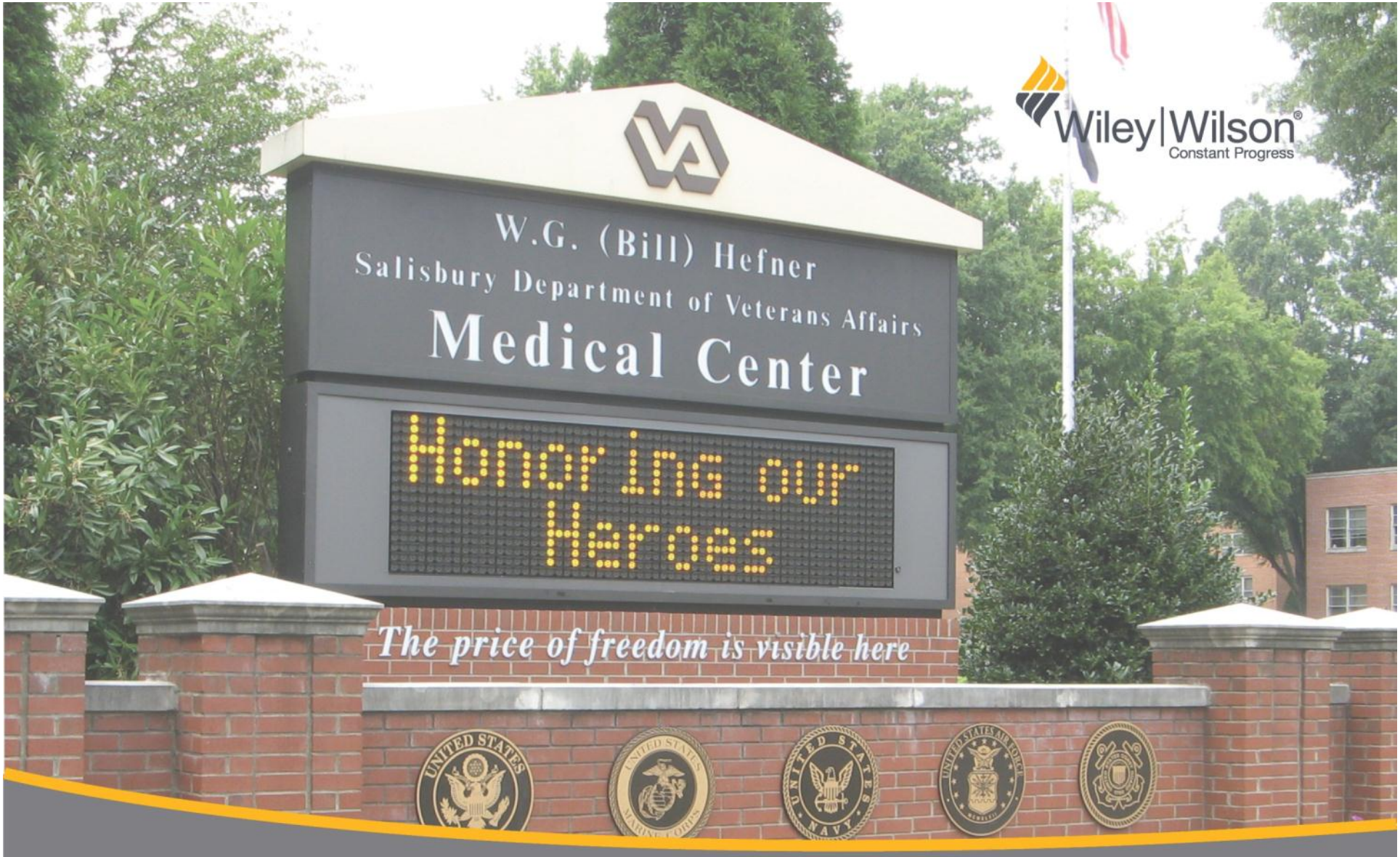


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# MEDIUM VOLTAGE ELECTRICAL SYSTEM UPGRADE AT A VA MEDICAL CENTER

IDEA Campus Energy 2015

# PRESENTATION AGENDA

## Medical Center Medium Voltage Distribution System Upgrade

- Project Overview
- Field Surveys & Options Analysis
- Design Approach
- System Automation

