

- Regional Initiative started early this year
- Value to ***utilities***
  - Significantly increase completed projects
- Value to ***trade allies***
  - Training & technical support
  - Communications (central access, website, newsletter)
  - Coordination with ALL regional utilities
  - Website – [www.northwest-lighting.com](http://www.northwest-lighting.com)
- Enroll today!

# Utility Incentives for Controls

- Lighting **incentives vary by utility**
- **Confirm requirements** before you start!
- Utilities want **more savings per project**
- Utilities attending today . . .
  
- Find out at [www.northwest-lighting.com](http://www.northwest-lighting.com)

# Project starts with an interview

## SAMPLE PROJECT INFORMATION:

- Lighting retrofit measures have been specified
- Office workers are in and out of their space
- Production workers work both shifts
- Ceiling heights in manufacturing/warehouse 30'
- Shelving 20'
- Lay in ceiling in office areas
- Warehouse area is occupied an average of 50%
- There is natural daylight in perimeter offices and production/manufacturing areas
- Exterior lighting currently controlled by individual photo cells
- Manufacturing/warehouse lighting is controlled by breakers
- Don't leave any kWh on the table and specify controls!
- Use appropriate controls where applicable
- Don't be scared....



# Things to think about

- Square footage of area
- Coverage of control device
- Partitions, obstructions or open area
- Natural daylight
- Activity
- Security
- Applicable technologies for specific areas  
(I.R. U.S. Micro. P.C. relay panel, wireless power signal,  
etc.)

# Handouts

- Project information
- Lighting plan
- Dimensions
- Audit sheet
- Tip Sheet
- Utility spreadsheet tool
- Controls spreadsheet
- Catalogs (from reps)

# Tip Sheet



## "Hand's On" Lighting Controls Tip Sheet

<u>Location:</u>	<u>Control Technology:</u>	<u>Considerations:</u>
Closed Office	_____ _____ _____	_____ _____ _____
Open Office	_____ _____ _____	_____ _____ _____
Conference Rm	_____ _____ _____	_____ _____ _____
Rest Rooms	_____ _____ _____	_____ _____ _____
High Bay	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
Exterior Lighting	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____

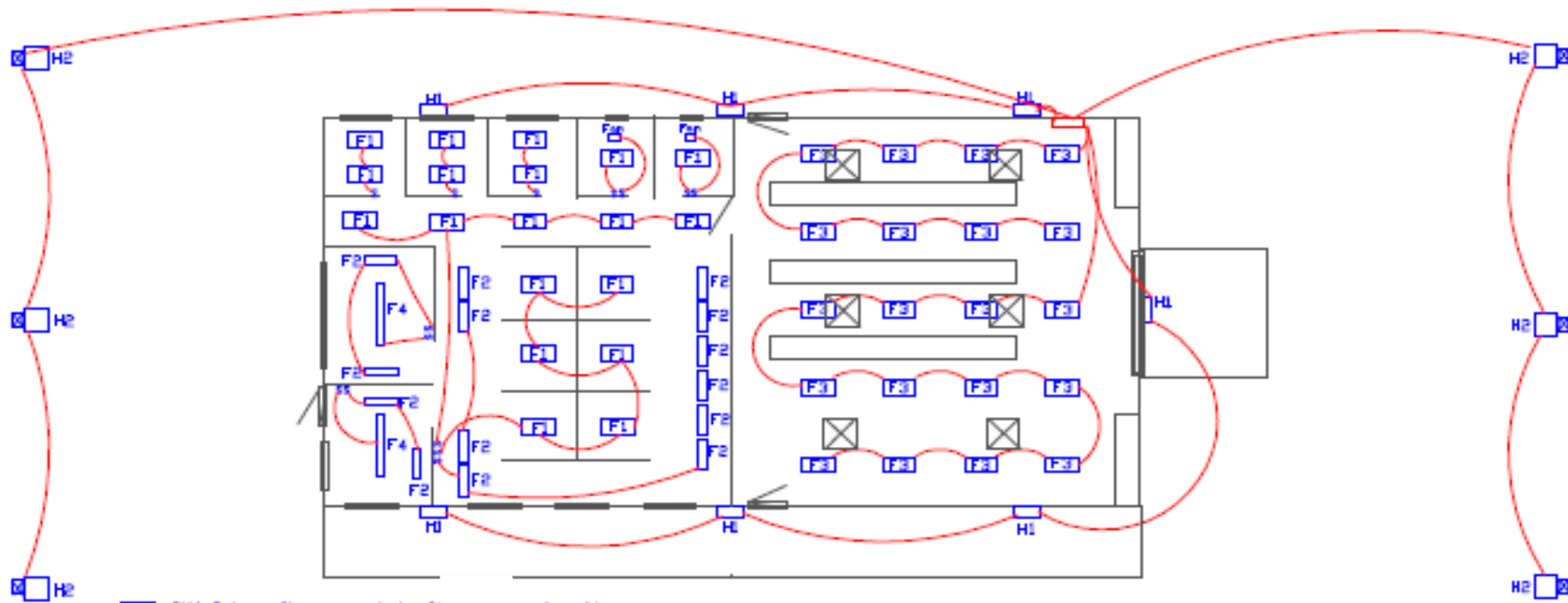
# Audit Sheet



*Illuminating opportunities*

Project Name		Utility		Date	
Contact		Phone		Type of business	
E-mail					
Hours of operation - M-F			Sat.	Sun.	
Location		<b>Existing</b> Qty.		<b>Proposed</b> Qty.	
<input type="checkbox"/> 4-lamp	<input type="checkbox"/> Strip	<input type="checkbox"/> VHO	<input type="checkbox"/> HPS	<input type="checkbox"/> Retro T8	<input type="checkbox"/> De-lamp
<input type="checkbox"/> 3-lamp	<input type="checkbox"/> Shaded	<input type="checkbox"/> HO	<input type="checkbox"/> 48"	<input type="checkbox"/> Replace	<input type="checkbox"/> Reflector
<input type="checkbox"/> 2-lamp	<input type="checkbox"/> troffer	<input type="checkbox"/> HPS	<input type="checkbox"/> 72"	<input type="checkbox"/> LW BF	<input type="checkbox"/> 4-lamp TSHO
<input type="checkbox"/> 1-lamp	<input type="checkbox"/> wrap	<input type="checkbox"/> MH	<input type="checkbox"/> 90"	<input type="checkbox"/> Normal BF	<input type="checkbox"/> 6-lamp T8HP
<input type="checkbox"/> T12	<input type="checkbox"/> Silmline	<input type="checkbox"/> MV	<input type="checkbox"/> Other	<input type="checkbox"/> H BF	<input type="checkbox"/> Other
Existing Control:			EST Wattage:	Occ sensor:	Controls:
Notes: <input type="checkbox"/> See back for more notes.					
Location		<b>Existing</b> Qty.		<b>Proposed</b> Qty.	
<input type="checkbox"/> 4-lamp	<input type="checkbox"/> Strip	<input type="checkbox"/> VHO	<input type="checkbox"/> HPS	<input type="checkbox"/> Retro T8	<input type="checkbox"/> De-lamp
<input type="checkbox"/> 3-lamp	<input type="checkbox"/> Shaded	<input type="checkbox"/> HO	<input type="checkbox"/> 48"	<input type="checkbox"/> Replace	<input type="checkbox"/> Reflector
<input type="checkbox"/> 2-lamp	<input type="checkbox"/> troffer	<input type="checkbox"/> HPS	<input type="checkbox"/> 72"	<input type="checkbox"/> LW BF	<input type="checkbox"/> 4-lamp TSHO
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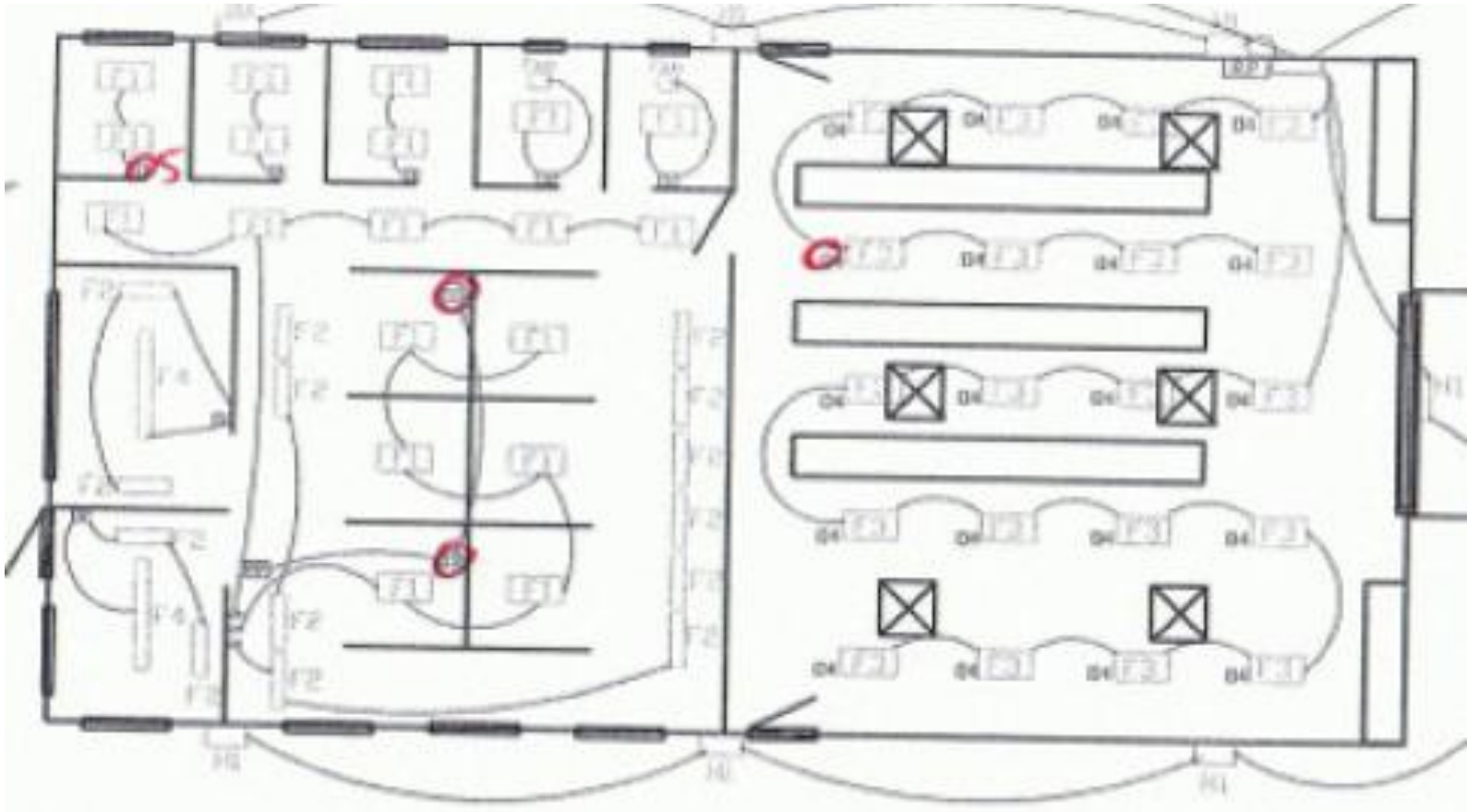
# Plans



