
AABC Commissioning Group

AIA Provider Number 50111116



Challenges of Phased Projects from the Commissioning Perspective

Course Number: CXENERGY1924



Dan Eckelkamp, CxA
Engineered Air Balance. Co., Inc.

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Course Description

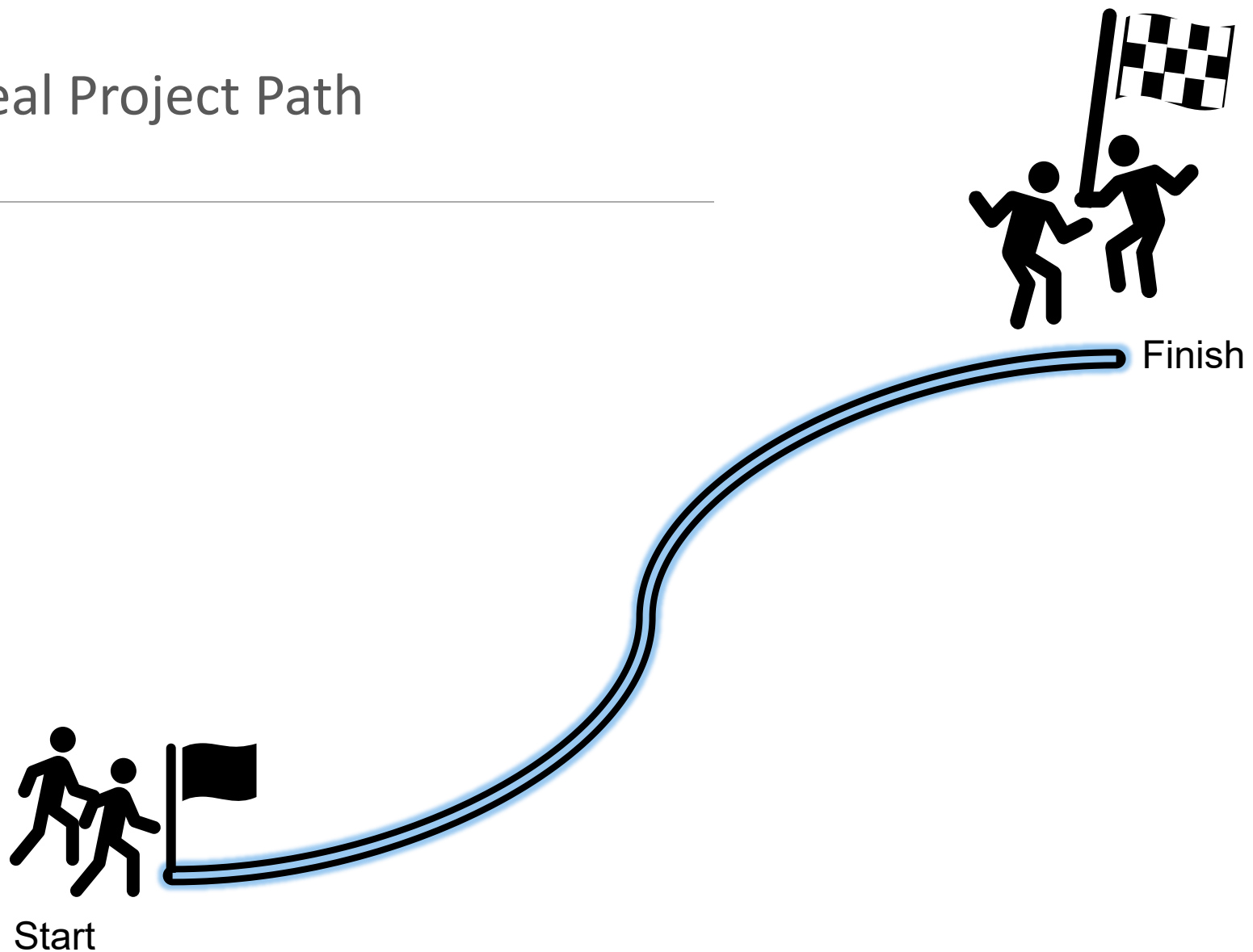
We'll explore the challenges presented to the commissioning process by projects that have a phased turnover schedule. We will review a recent multistory hospital for which the design did not account for a phased turnover approach and cover the challenges this produced and the strategies devised to try to mitigate them.

Learning Objectives

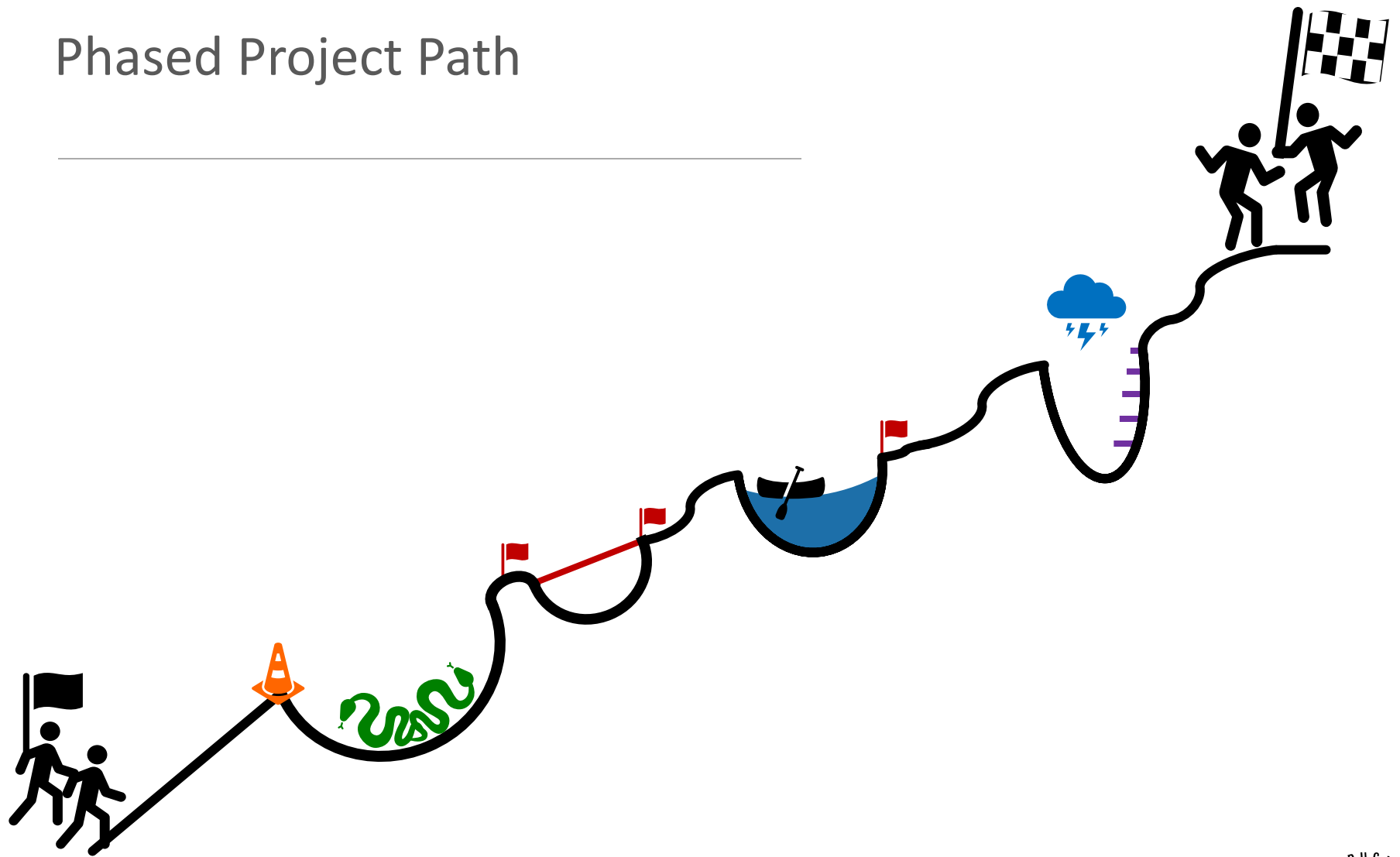
At the end of the this course, participants will be able to:

1. Identify the challenges of phased turnover projects such as the unexpected conditions discovered in future phases and phase boundaries not matching architectural boundaries.
2. Review some potential solutions to these common challenges.
3. Understanding building pressurization as it relates to an example of a phased turnover project.
4. Explore a few strategies for maintaining systems cleanliness in hospital and laboratory phased turnover projects.