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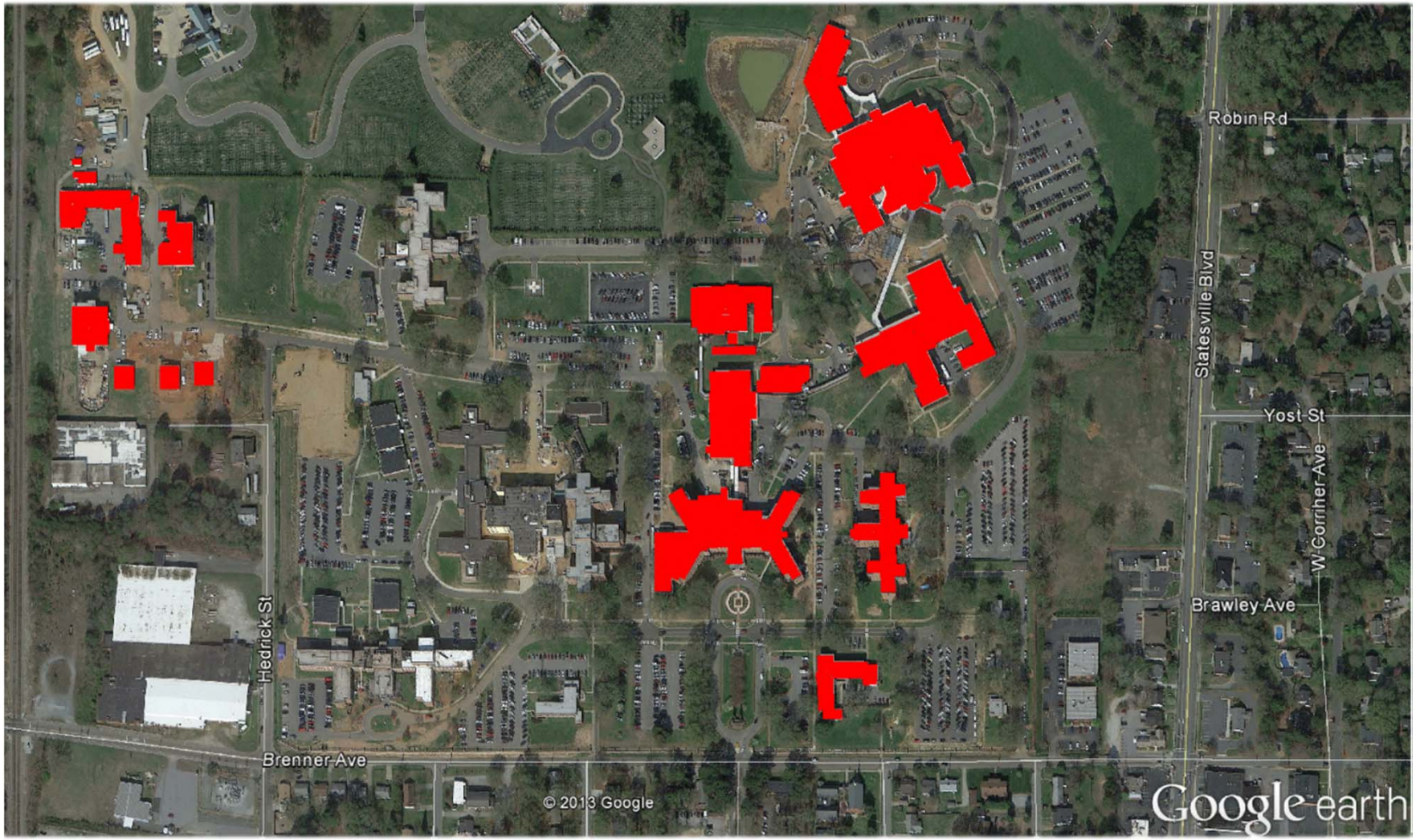
# PROJECT OVERVIEW