- F1** 2x4 2-lamp fluorescent troffer 48 input watts
- F2** 1x4 2-lamp fluorescent troffer 48 input watts
- F3** 2x4 4-lamp T5HO fluorescent troffer - 234 input watts
- F4** 1x8 4-lamp fluorescent pendant - 95 input watts
- H1** 320 watt pulse start MH - 375 input watts
- H2** 320 watt pulse start MH - 375 input watts
- Exhaust Fan
- Distribution panel
- s** Single pole switch
- ss** Single pole switch 2-gang
- Skylight

# Specify

- Draw sensors on plan



# Specify

- Make notes on Tip Sheet

**"Hand's On" Lighting Controls  
Tip Sheet**

<u>Location:</u>	<u>Control Technology:</u>	<u>Considerations:</u>
Closed Office	WALL SWITCH INFRARED	DAYLIGHT OPEN
Open Office	CEILING TECHNOLOGY	PARTITIONS
Conference Rm		
Rest Rooms		
High Bay		
Exterior Lighting		

# Exercise



Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class: Lighting Controls 102

Instructions: Circle the control device that best suits the lighting application a - d. Then circle the Options that may apply to the application.

1. Office 1, 2 and 3

- a. Wall switch sensor
- b. Ceiling sensor
- c. Relay panel w/clock
- d. Fixture mount sensor

Options:

- 1. Photo cell
- 2. Dual relay
- 3. Dimmer
- 4. Dimming ballasts
- 5. Infrared
- 6. Dual technology
- 7. Power pack/relay
- 8. Remote switch
- 9. Other \_\_\_\_\_

Notes:

2. Open Office

- a. Wall switch sensor
- b. Ceiling sensor
- c. Relay panel w/clock
- d. Fixture mount sensor

Options:

- 1. Photo cell
- 2. Dual relay
- 3. Dimmer
- 4. Dimming ballasts
- 5. Infrared
- 6. Dual technology
- 7. Power pack/relay
- 8. Remote switch
- 9. Other \_\_\_\_\_

Notes:

3. Conference Room/Reception

- a. Wall switch sensor
- b. Ceiling sensor
- c. Relay panel w/clock
- d. Fixture mount sensor

Options:

- 1. Photo cell
- 2. Dual relay
- 3. Dimmer
- 4. Dimming ballasts
- 5. Infrared
- 6. Dual technology
- 7. Power pack/relay
- 8. Remote switch
- 9. Other \_\_\_\_\_

Notes:

# Begin

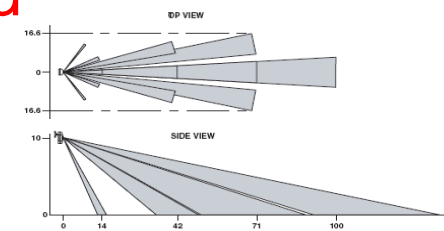
- You have 15 minutes.....



# Cheat Sheet

1. Small open office
2. Small office with partitions
3. Large open office
4. Large open office with partitions/obstructions
5. Open restrooms
6. Restrooms with stalls
7. Hallways and Aisles
8. Individual high bay lighting
9. Zonal high bay lighting

1. Switch infrared
2. Switch two technology
3. Ceiling infrared
4. Ceiling/wall two technology
5. Switch Infrared
6. Ceiling two technology
7. Wall mount infrared
8. Fixture mount infrared
9. Wall mount infrared