Ideal Project Path

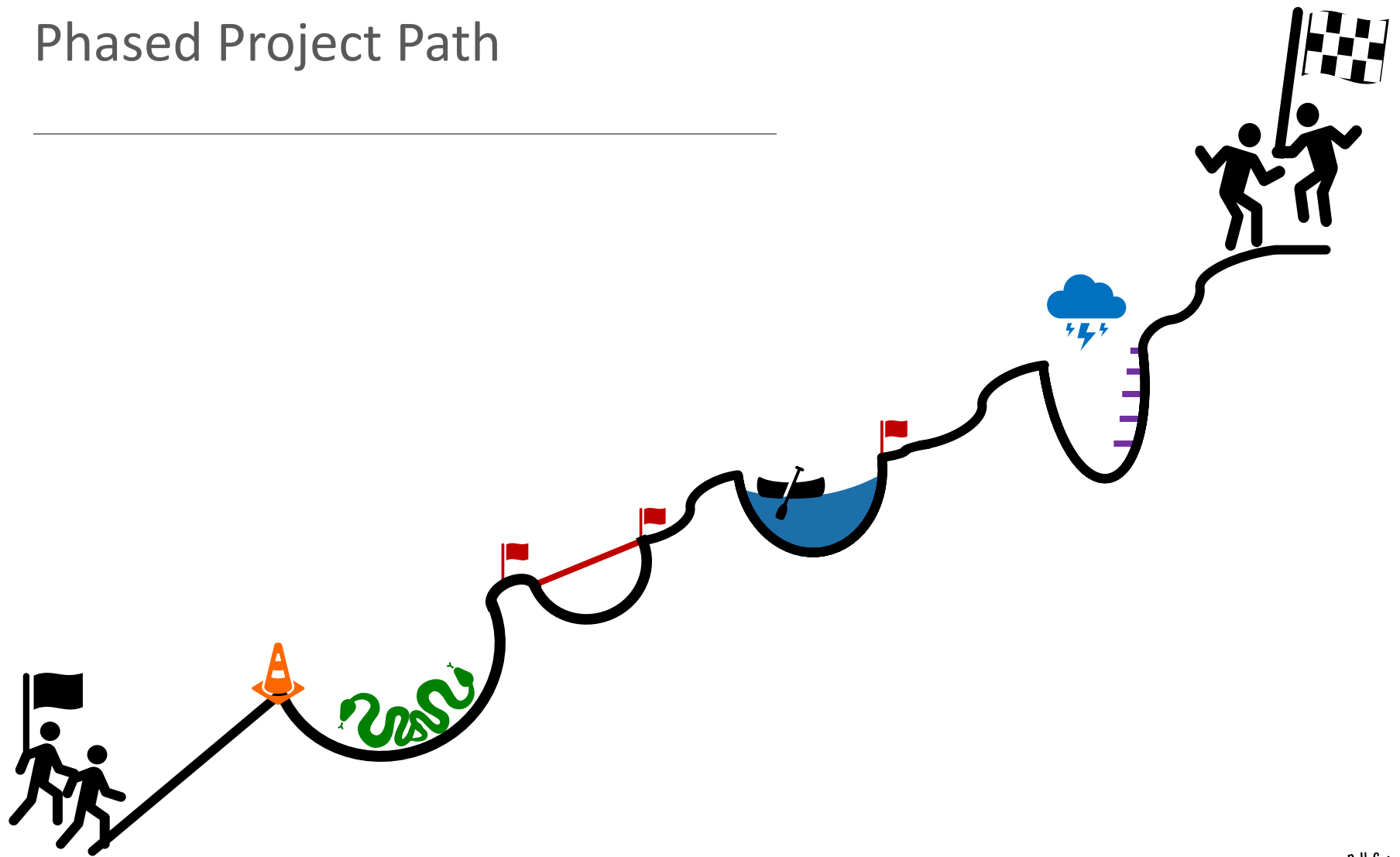


Phased Project Path



Start

Phased Project Path

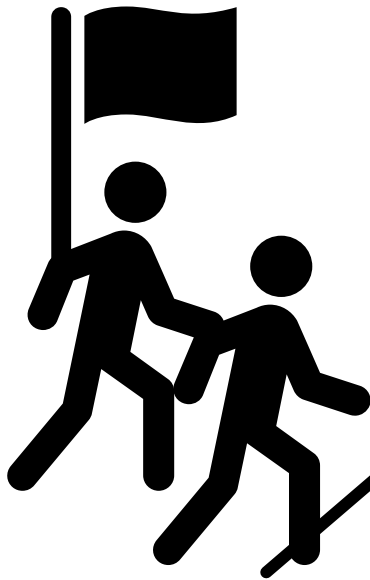


Start

Phased Project Path



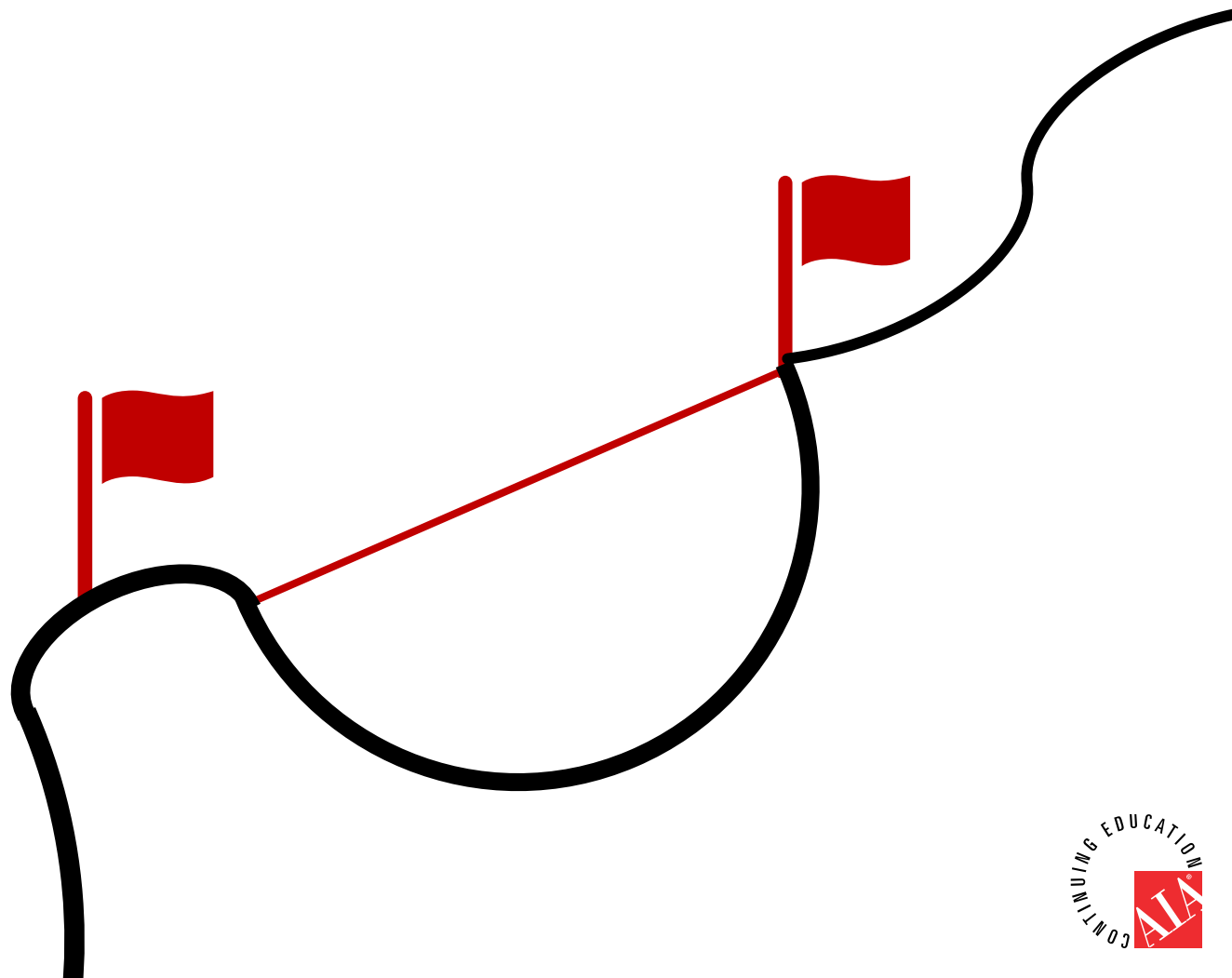
One Phase at a Time



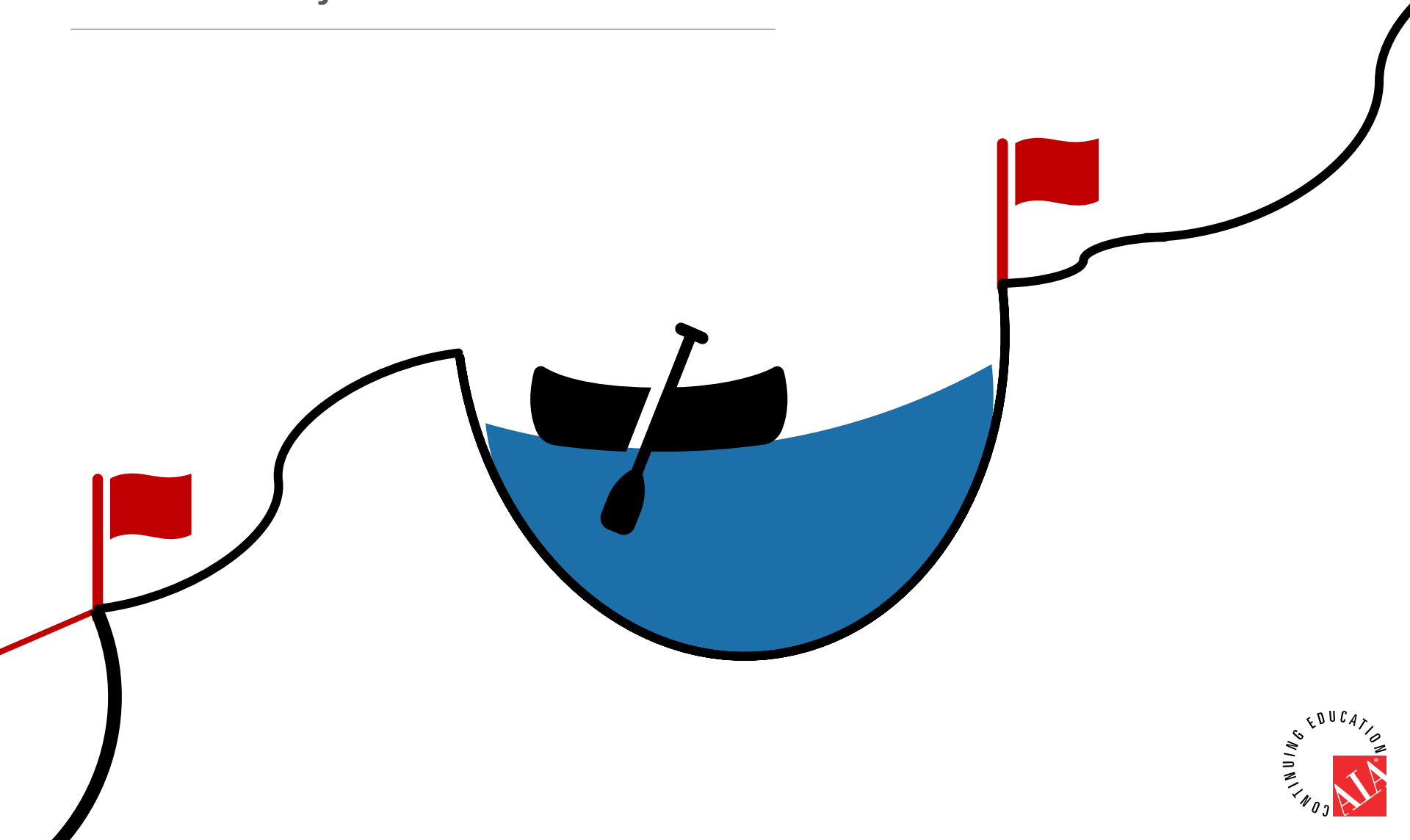
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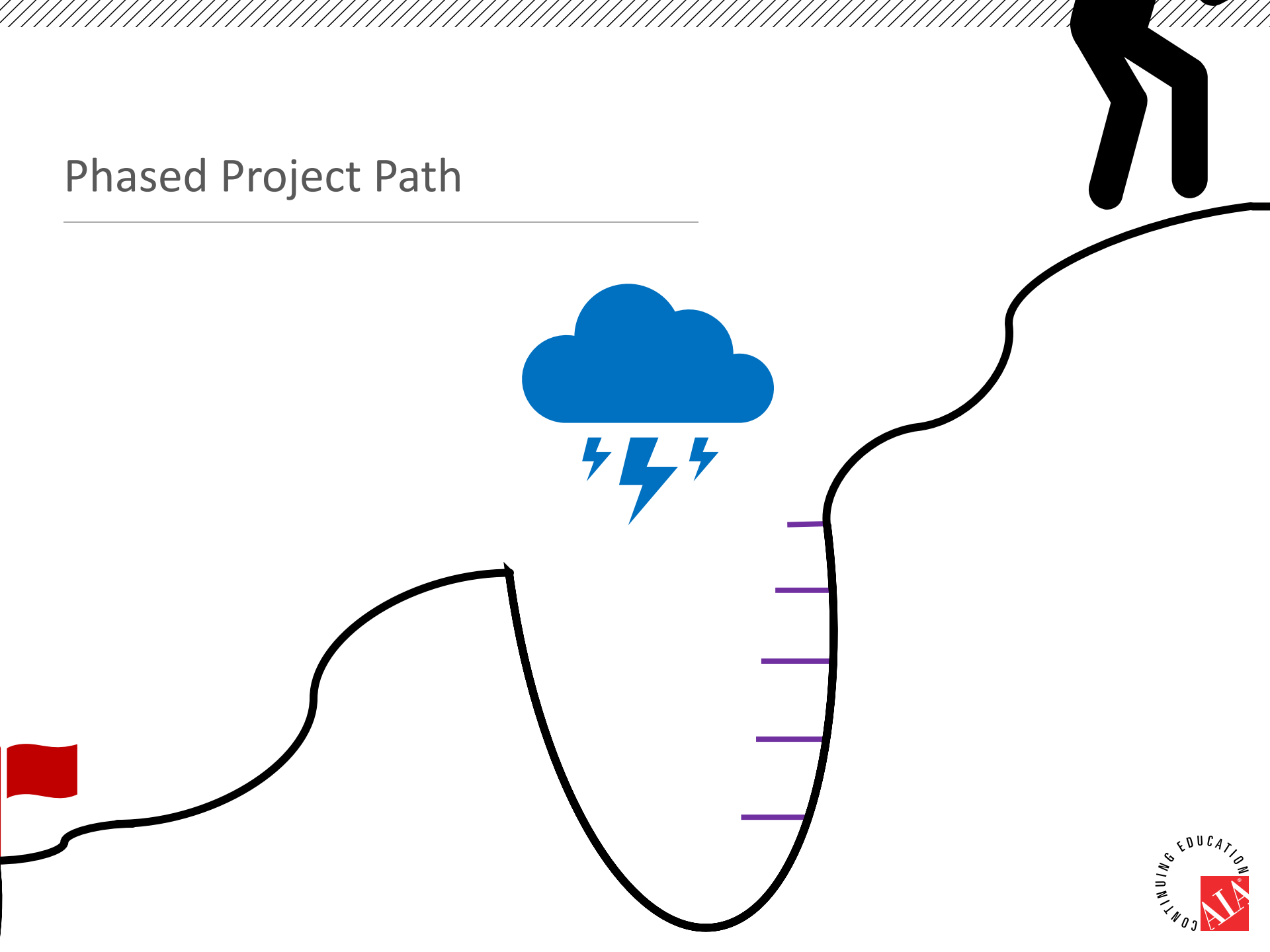
Phased Project Path



Phased Project Path



Phased Project Path



Phased Project Path – test



Phased Project Challenges



Unoccupied Workspace



VS

Phased Project



Occupied Operational Facility

Phased Projects Common Challenges



Many building systems do not adhere to the architectural boundaries of each phase.

Static pressure control sensors (2/3rd sensor) might not be installed until later phases.

Software programming changes during later phases can negate previous software testing.

Maintaining building pressurization can be difficult until all phases are complete.

Project team members can change over long project timeframes.