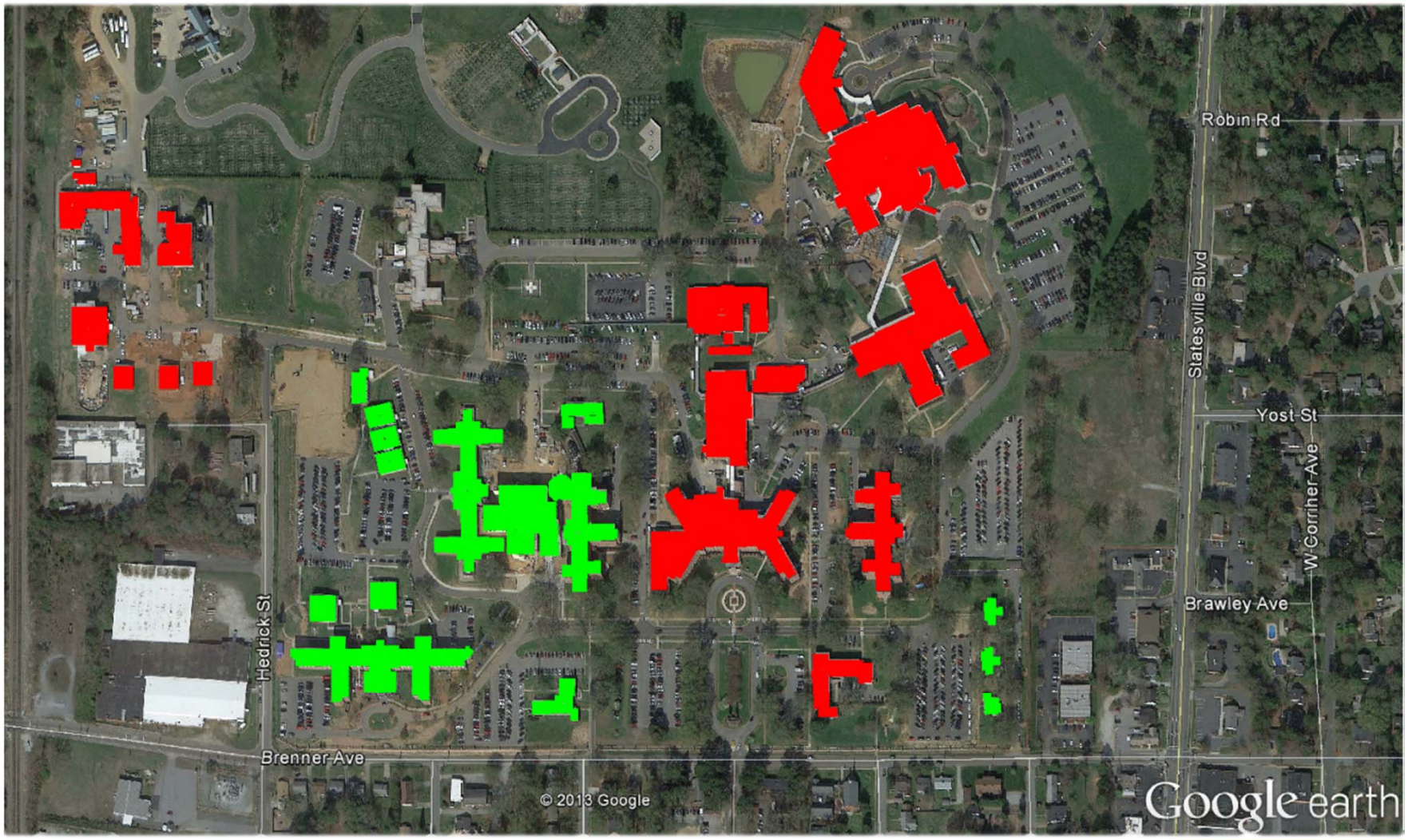
## Design Scope

- Replace Aging Distribution System Equipment
- Replace Standby Generator (If Practical)
- Develop Design Options
- Base Detail Design on Client's Selection