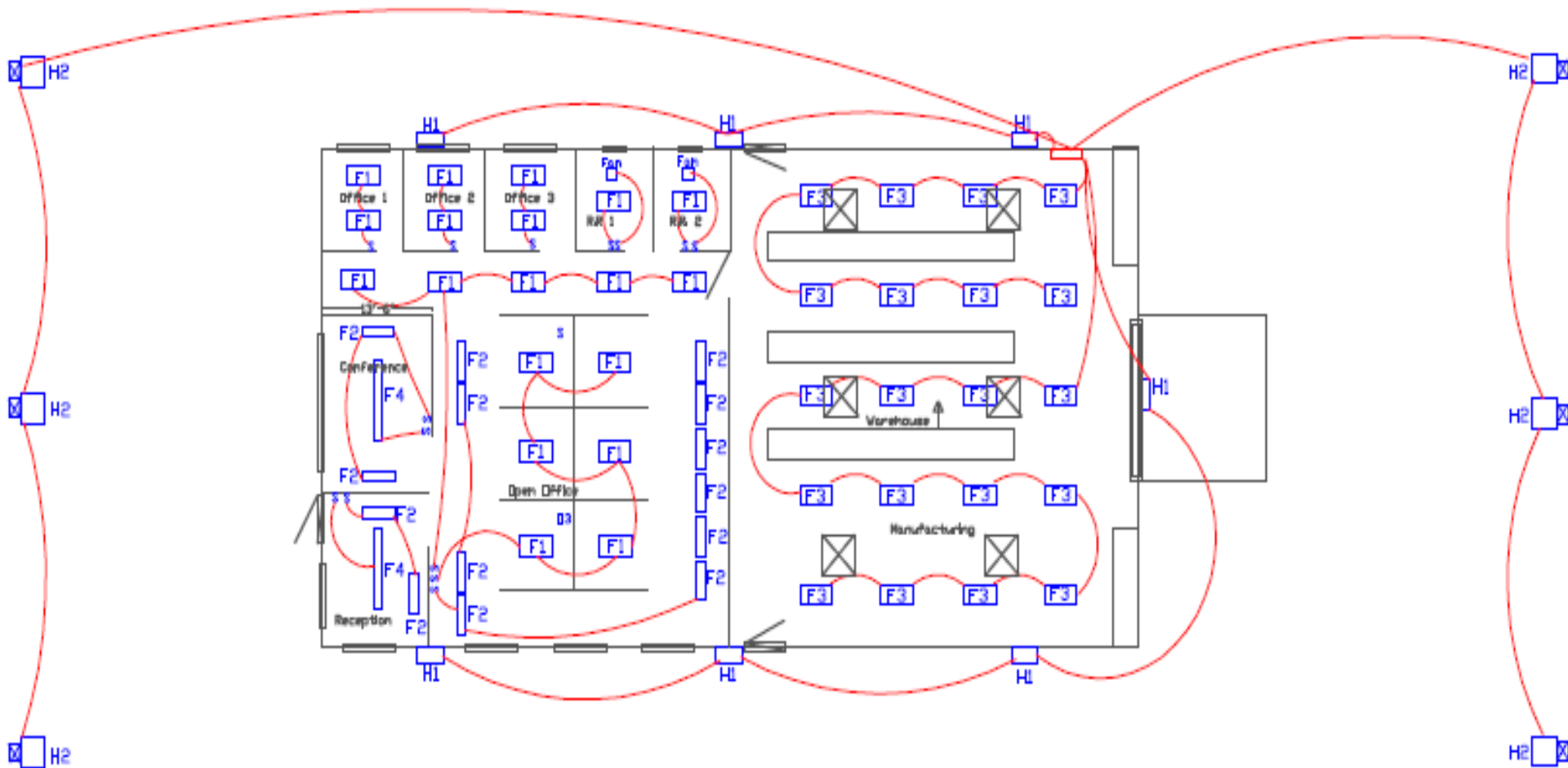


# Grade time

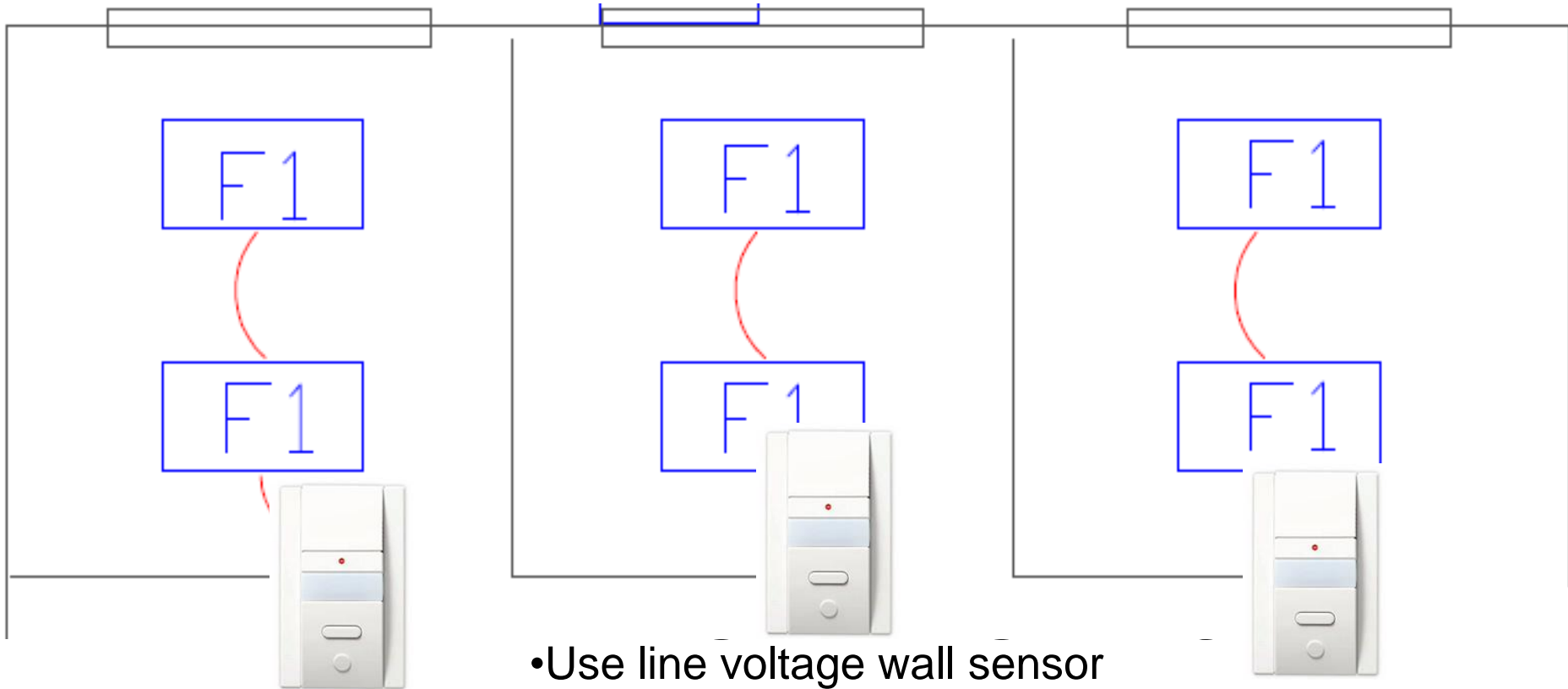
- Audience participation
- Raise your hand
- Offer options
- No spit balls at the instructor
  
- Anyone? Anyone???