Phased Project Challenges

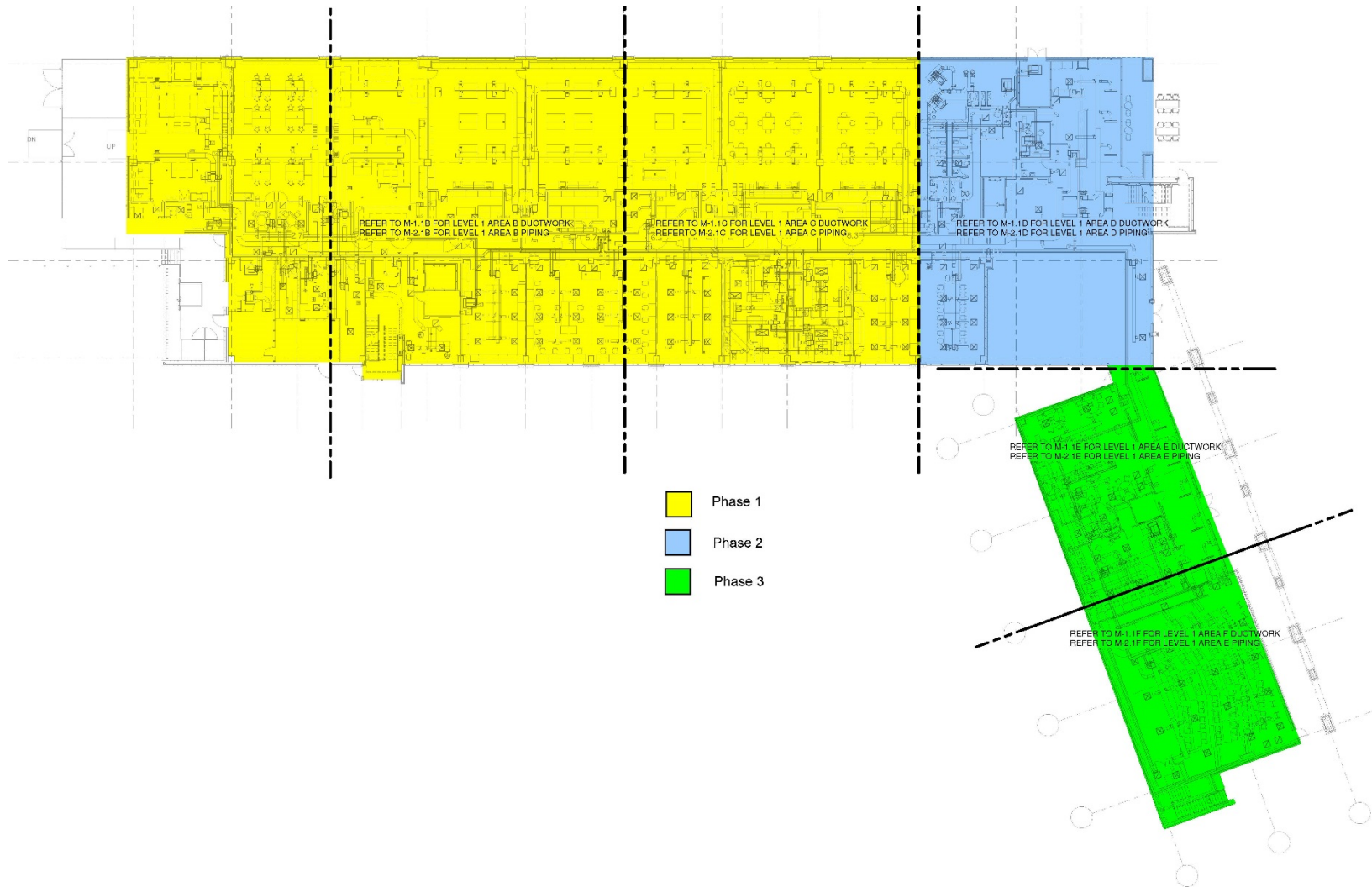


Meet the Operational Requirements for Occupants

- ☐ Can they manage with intermittent outages?
- ☐ Are they operating 24/7?
- ☐ What kind of disruptions can the occupants handle?
- ☐ When is the most optimal time to lose electrical power?
- ☐ Do they need to maintain pressurization?
- ☐ Are there temperature requirements to be maintained?
- ☐ Are there humidity requirements to be maintained?