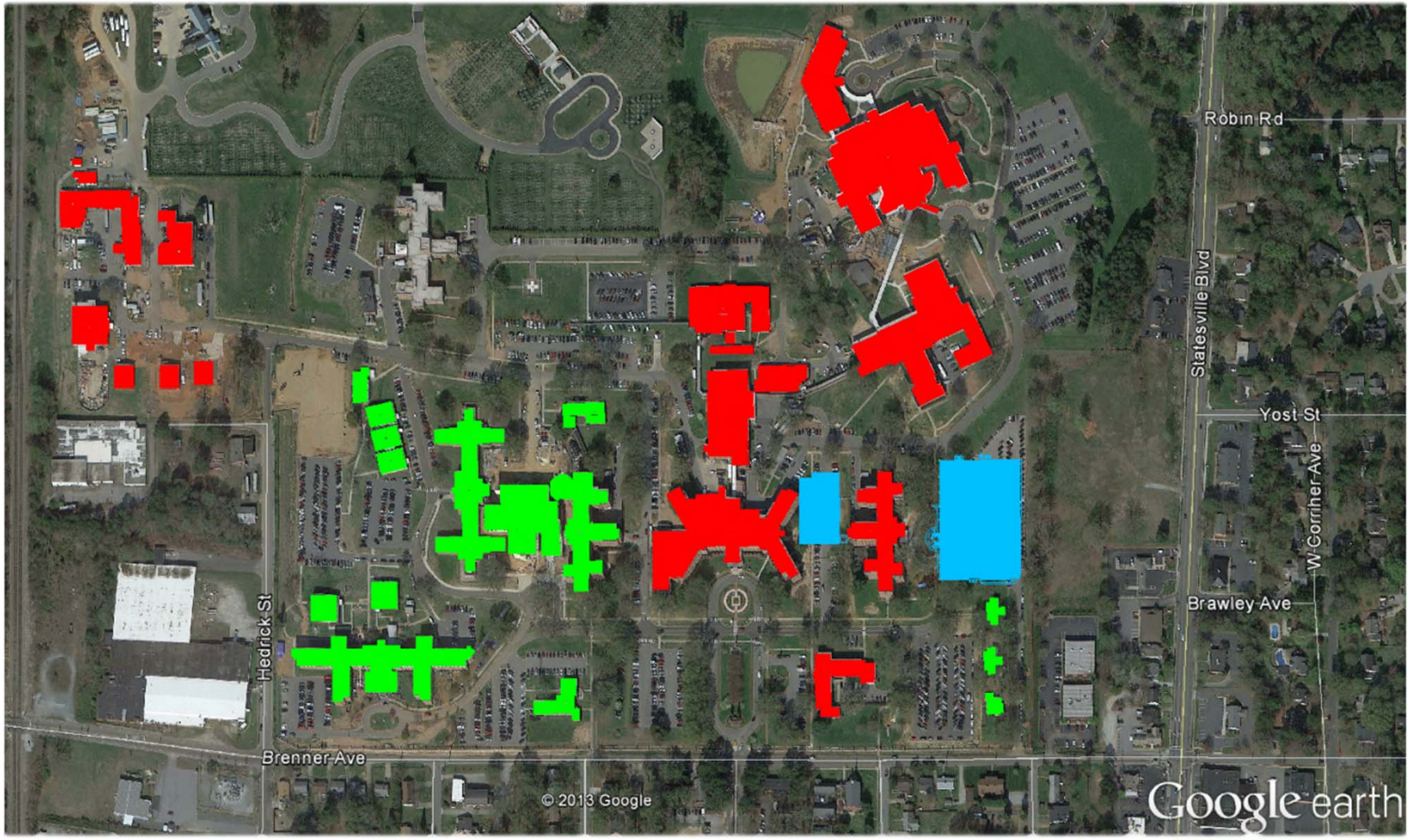

# PROJECT OVERVIEW



# PROJECT OVERVIEW



# PROJECT OVERVIEW

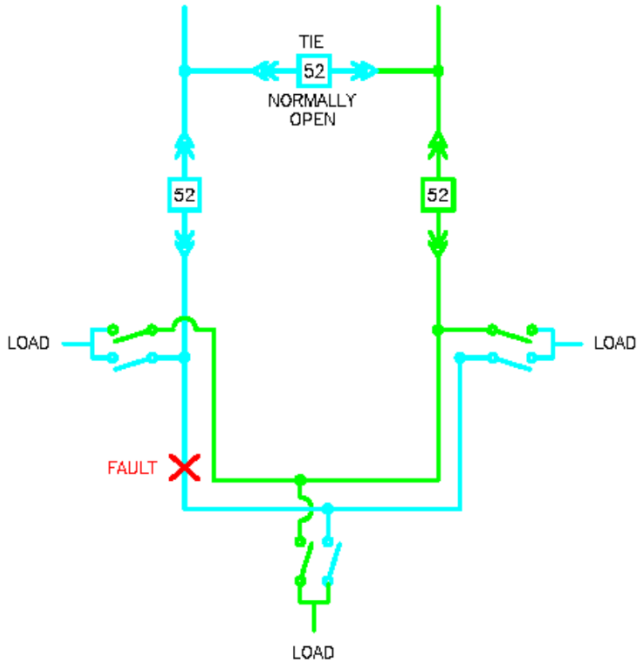


# FIELD SURVEY

- Full assessment of existing system
- Extensive underground utility survey


# OPTIONS ANALYSIS

- **Presented Four Main Options**
  1. Primary Selective System
  2. Looped Distribution System