# Area 1 - Closed Office

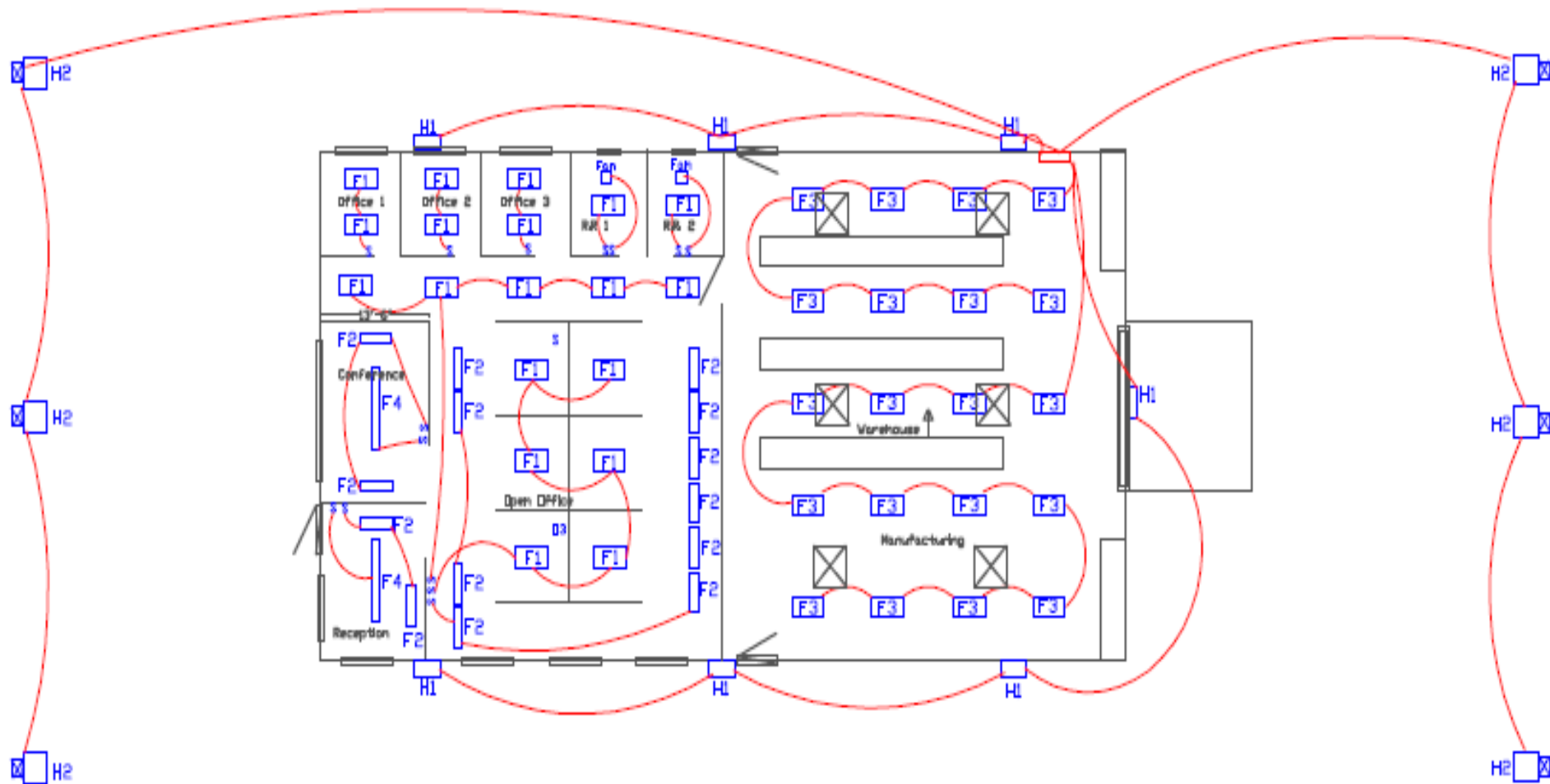


# Area 1 - Closed Office

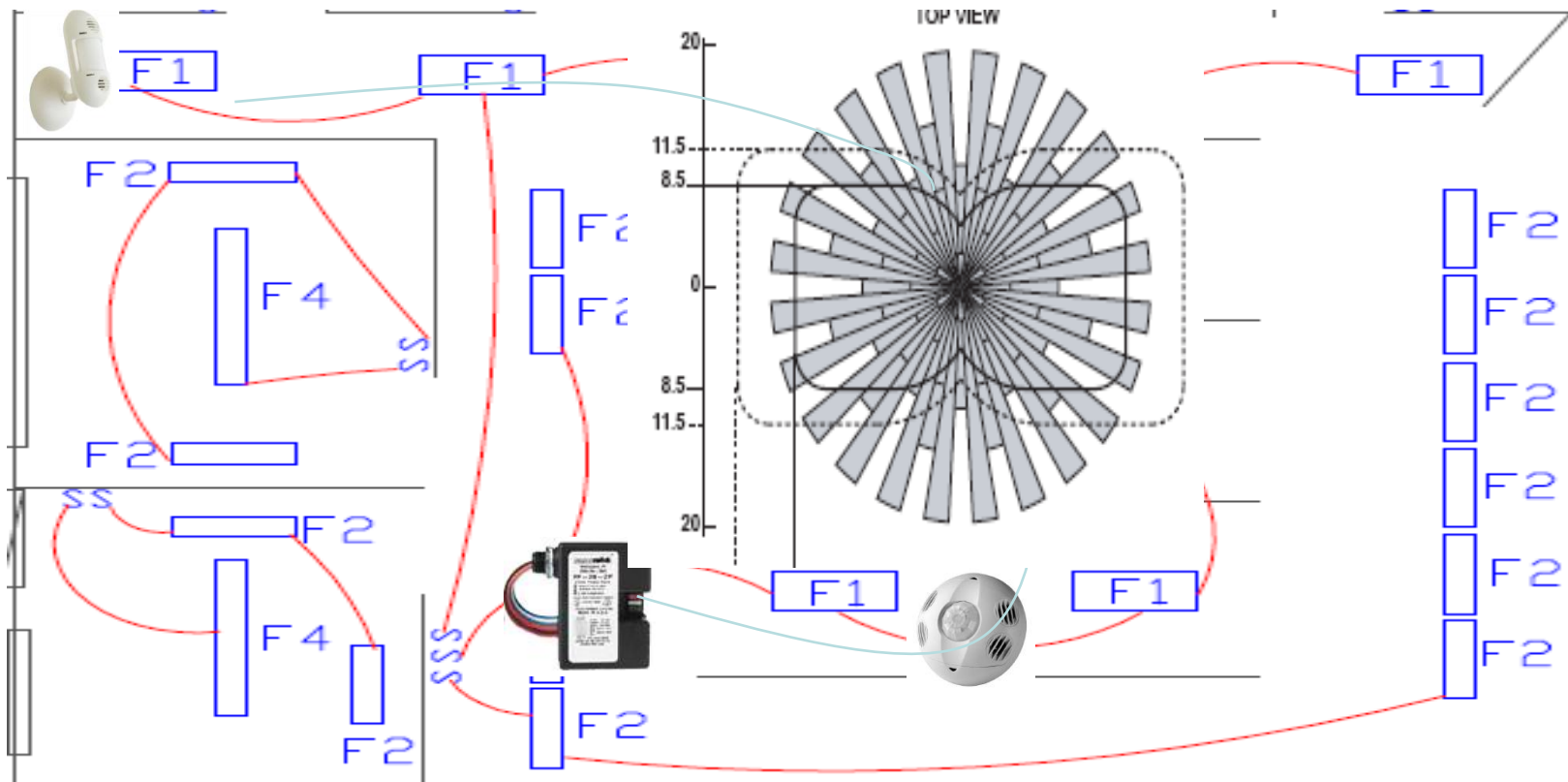


- Use line voltage wall sensor
- Infrared technology
- Integral photo cell
- Program as manual on

# Area 2 – Open Office

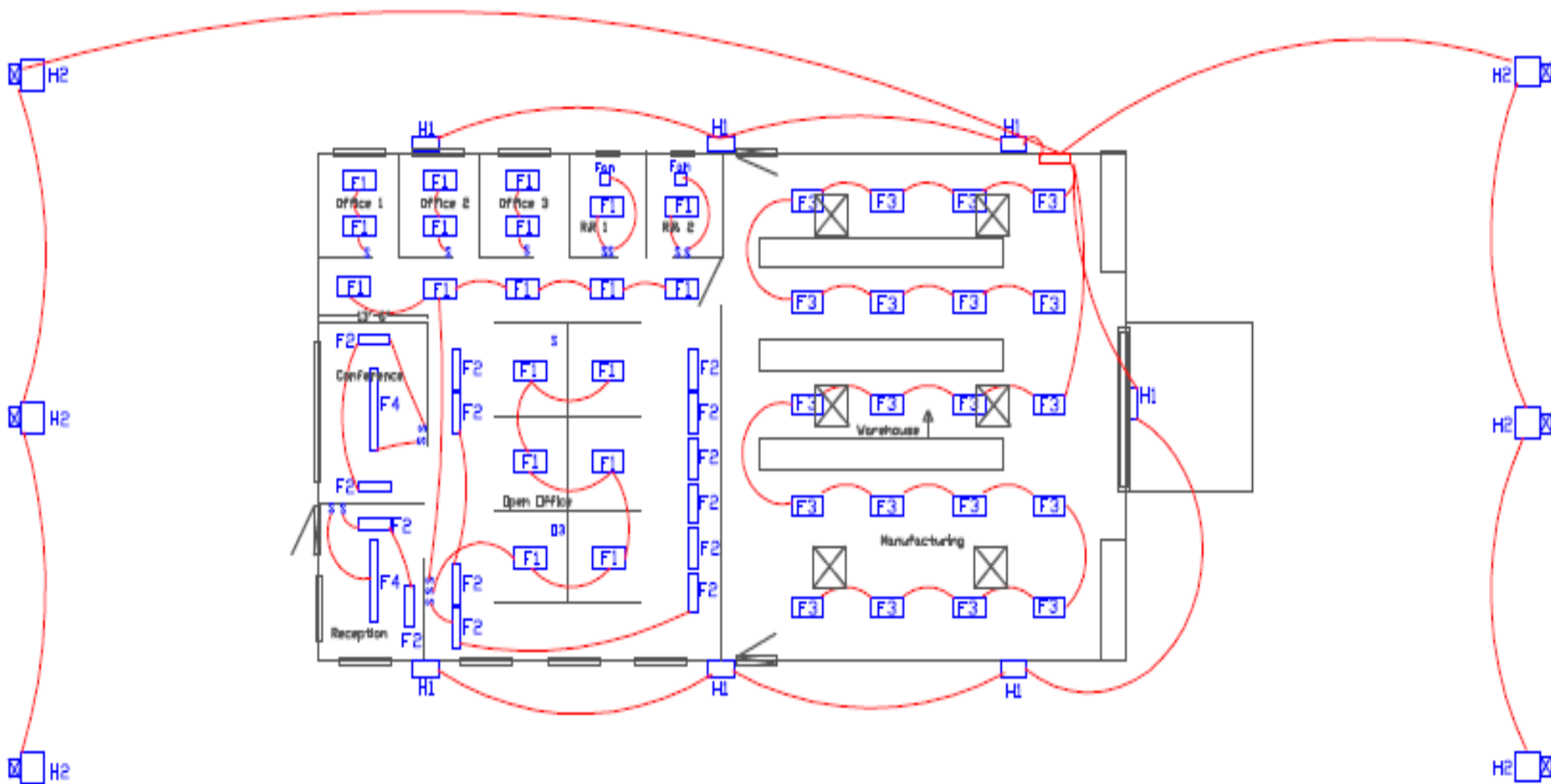


# Area 2 – Open Office



- Use low voltage ceiling sensors
- Two technology sensor (360 degree and 1000 sq. ft.)
- Power packs/relays
- Option – wall L.V. sensor
- Leave existing wall switches