Architectural Boundaries



Architectural Boundaries

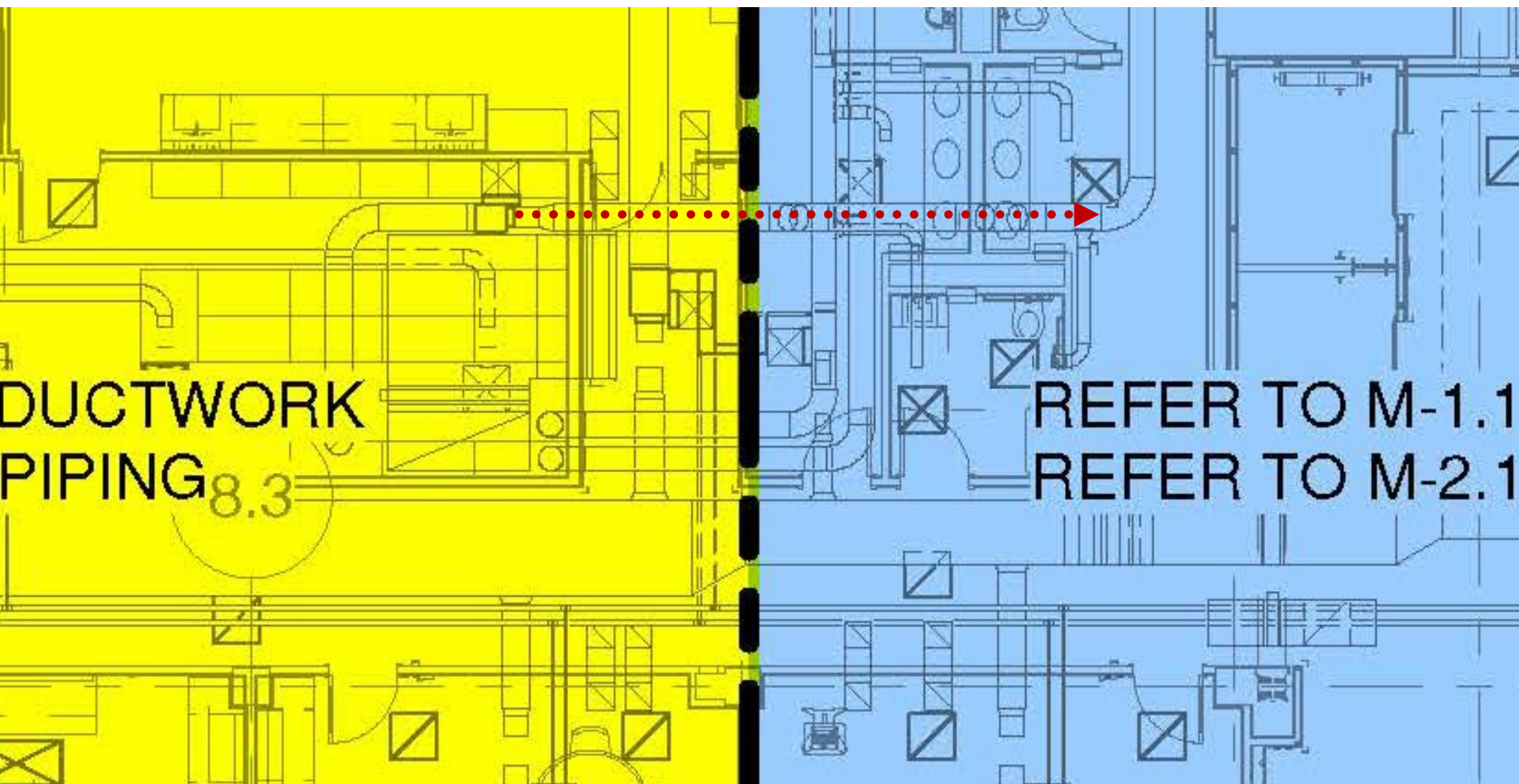
Ductwork



Phase 1

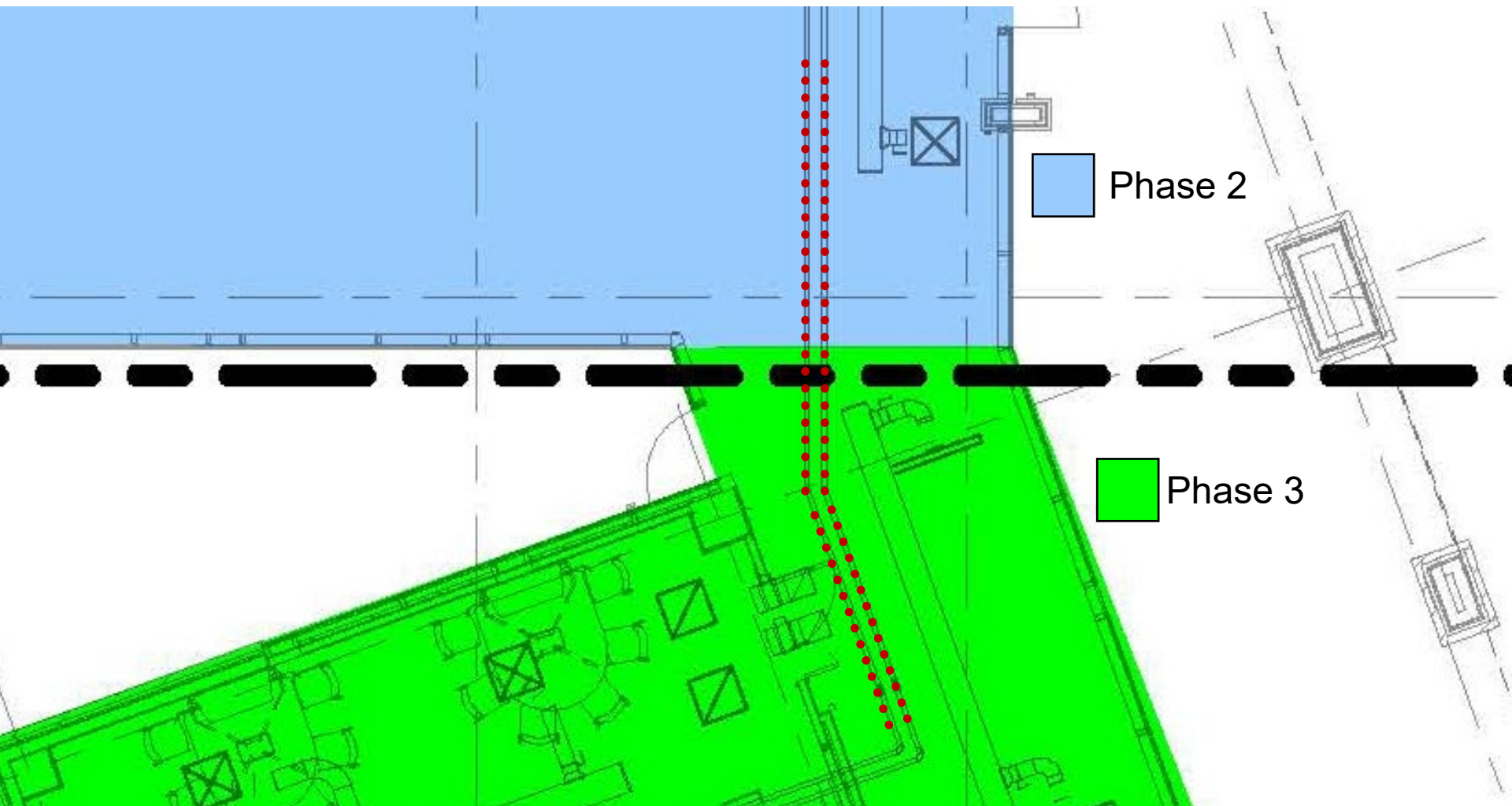


Phase 2



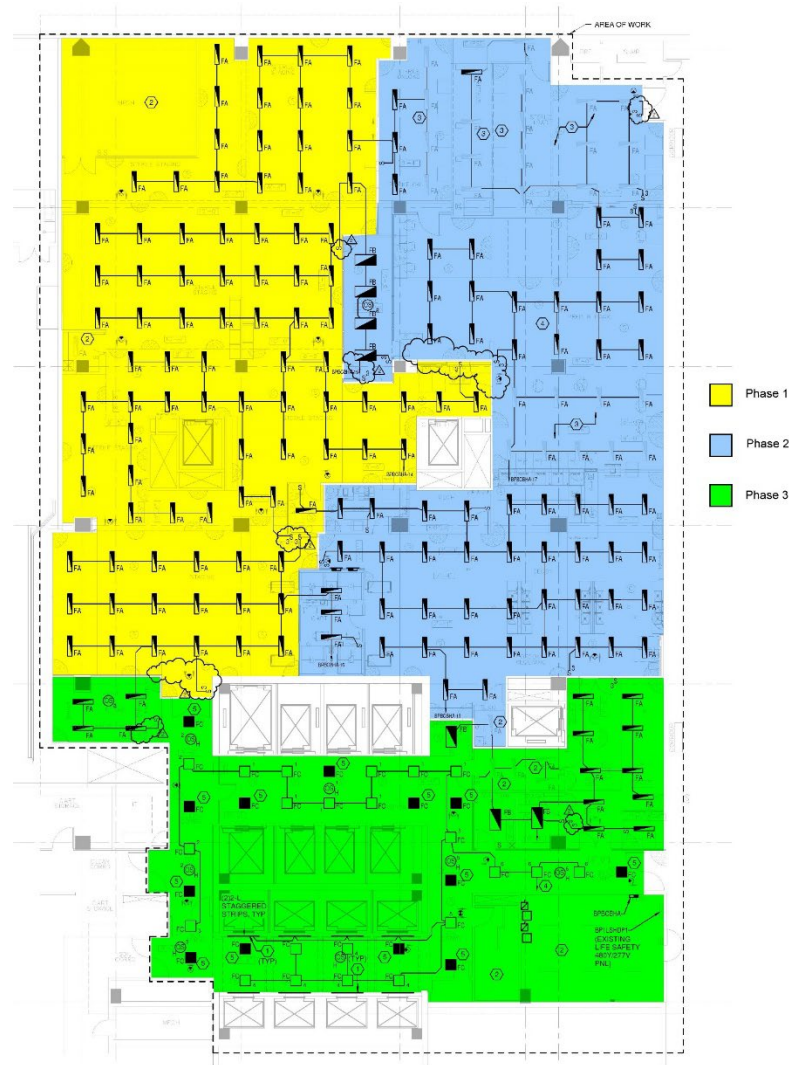
Architectural Boundaries

Hydronics



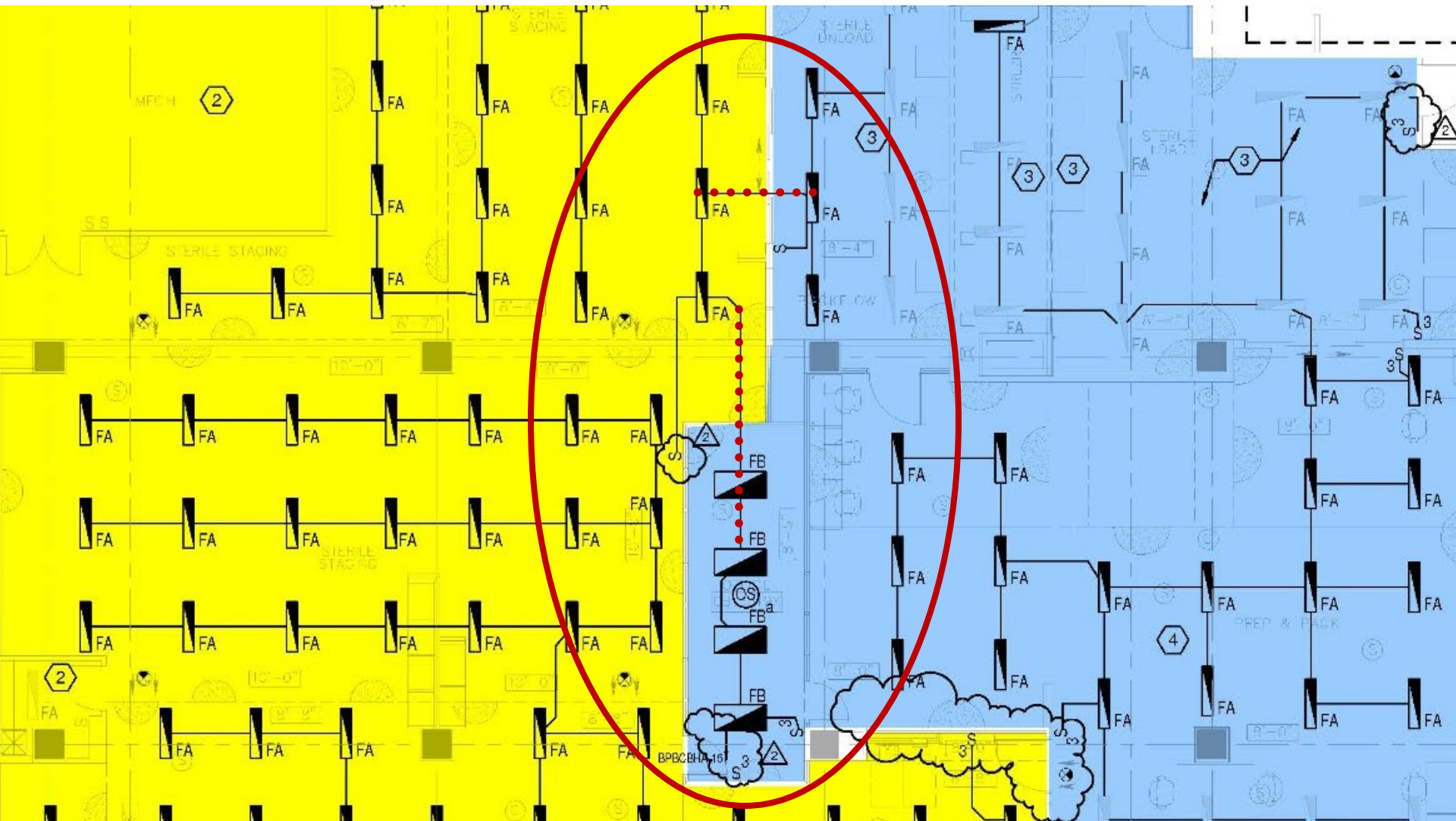
Architectural Boundaries

Lighting



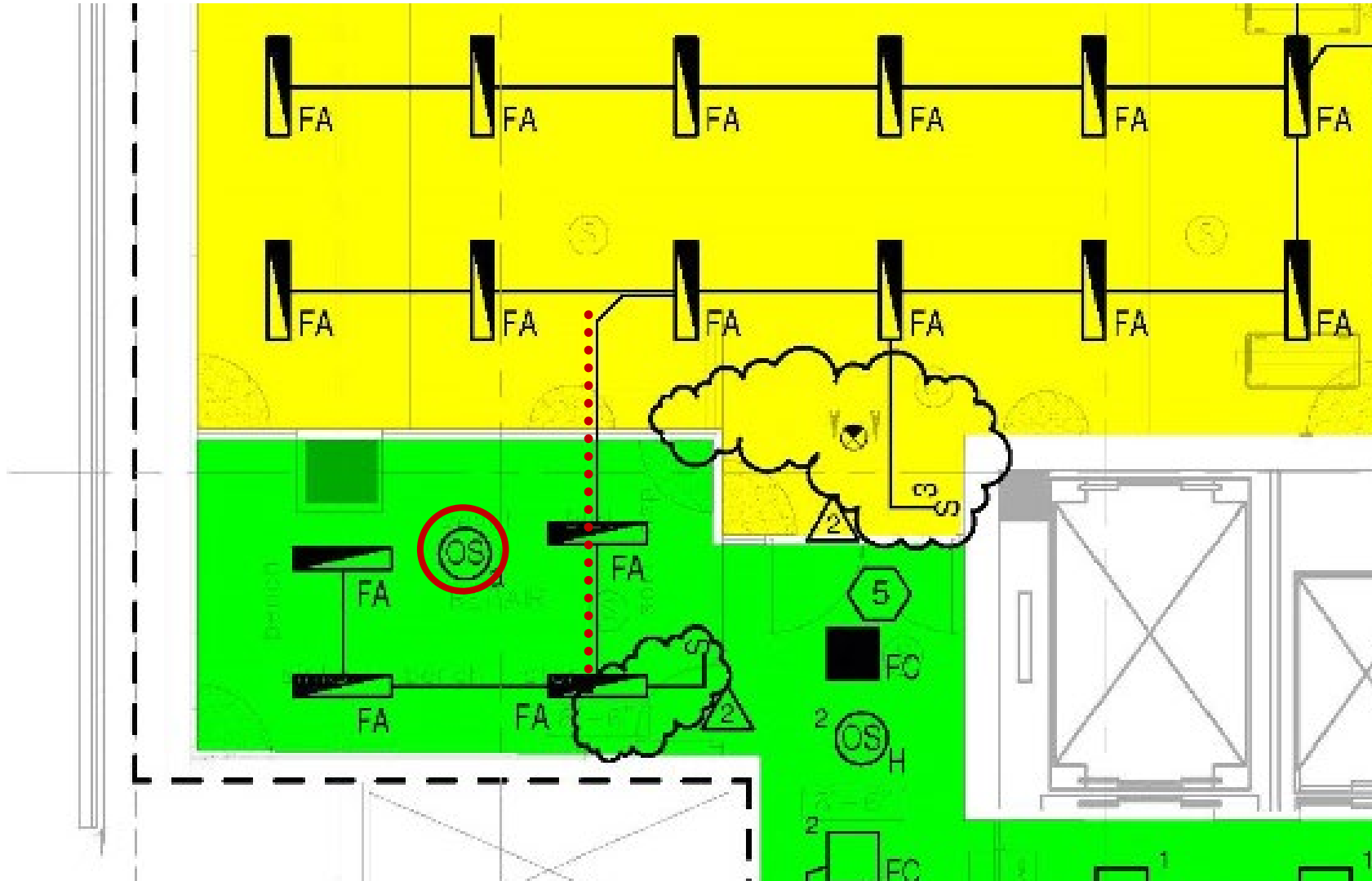
Architectural Boundaries

Lighting Circuits



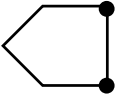
Architectural Boundaries

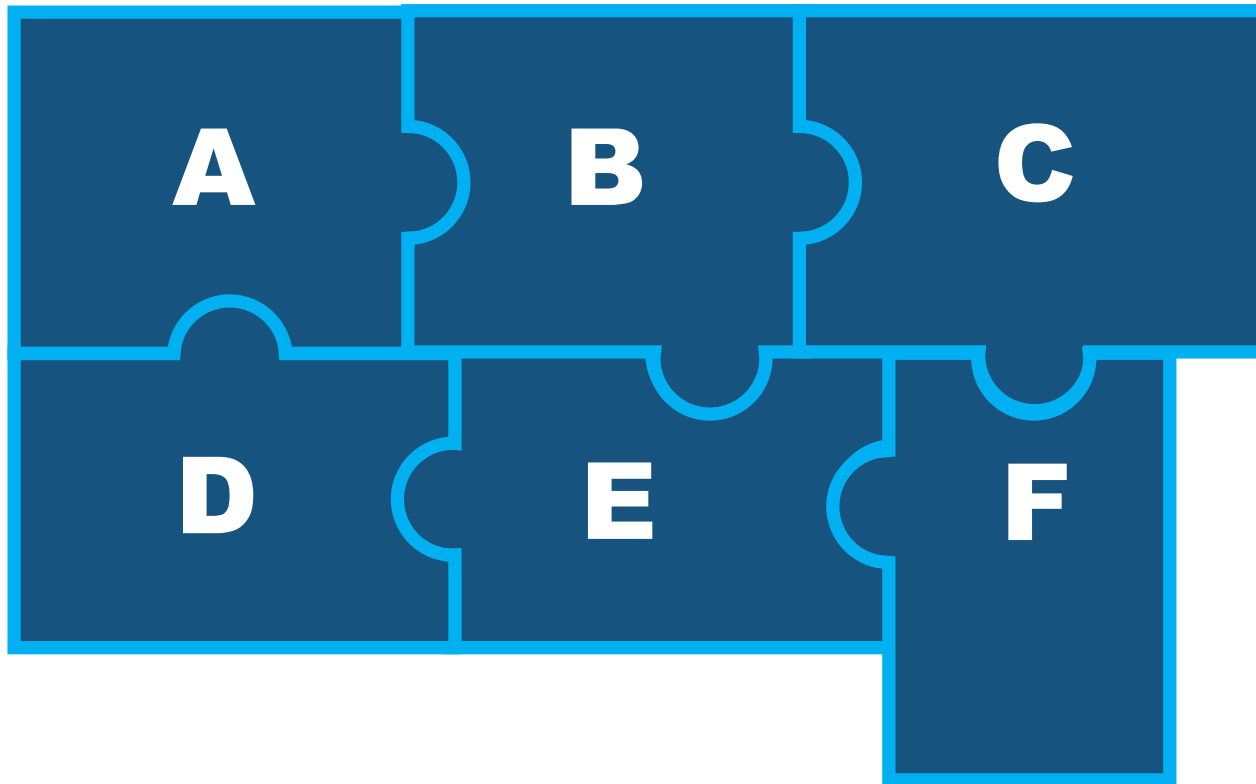
Lighting Control Programs



Smoke Zone Project Software Changes



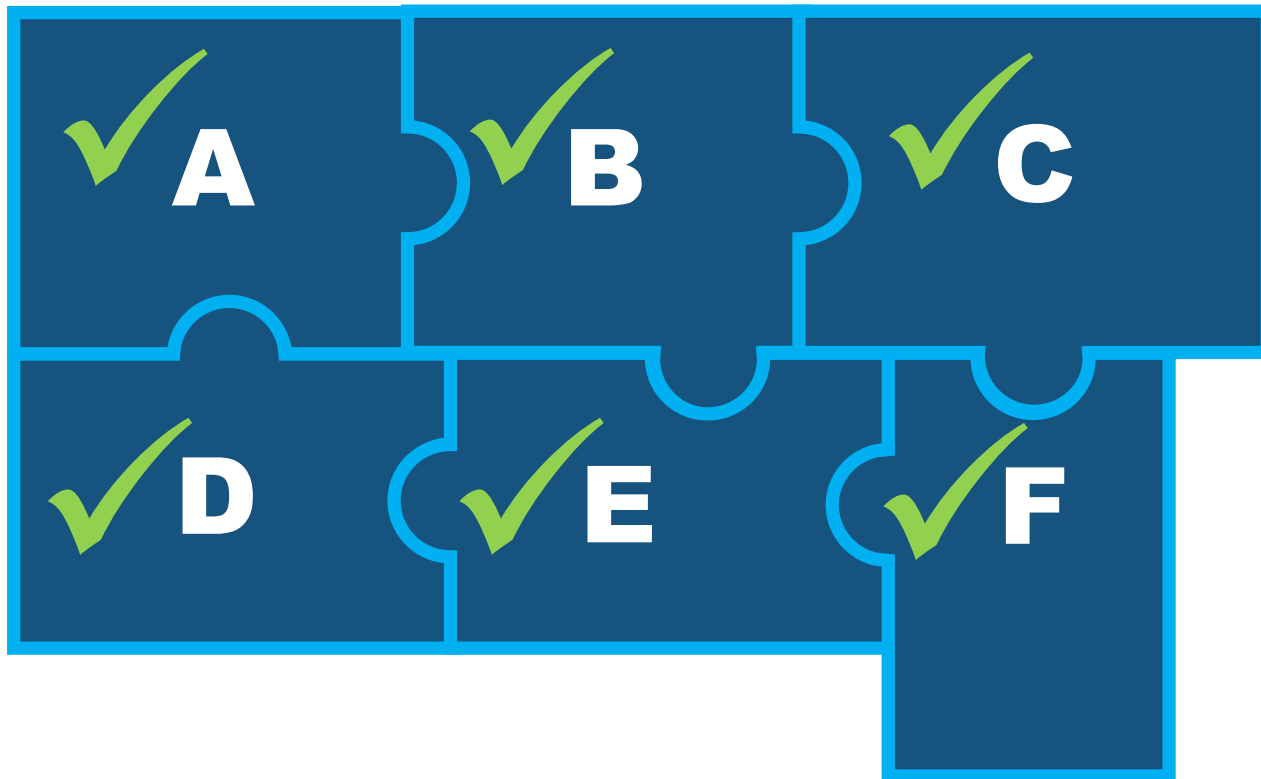
6 Zones Reworked  Fire Alarm
Fire Smoke Dampers



