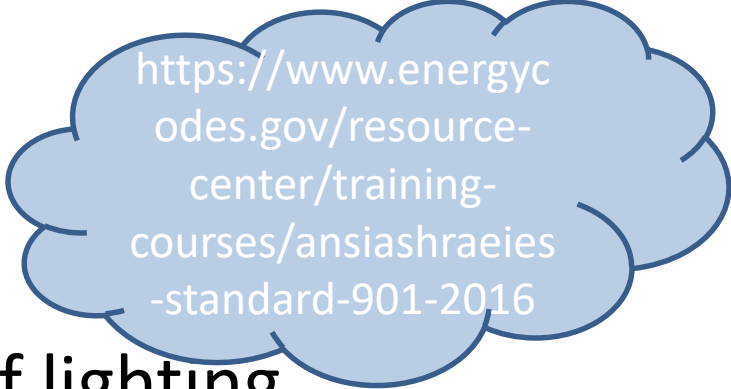
BOD



# TWO MAGICAL DOCUMENTS

With the  
information  
provided by the  
OPR...





<https://www.energycodes.gov/resource-center/training-courses/ansiashraeies-standard-901-2016>

- Functional testing (calibrated/adjusted/programmed) of lighting control devices and systems required within 90 days of occupancy
  - Must be performed by individuals NOT involved in design, manufacture, or installation
  - For occupant sensors:
    - Certify location and aiming per manufacturer recommendation
    - Test all sensors if project  $\leq 7$
    - If  $> 7$  sensors, test for each unique combination of sensor type and space geometry and verify
      - Status indicator
      - Lights turn off or down to permitted level within required time
      - Auto-on – lights turn on to permitted level when someone enters the space
      - Manual on – lights turn on only when manually activated
      - Lights aren't incorrectly turned on by movement in nearby areas or by HVAC operation



SAVE



SAVE





**THIS IS THE LAST LIST**

I PROMISE

THIS IS THE LAST LIST

## **REDUCED RFI'S**

**BENEFITS OF WELL CONSTRUCTED  
DOCUMENTATION**

REDUCED RFI'S

**BETTER, MORE REALISTIC PRICING**

BENEFITS OF WELL CONSTRUCTED  
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**REDUCED CHANGE ORDERS**

BENEFITS OF WELL CONSTRUCTED

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**SPECIFICATION COMPLIANT SUBMISSIONS**

BENEFITS OF WELL CONSTRUCTED

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CODE & SPECIFICATION COMPLIANT INSTALLATIONS

**FULLY REALIZED AND IMPLEMENTED DESIGN INTENT**

**BENEFITS OF WELL CONSTRUCTED**

**DOCUMENTATION**



This concludes The American Institute of Architects Continuing  
Education Systems Course