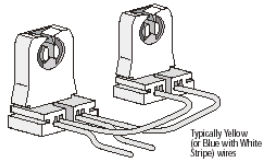
# Area 3 – Conference room



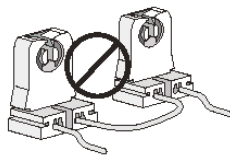
# Area 3 – Conference room

## Socket Wiring for T8 and T12 Linear

For ballasts that control more than one lamp, sockets wired to the yellow or blue-with-white stripe leads of the ballast must be wired in parallel, not in series.

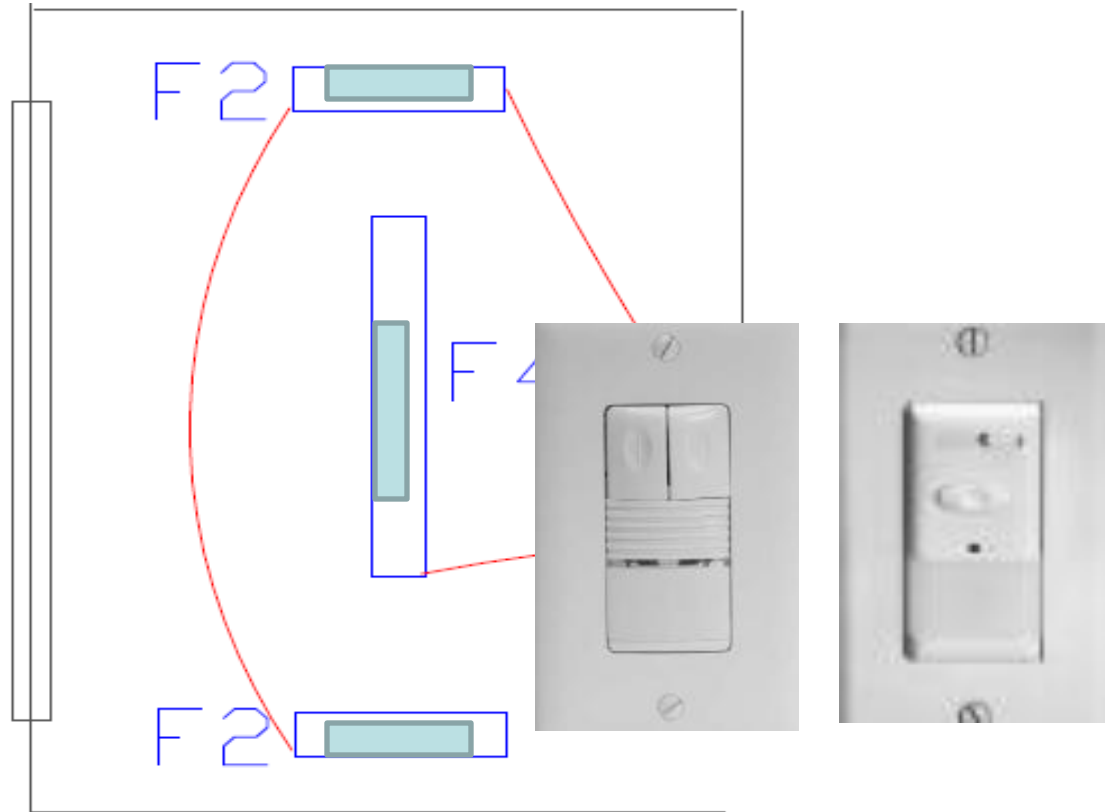


Correct - sockets wired in parallel



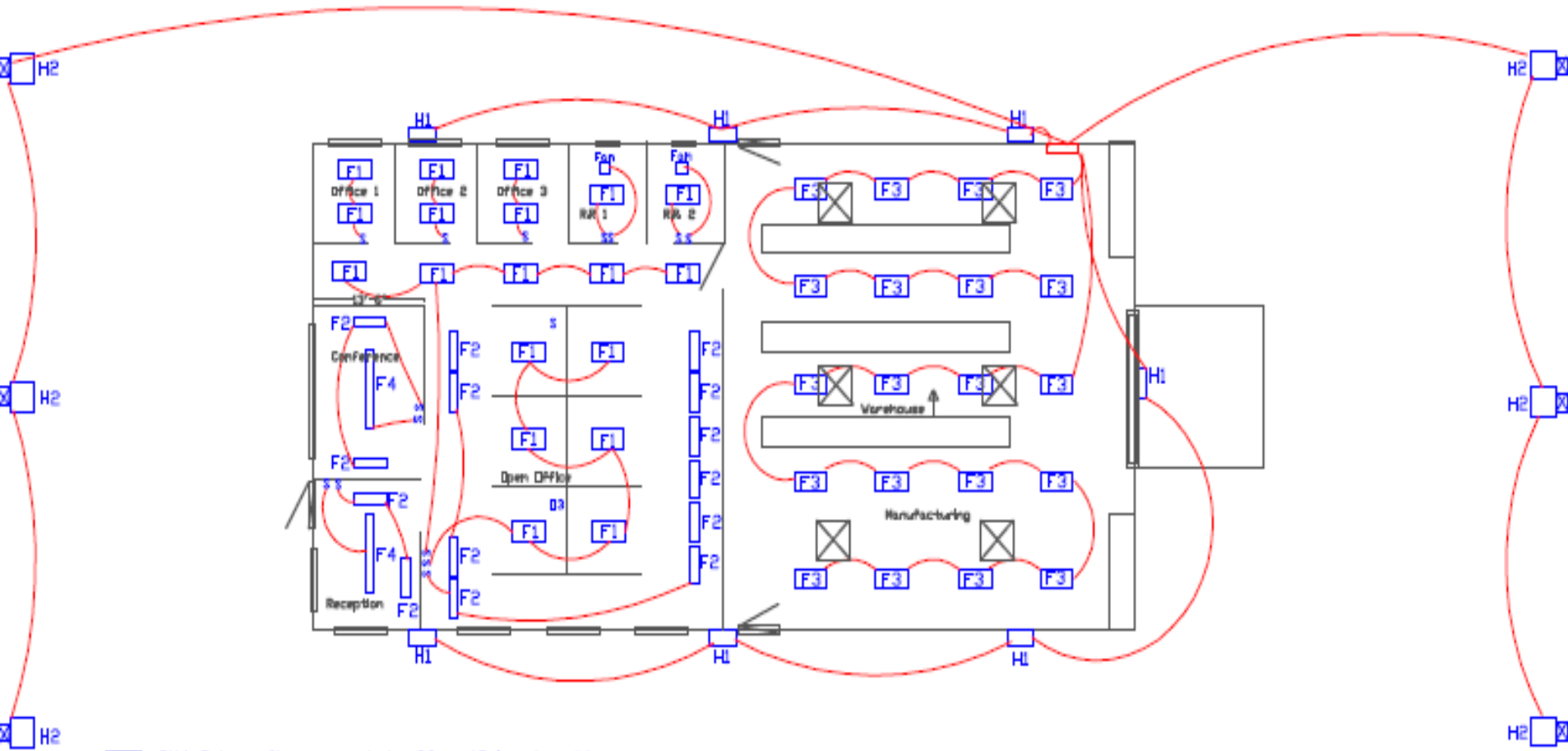