  3. Loop System with Full Standby Generation
  4. Loop System with Second Utility Feed

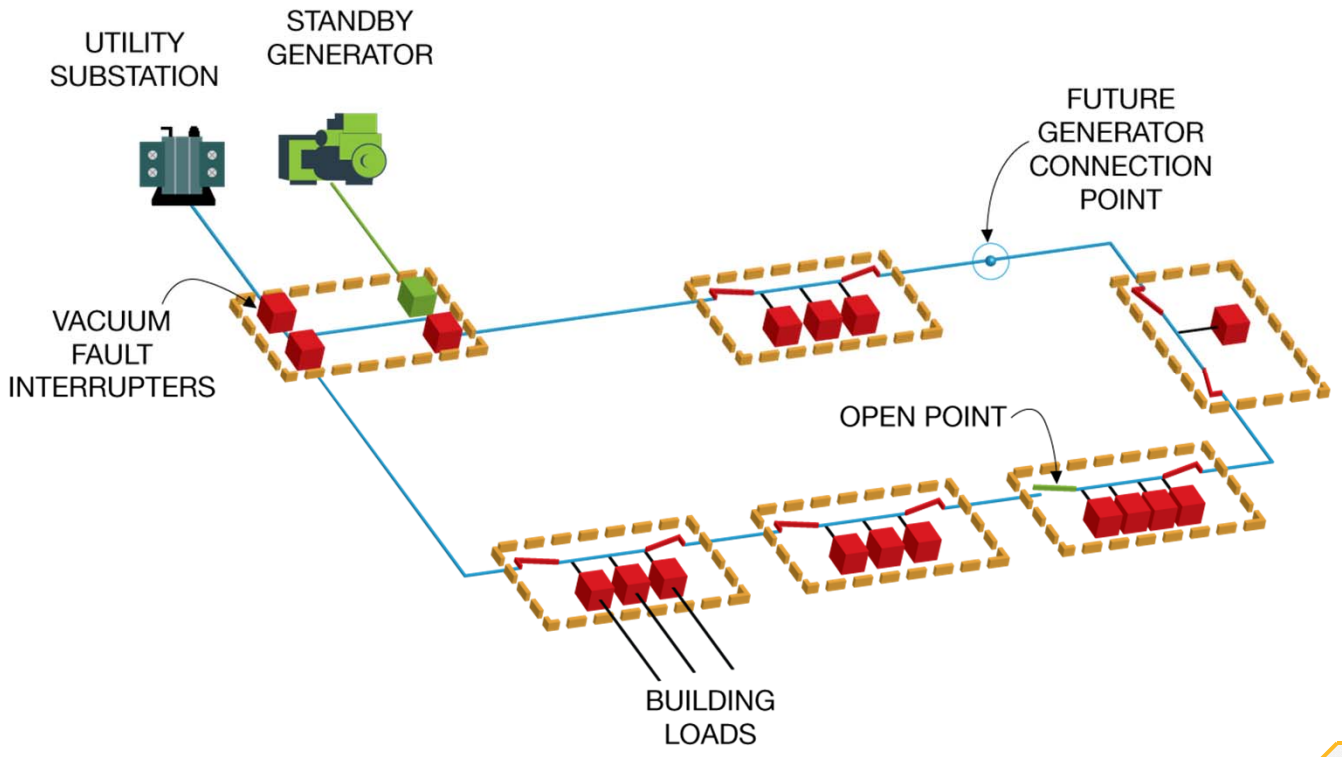



- **Estimated Infrastructure Comparison**

| | Primary Selective | Loop |
|---|---|---|
| Duct Bank | 9000 ft | 9500 ft |
| 1/C Cable | 76,000 ft | 43,000 ft |
| Sectionalizing Switch | 21 | 10 |