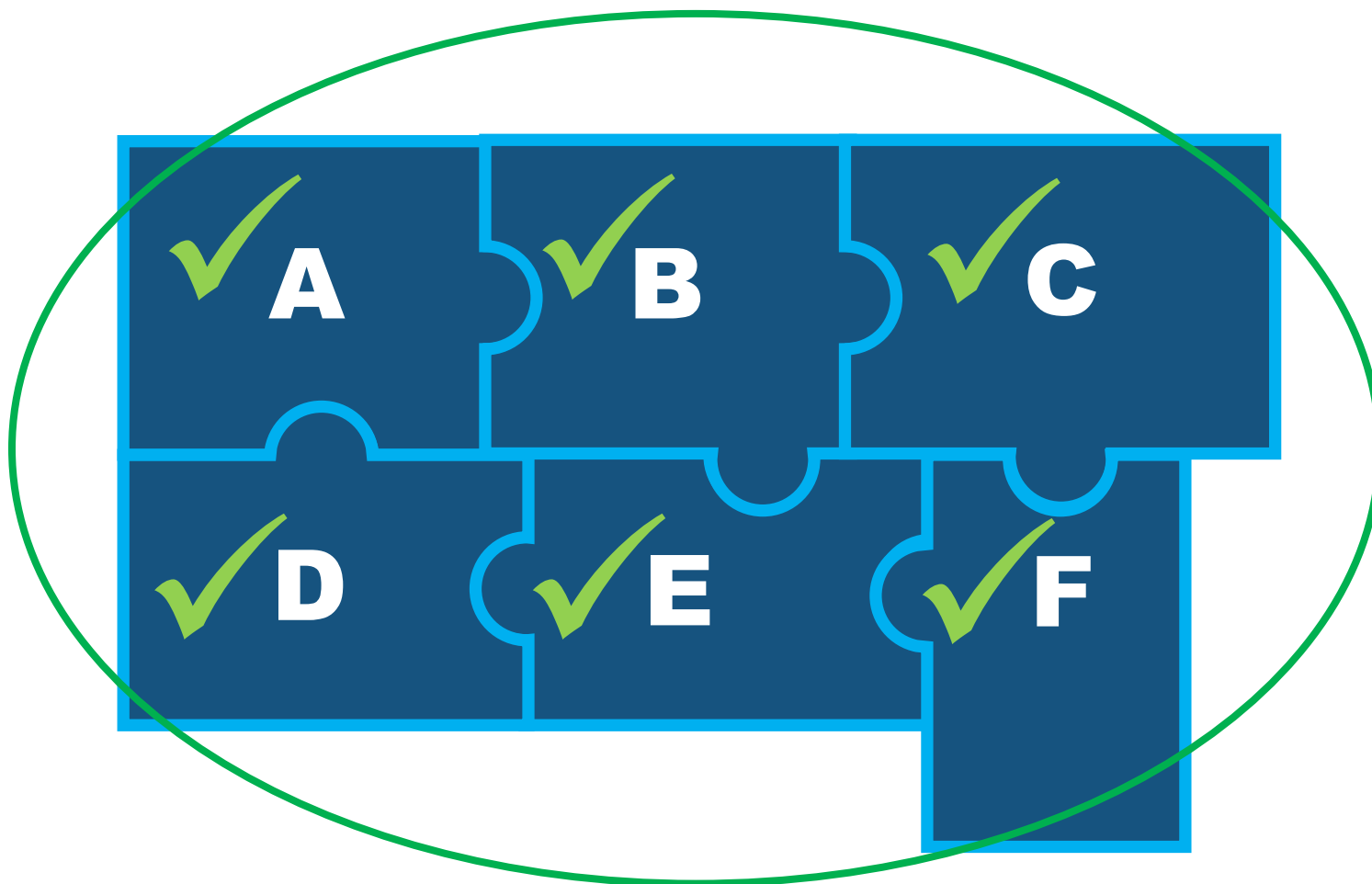
Smoke Zone Project Software Changes



Test each New Zone after each Phase

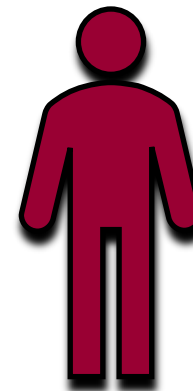
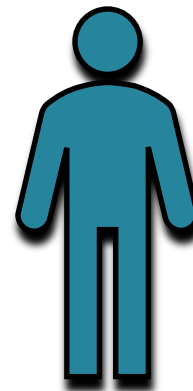
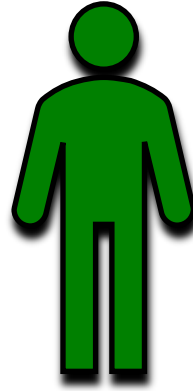
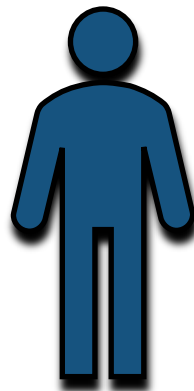
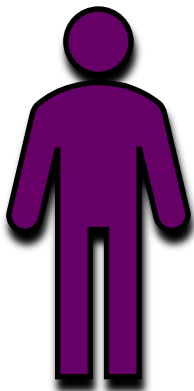
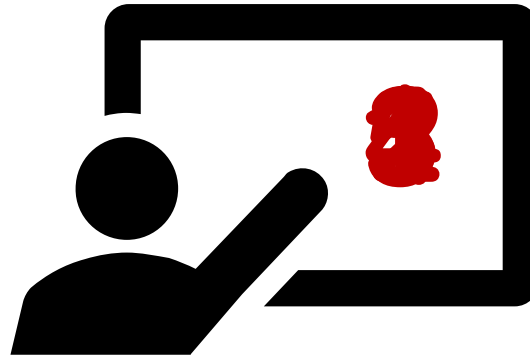
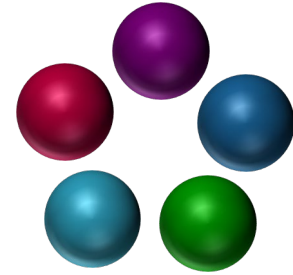


Smoke Zone Project Successful

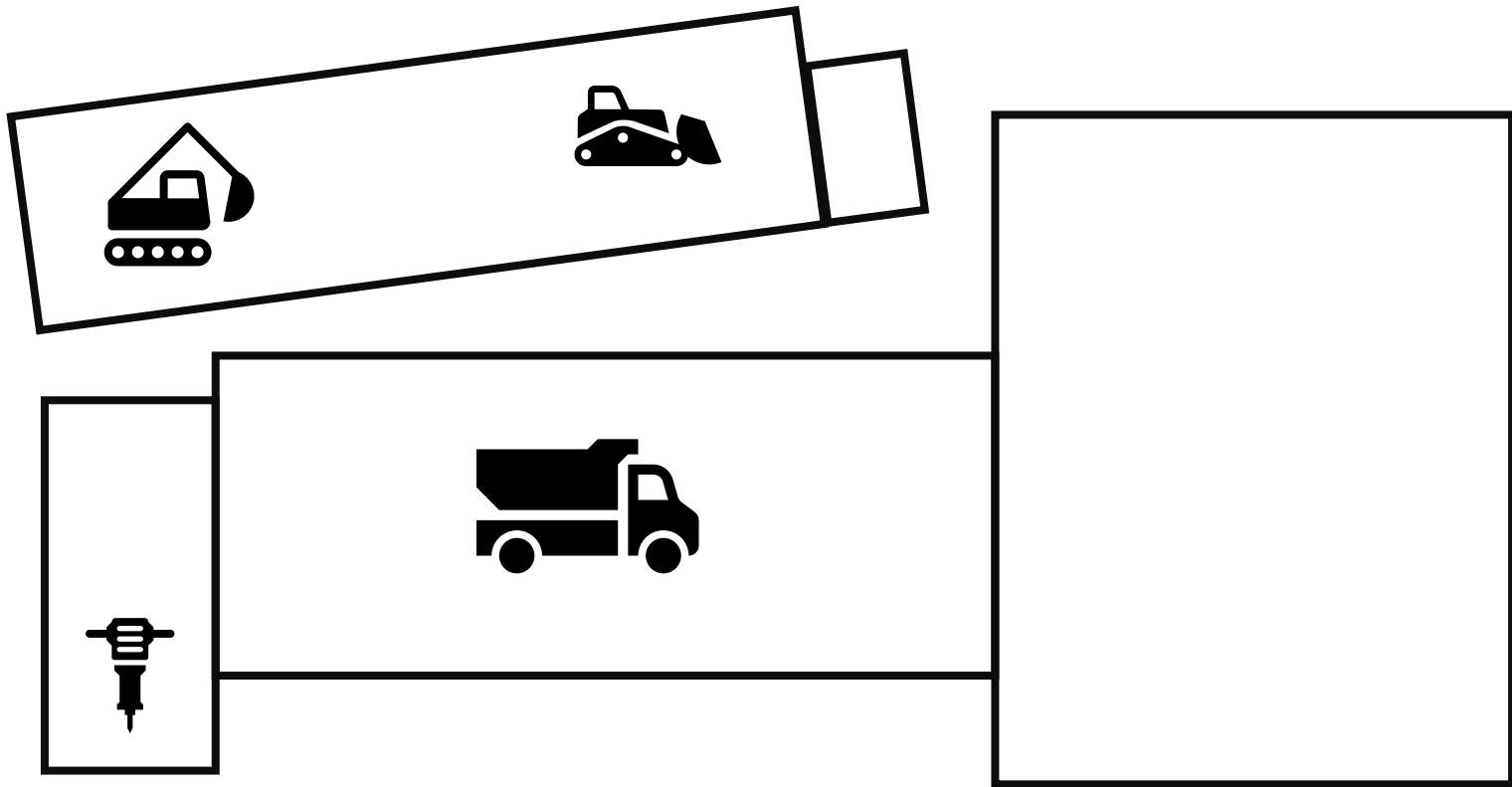
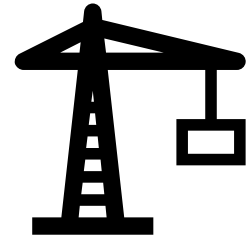


Smoke Zone Project

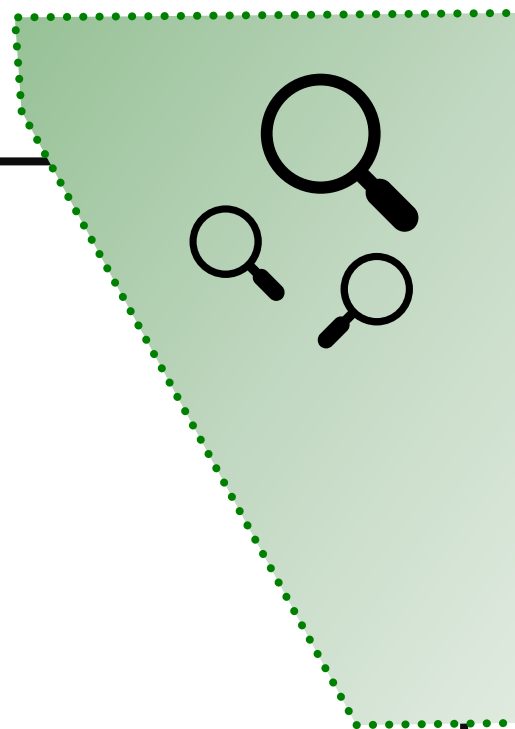
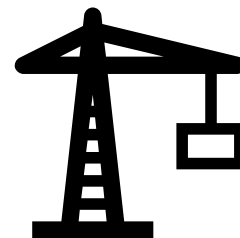
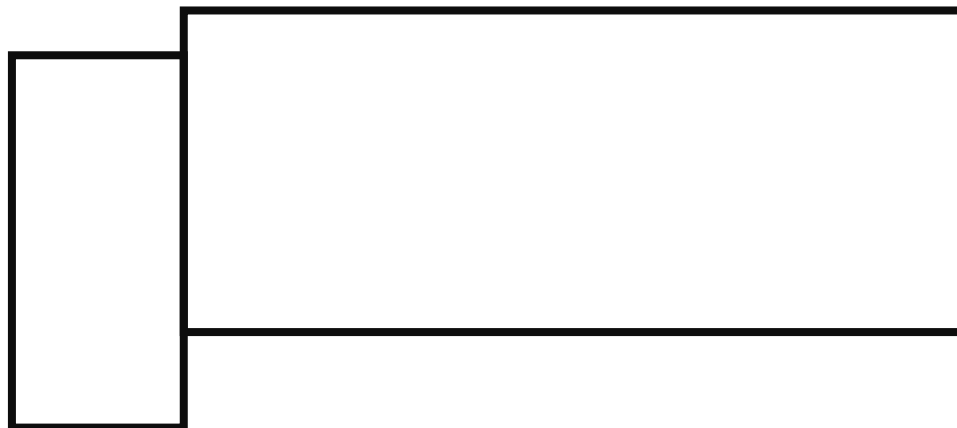
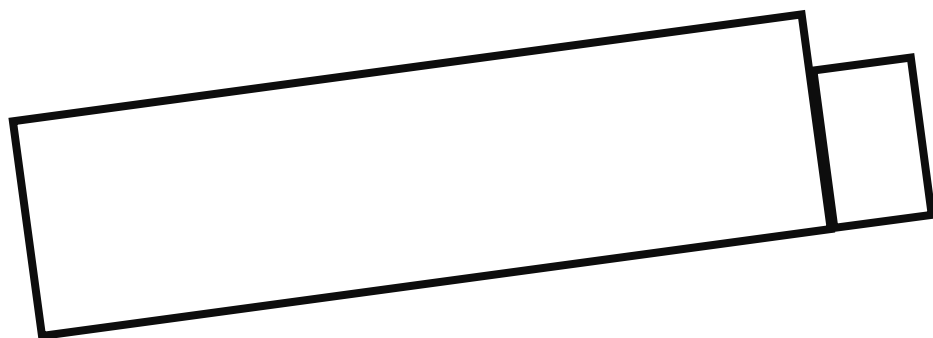
Stakeholder Engagement