Incorrect - sockets wired in series

**Reminder**

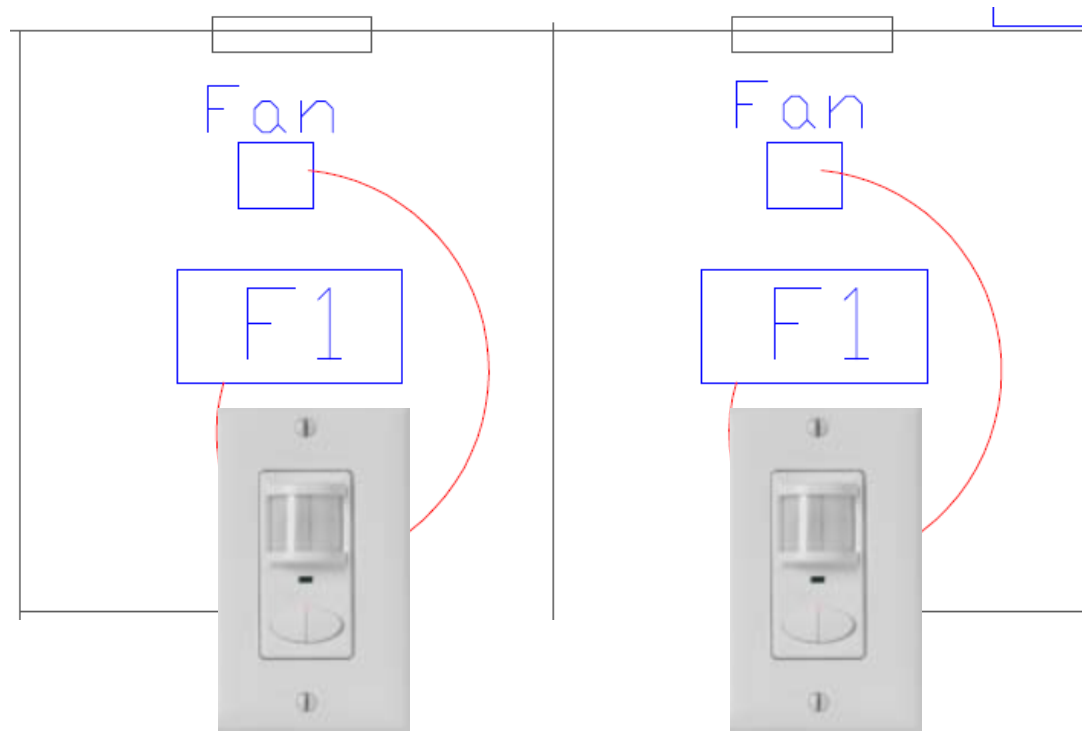


- Use line voltage 2-pole switch sensor 500 sq ft
- Integral photo cell if available
- Option – Dimming occupancy sensor
- Retro with 2-wire dimming ballast

# Area 4 – Rest Rooms

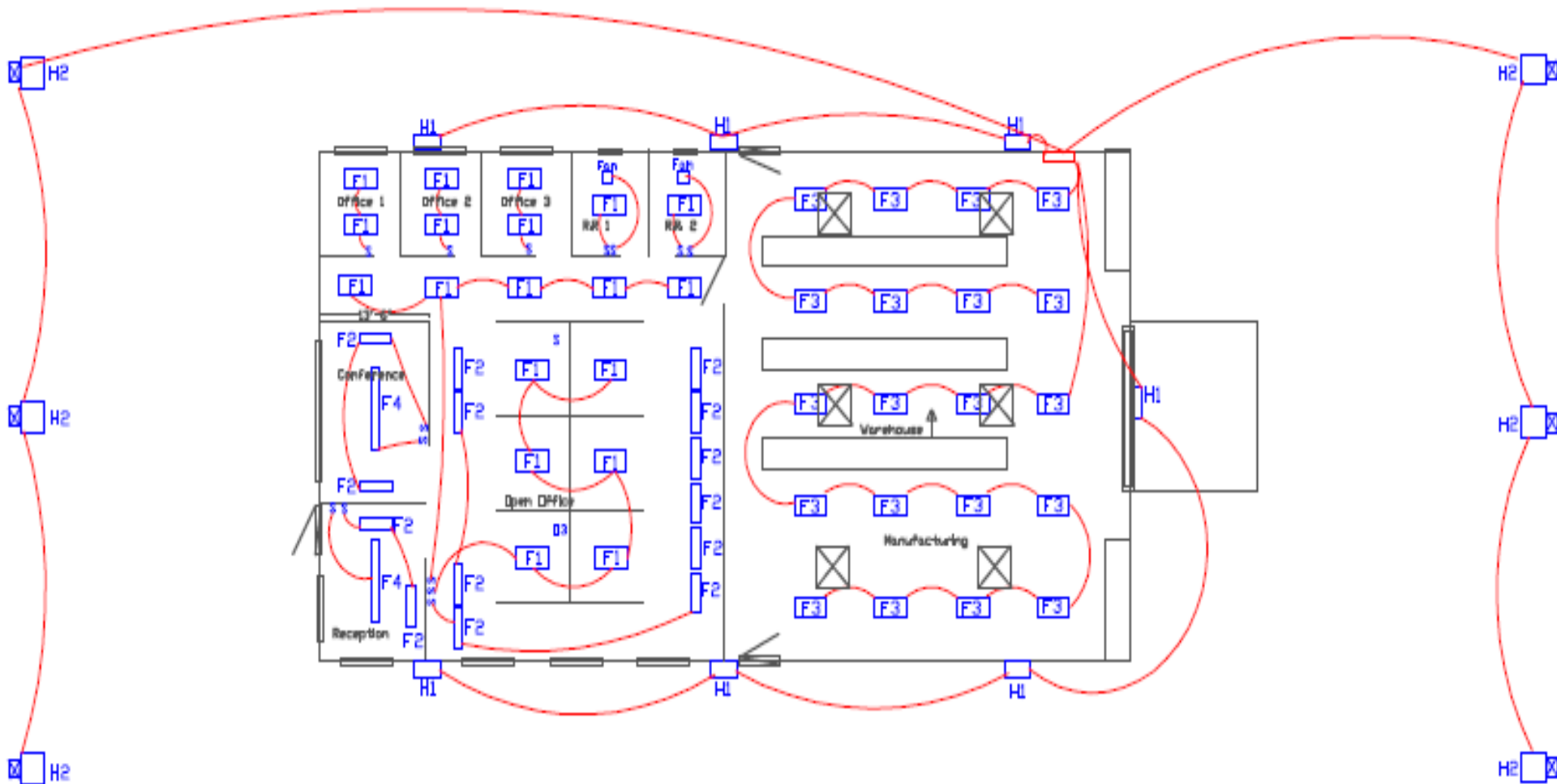


# Area 4 – Rest Rooms

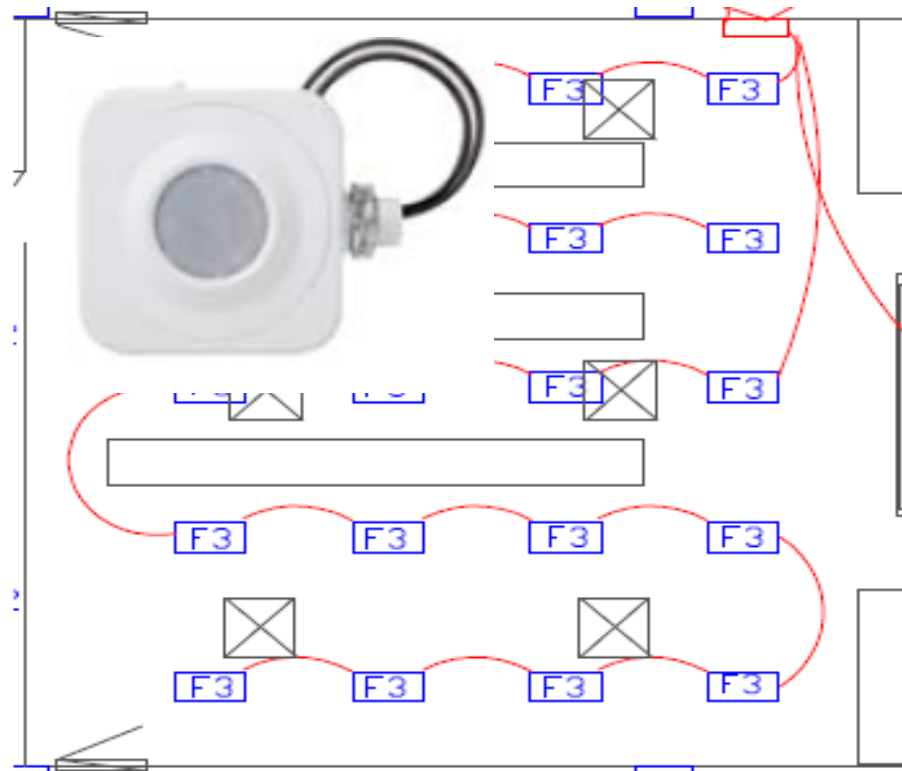


- Use line voltage 2-pole switch sensor (lights and fan)
- Infrared technology 500 sq. ft.
- Integral photo cell