# DESIGN APPROACH

- 12.47kV Loop Distribution System Designed for 6MW Site Load
- Plan for future Generator/Utility Connections



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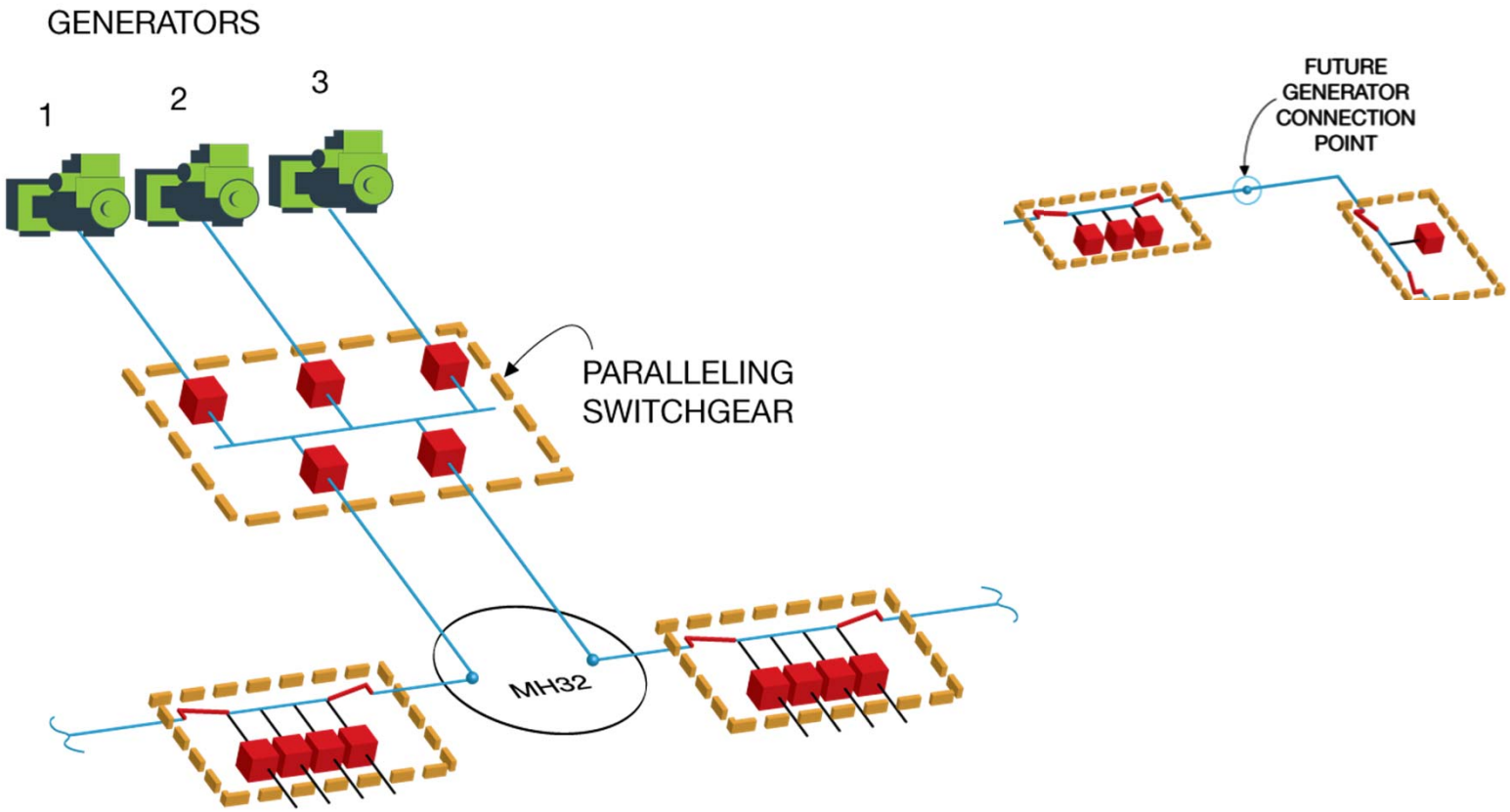
# DESIGN APPROACH