Expect the Unexpected Original Floor plan



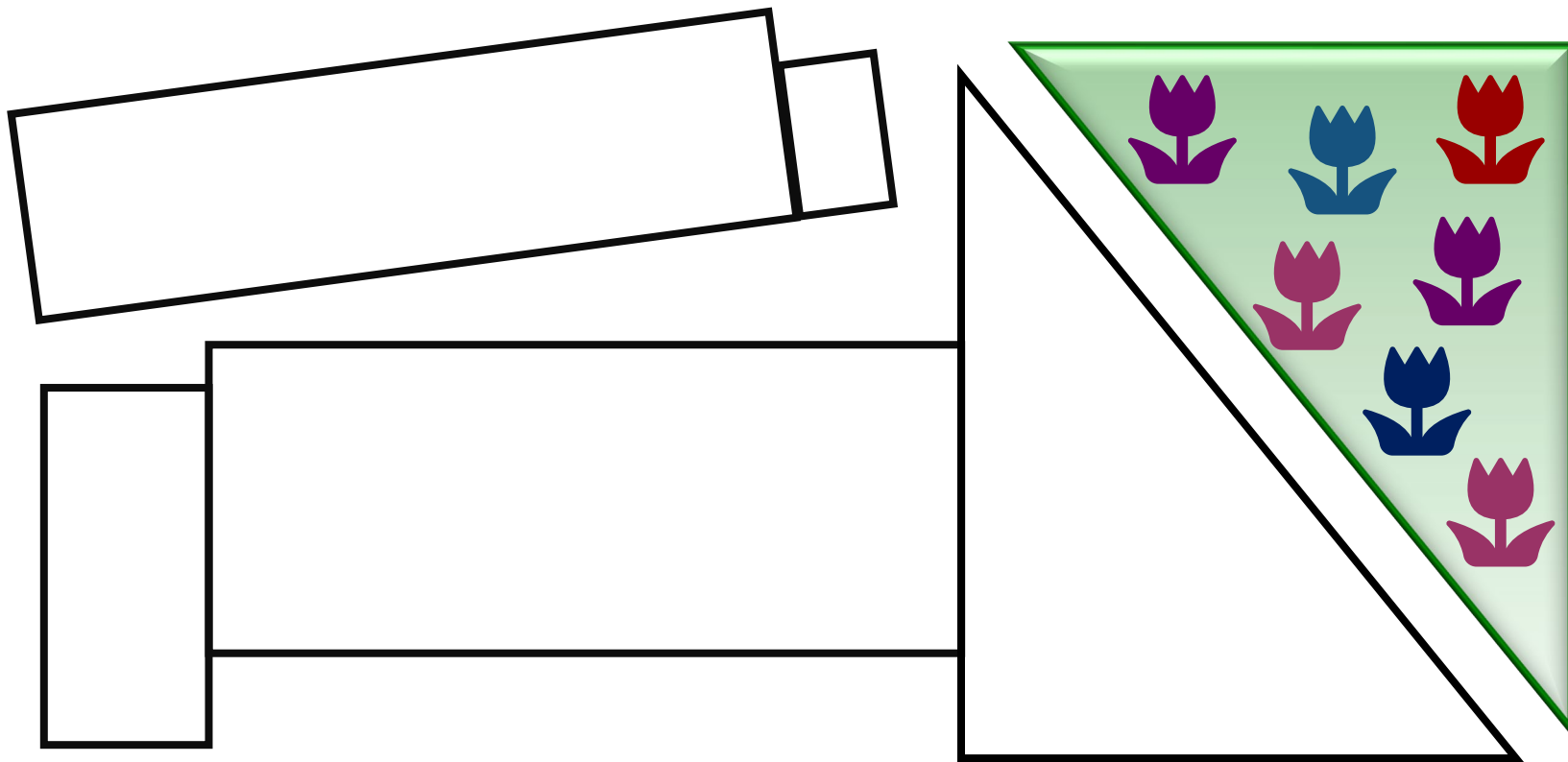
Expect the Unexpected



Expect the Unexpected

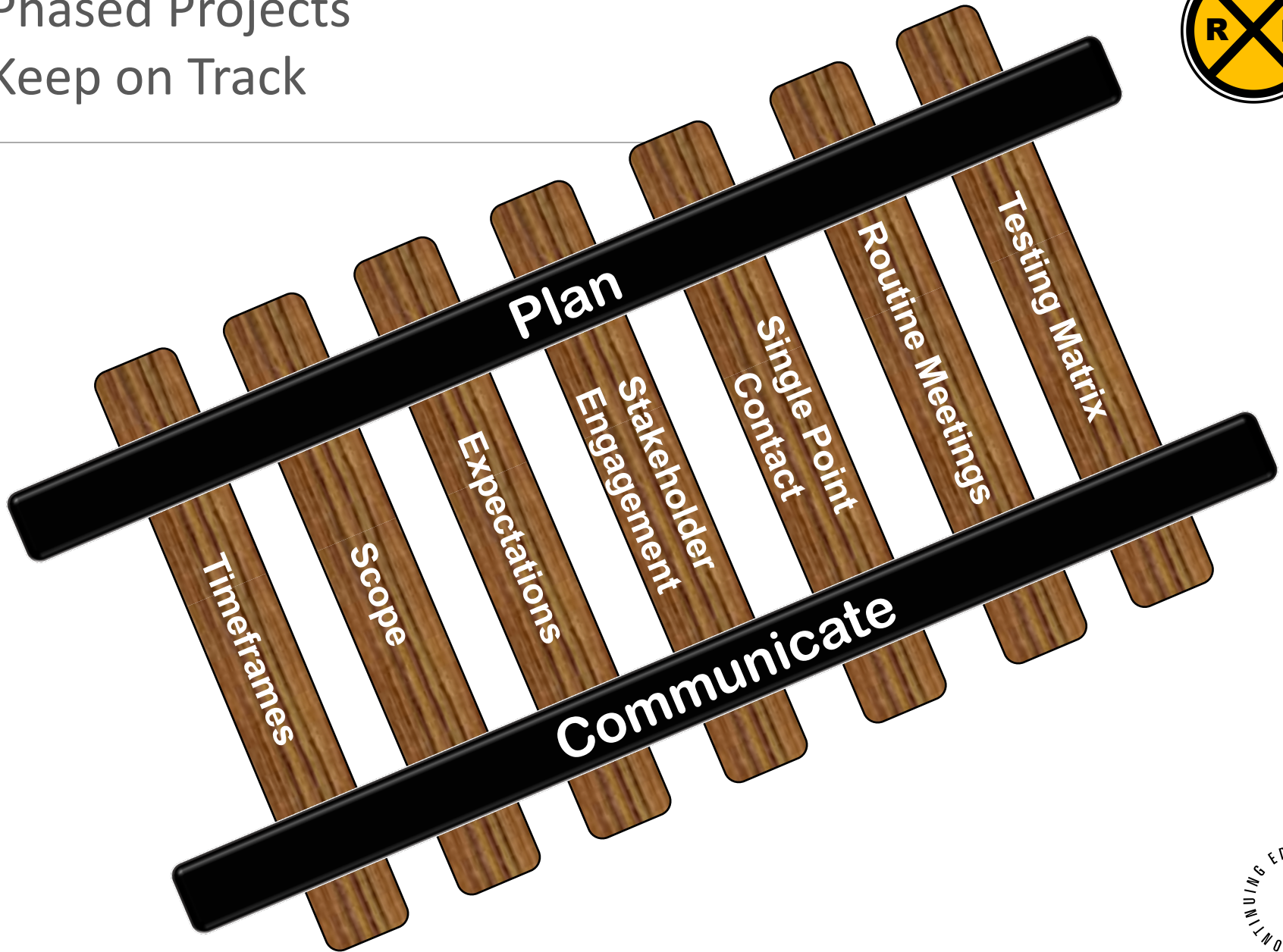


Expect the Unexpected Final Floor Plans



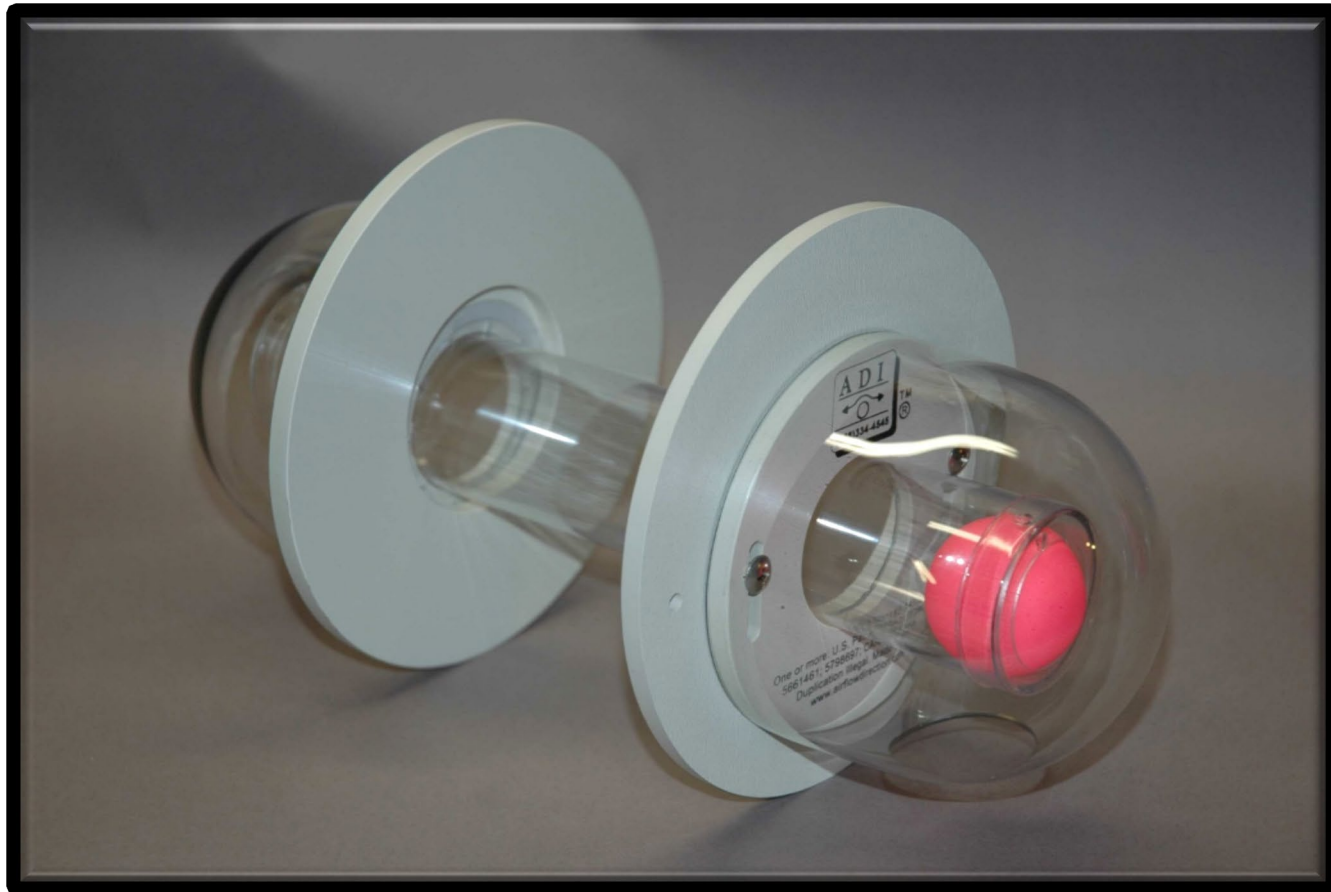
Phased Projects

Keep on Track



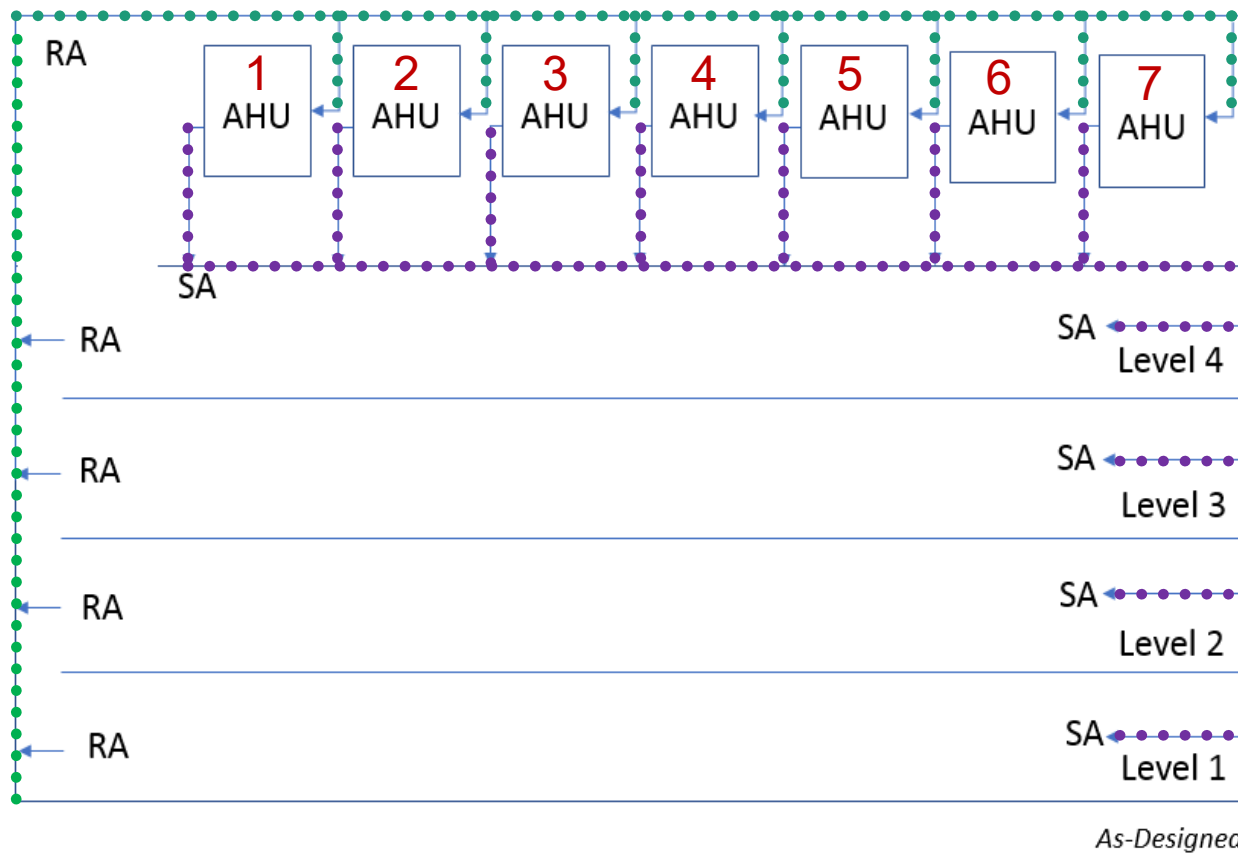
BALL-IN-THE-WALL[®]

Analog Solution

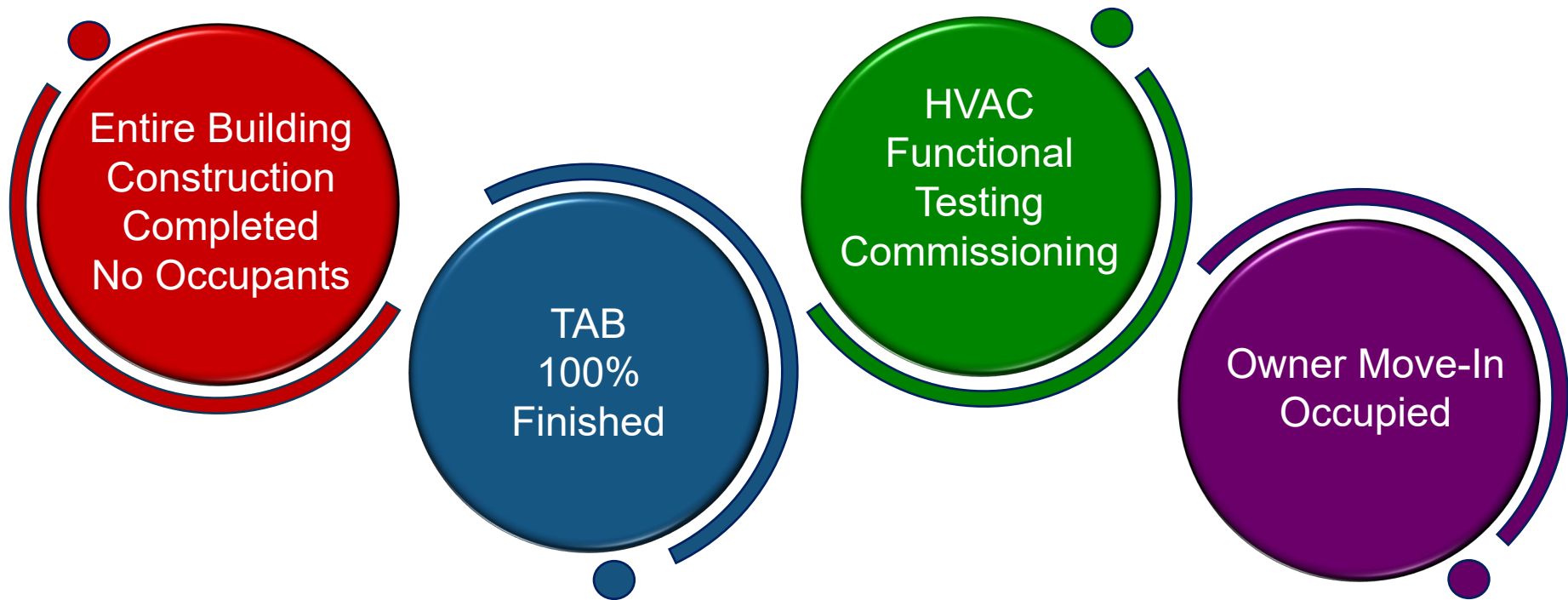


© Airflow Direction Incorporated BALL-IN-THE-WALL[®]

Case Study Example



Ideal Process

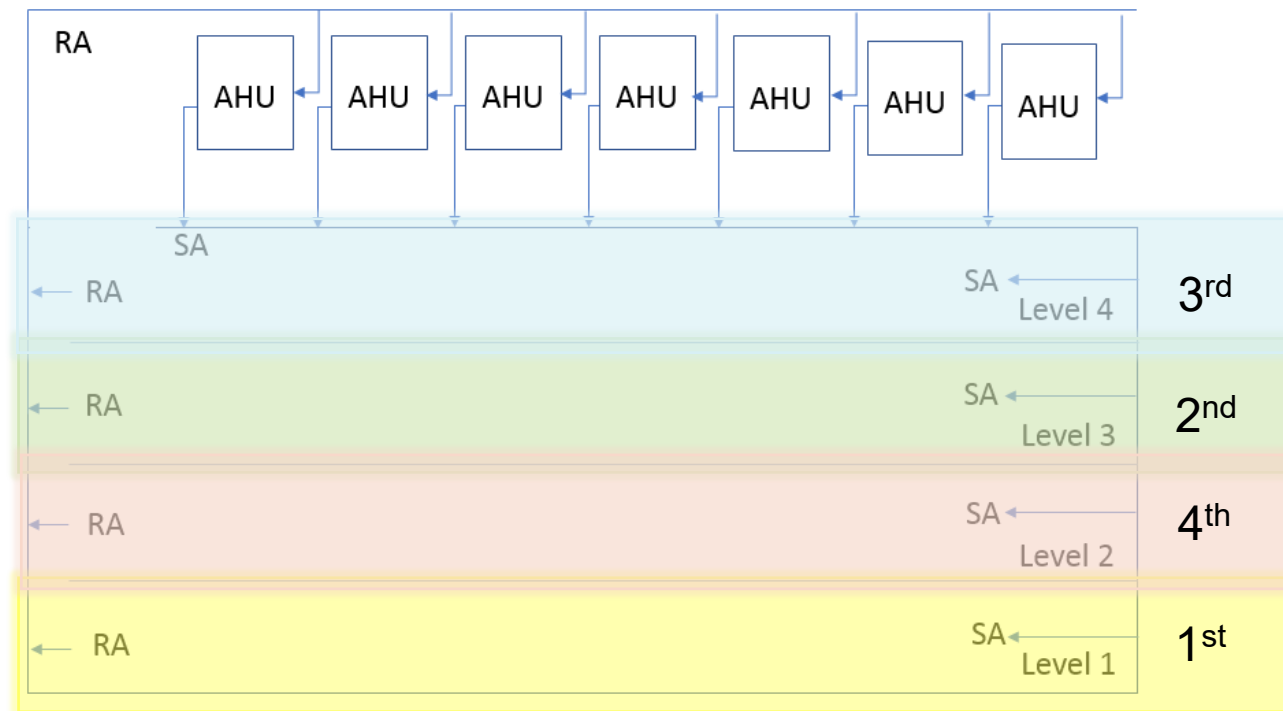


Case Study Example

Phase Order