# Area 5 – Warehouse/manufacturing

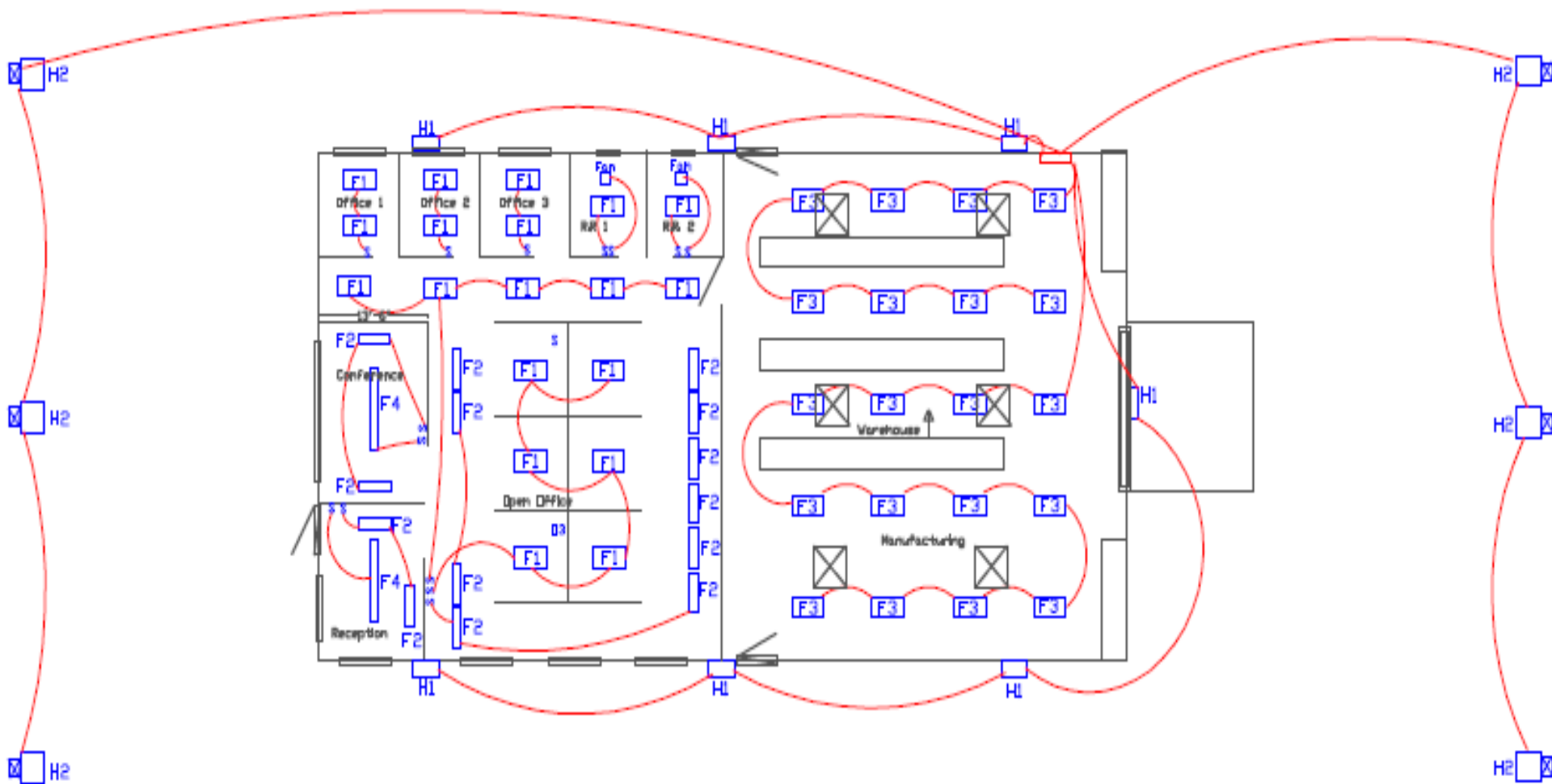


# Area 5 – Warehouse/manufacturing

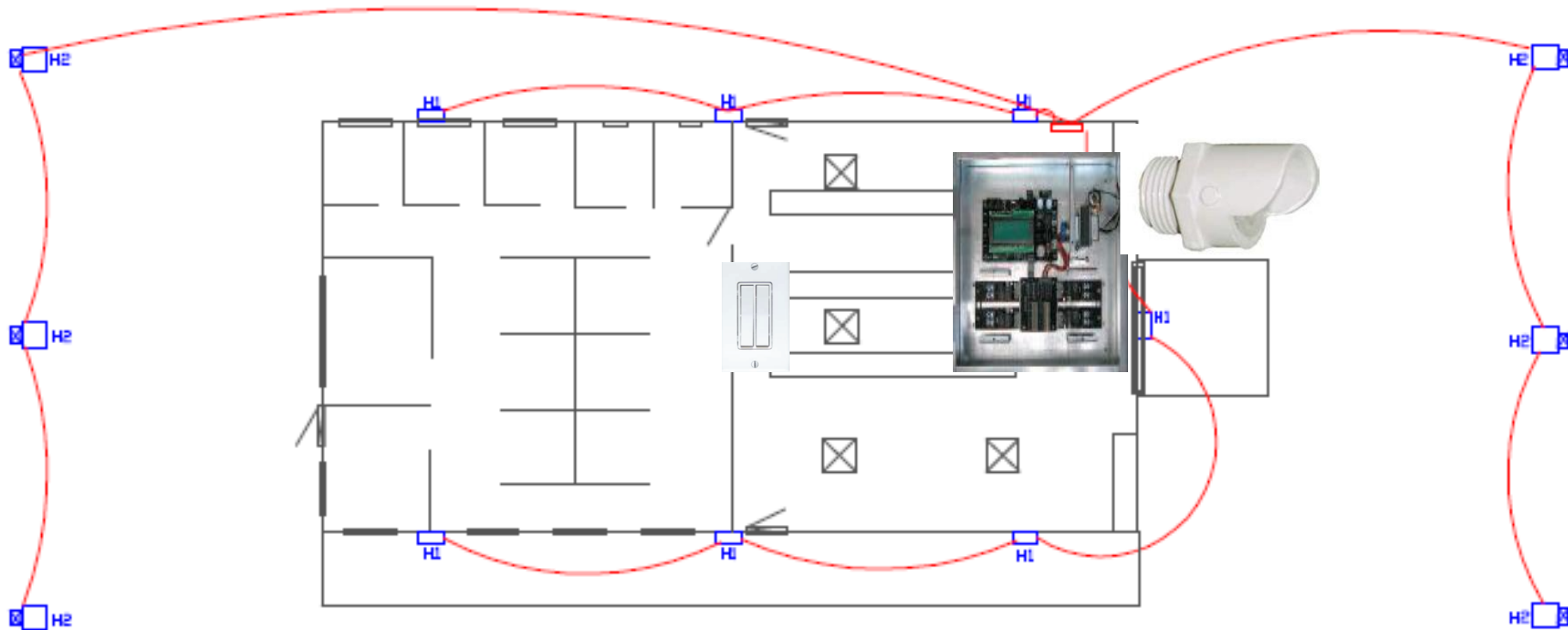


- Use line voltage fixture mount sensor
  - Infrared technology
  - Integral photo cell