## Inherent Ability for Modularity



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# DESIGN APPROACH

## Substation Modifications

- Additional Power Capacity
- Distribution Voltage Increase
- Temporary Transformer Required

# DESIGN APPROACH

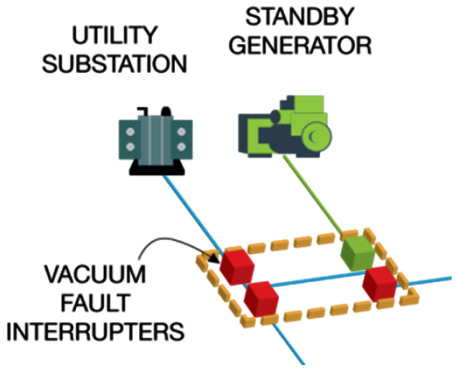
## Phasing

- Facility Functional Throughout Construction
- Plan for Minimal Interruptions

# SWITCHGEAR

## Outdoor Metal-Clad Switchgear Replaced with Pad-mount Switchgear

- Significant Cost Savings
- Relaying and Fast Interrupters Can Meet Utility Requirements
- Rated Up To 600A
- Operator Preferred Option



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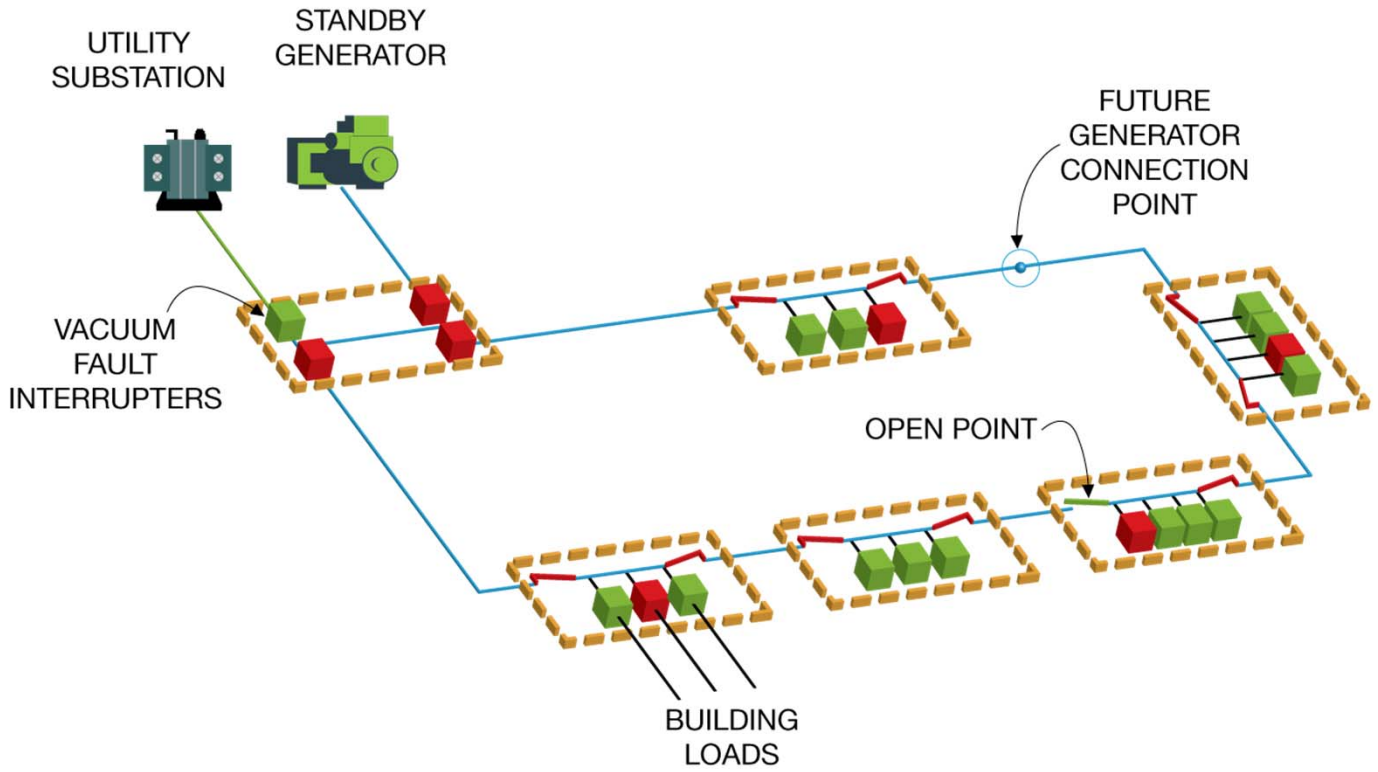
# AUTOMATION