Order of Floor Turnover



As-Designed

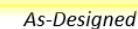
```
graph LR; A((Level 2 Construction Finished No Occupants)) --> B((Level 2 TAB)); B --> C((Level 2 HVAC Functional Testing Commissioning)); C --> D((Level 2 Owner Move-In Occupied));
```

Level 2 Construction Finished No Occupants

Level 2 TAB

Level 2 HVAC Functional Testing Commissioning

Level 2 Owner Move-In Occupied

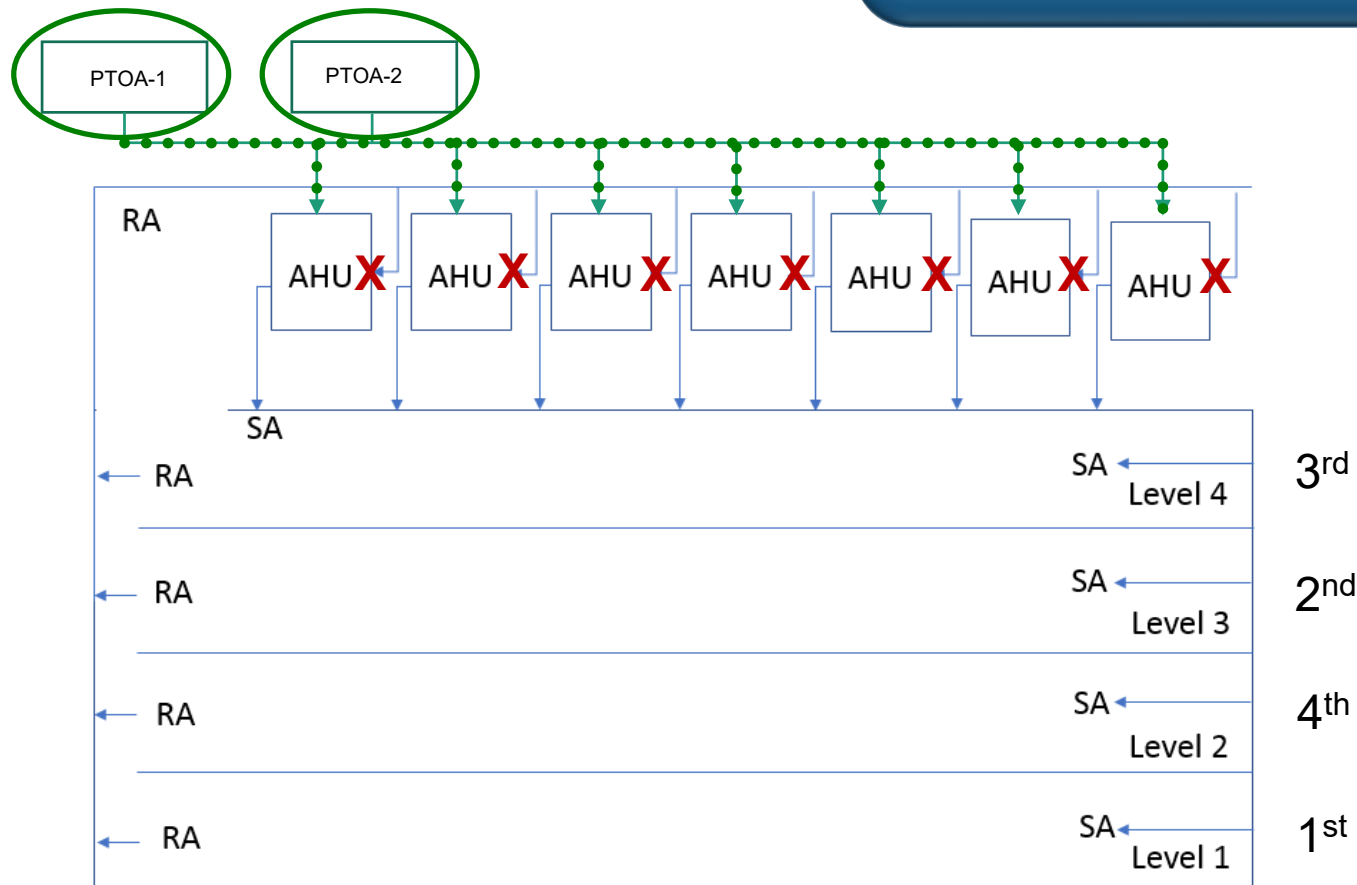


Case Study

Idea # 1

Close all RA dampers

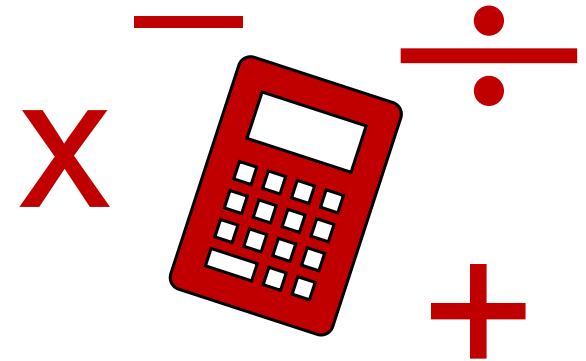
PTOAs provide same
airflow not using RA ducts