# Area 6 – Exterior Lighting

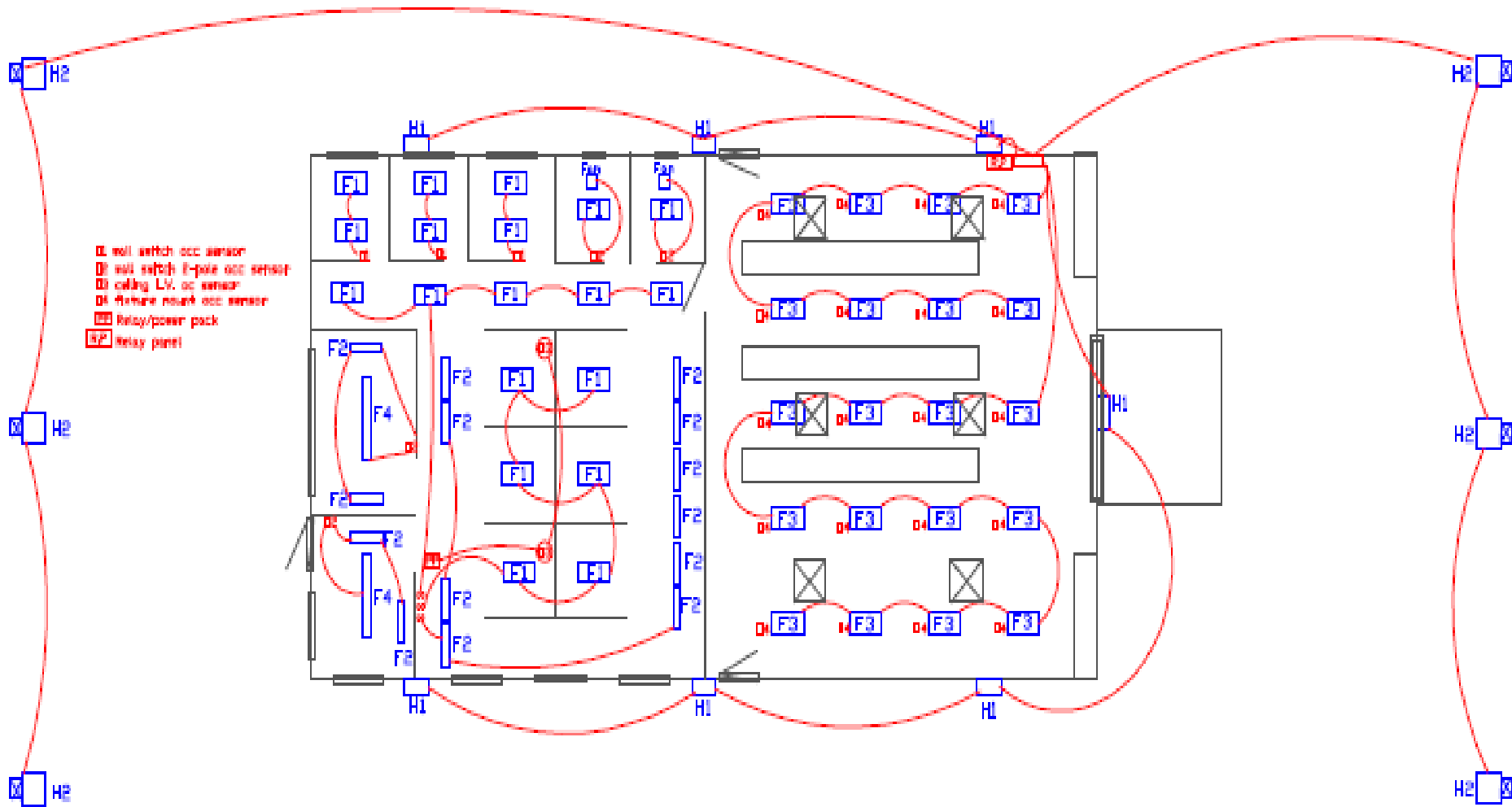


# Area 6 – Exterior Lighting



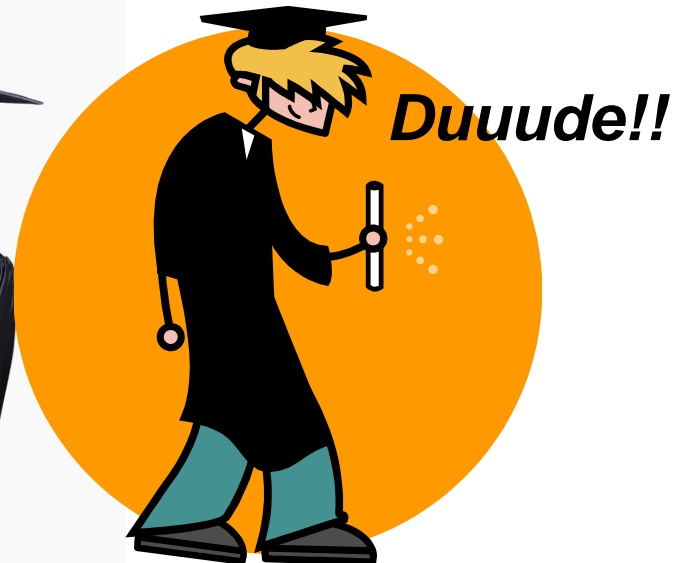
- Use 4-circuit relay panel with astronomical time clock
- Program more off time (instead always on when it's dark)
- Option install photo cell
- Option – install manual Low voltage switch (maybe wireless)

# With Controls



# Pass or fail?

- Everyone passed!!



# SCL -Let's compare!

## Before controls

- Estimated Annual Savings 38,366 kWh / Yr.
- Estimated Annual cost Savings \$ 2,110 /Yr
- Estimated Utility Incentives \$8,124
- Estimated Installation Cost \$15,587
- Minus Utility Incentive/rebate \$8,124
- Net Installation Cost 7,463
- Simple Payback 3.5 years
- Return on Investment (ROI) 28%

## After controls

- 50,878 kWh / Yr.
- \$ 2,798 /Yr
- \$10,627
- \$20,938
- \$10,627
- \$10,311
- 3.7 years
- 27%

# Tacoma -Let's compare!

## Before controls

- Estimated Annual Savings 39,165 kWh / Yr.
- Estimated Annual cost Savings \$ 1,976 /Yr
- Estimated Utility Incentives \$6,658
- Estimated Installation Cost \$15,558
- Minus Utility Incentive/rebate \$6,658
- Net Installation Cost \$8,900
- Simple Payback 4.5 years
- Return on Investment (ROI) 22.2%

## After controls

- **57,156 kWh / Yr.**
- **\$ 2,585 /Yr**
- **\$9,717**
- **\$20,373**
- **\$9,717**
- **\$10,656**
- **4.1 years**
- **24.3%**

# Educate yourself online

www.aboutlightingcontrols.org



Education **EXPRESS**

My Classroom

Courses

Feedback

## WELCOME TO EDUCATION EXPRESS

As the lighting controls authority, the Lighting Controls Association is proud to offer free, comprehensive online education about lighting controls technology, application and commissioning. [Click here](#) to see current course offerings.

After taking a brief introductory course, select short learning modules as needed to customize your learning experience. You can receive education credit by taking a comprehension test at the end of each module; a passing grade enables you to download a certification of completion that awards credit that can be used towards certification maintenance. [Click here](#) for accrediting organizations that recognize Education Express.



Log in to begin, or [click here to register](#).

Username (your e-mail address)

Password

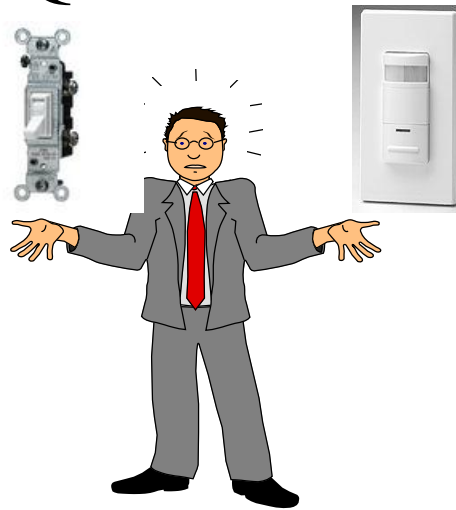
LOG IN

[Don't remember your password?](#)

# So one more time, why controls?

- **More value to customers**
  - **More cost savings = \$** (energy + maintenance)
  - Meets **sustainability** or **green** goals
  - **Differentiates** (sophistication + security benefits)
- **More value to contractors**
  - **More revenue** (based on more value)
  - **More projects** (controls only)
  - **Differentiates** (sophistication + options)

# Questions?



## Credits:

Wattstopper, Leviton, LC&D, Sensor Switch, Hubbell, Universal Lighting technologies, GE lighting, Philips, Osram Sylvania, ILC, Lutron, LCA, LC&D, Hubbell, PLC multipoint, Encelium, Crestron, Sentry Switch, Seattle Lighting Design Lab, National Lighting Bureau, IESNA.