As-Designed

Case Study

Idea # 1



7 AHUs x 26,000 CFM
Supply Air

182,000 CFM

Total OA from 2 PTOAs

— 60,000 CFM

122,000 CFM

Over Pressurization

122,000 CFM



Case Study

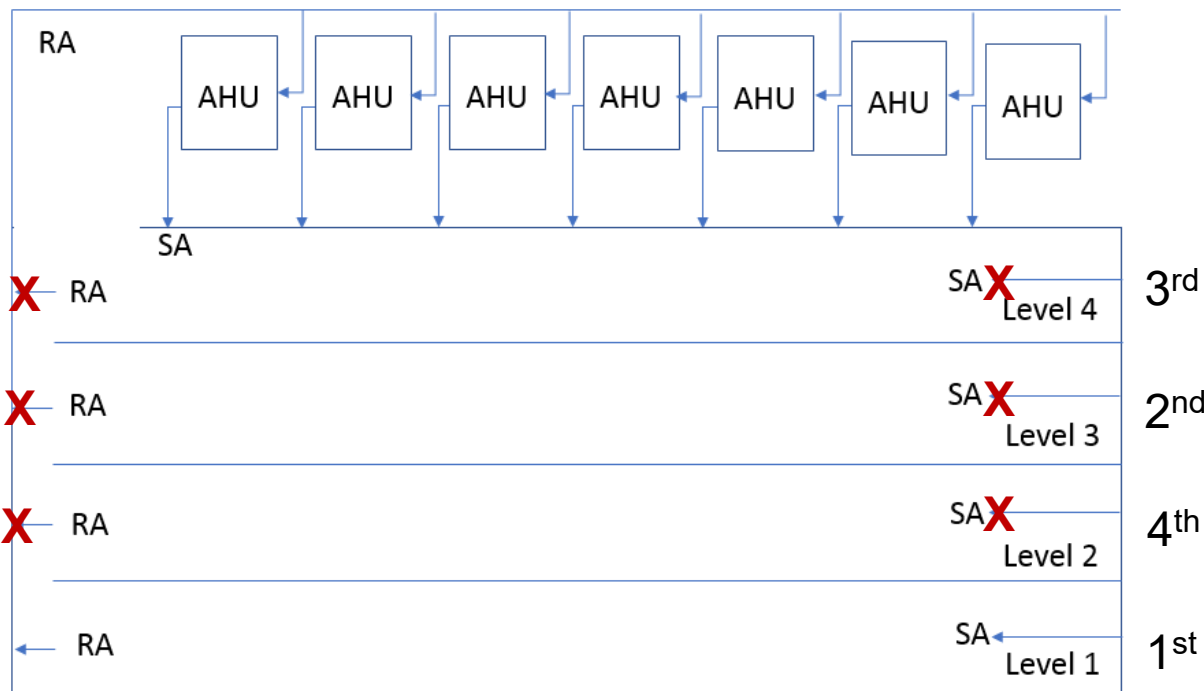
Idea # 2

Reminder

Conditioned Air Required
For Construction

Cap all work
except Level 1

Isolate all work
except Level 1

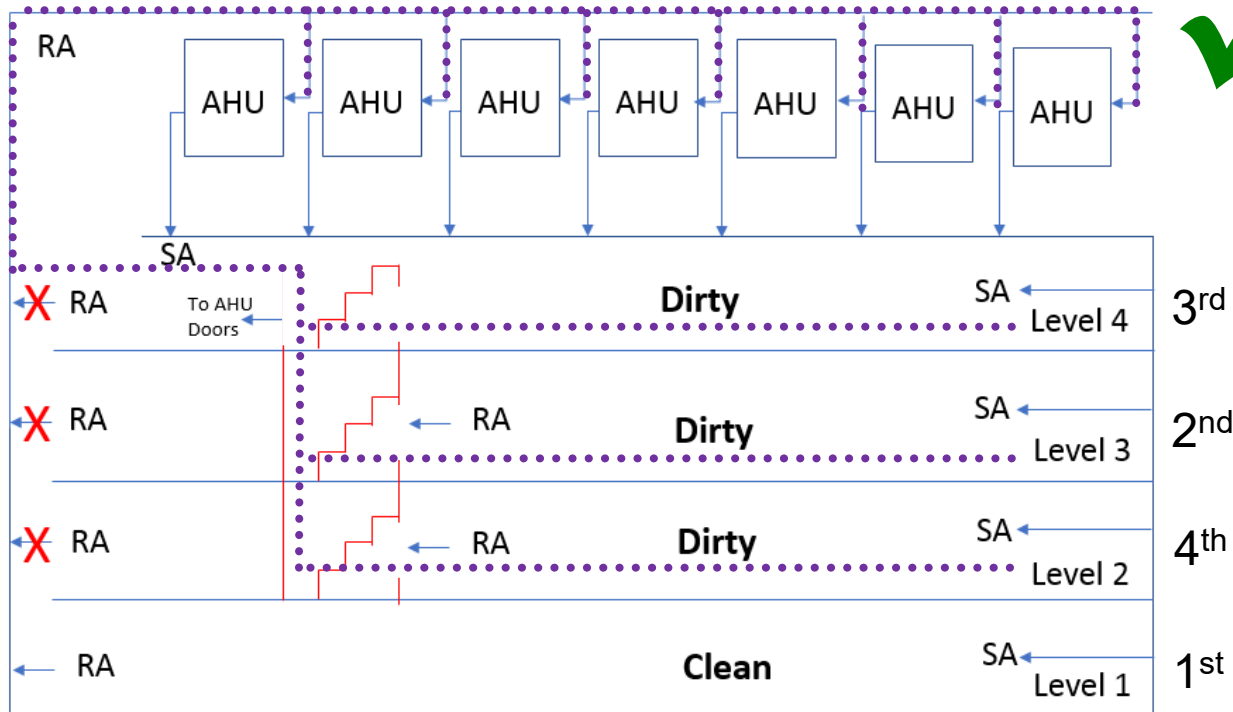


As-Designed

Case Study

Idea # 3

Stairwell Utilization



Levels 1: complete
Level 2,3,4: incomplete

Case Study

AHU with Temporary Filter Media (RA)



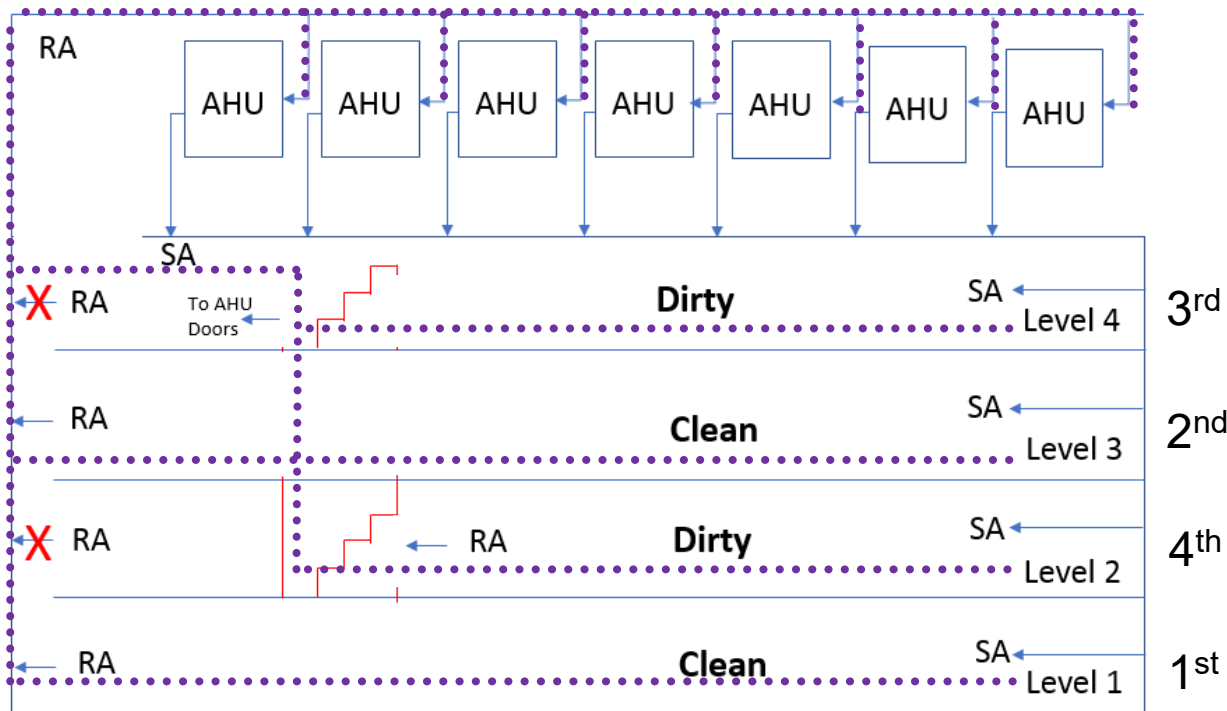
Case Study

AHU with Temporary Filter Media (RA)



Case Study

Level 3



Levels 1,3: complete
Level 2,4: incomplete

Case Study

Level 2 Custom Filter Rack



Levels 1,3,4: complete
Level 2: incomplete

Case Study Commissioning

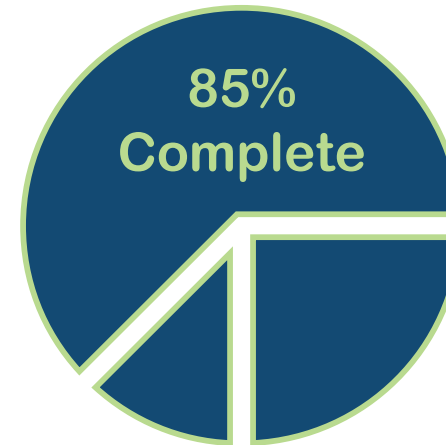
#1

Safe and Reliable

TAB



Commissioning

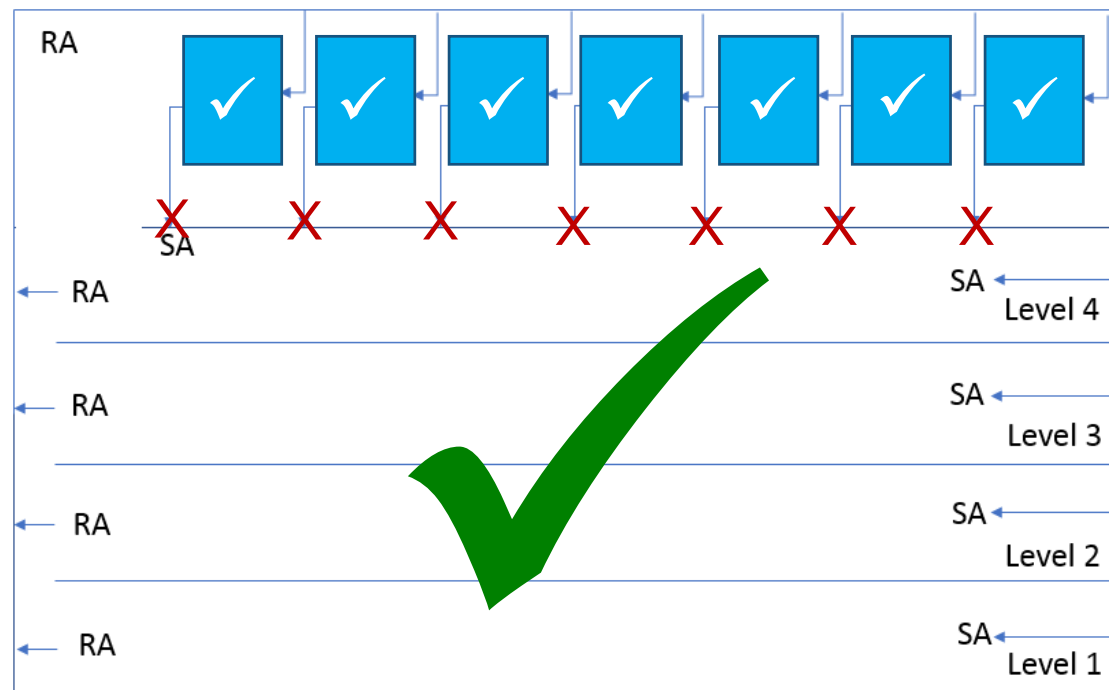


Case Study

Commissioning



Test and Balance each AHU



As-Designed

Learning Objectives

Overview



- ✓ 1. Identify the challenges of phase turnover projects.
 - Unexpected conditions of future phases
 - Phases cross architectural boundaries
- ✓ 2. Review some potential solutions to these common challenges.
 - Testing Matrix
 - Help to Facilitate Solutions
- ✓ 3. Understanding building pressurization as it relates to an example of a phased turnover project.
 - Case Study example – 7 AHU and Phasing
- ✓ 4. Strategies for maintaining systems cleanliness in hospital and laboratory phased turnover projects.
 - Maintaining space pressurization: BALL-IN-THE-WALL[®]
 - Open ductwork to clean spaces

This concludes The American Institute of Architects
Continuing Education Systems Course



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Special Thanks to:
S.L., C.M. & I.H.