## Load Shed/Restoration

- Load Shed Key For Loop Design
- Greater Generator Utilization



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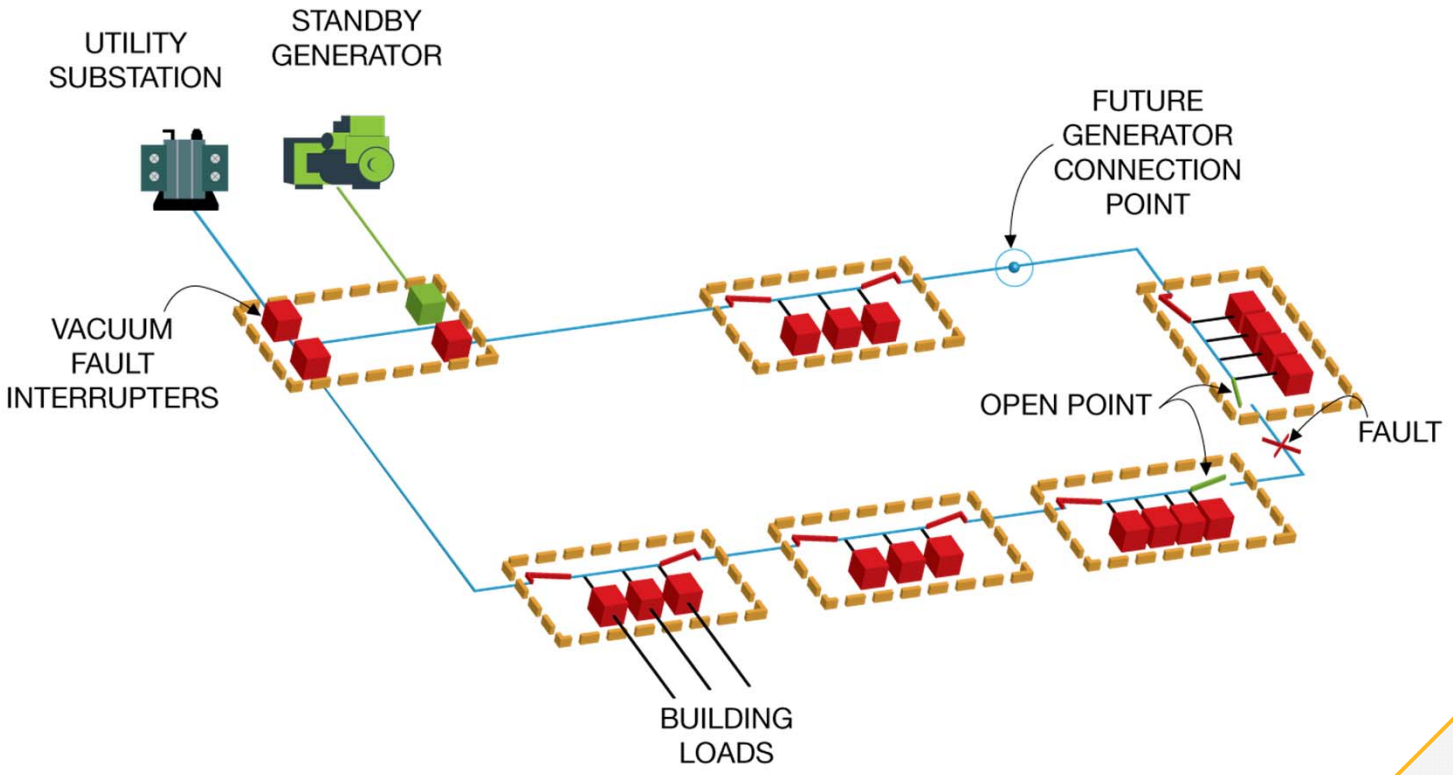
# AUTOMATION

- Fault Detection
- Automatic Loop Restoration



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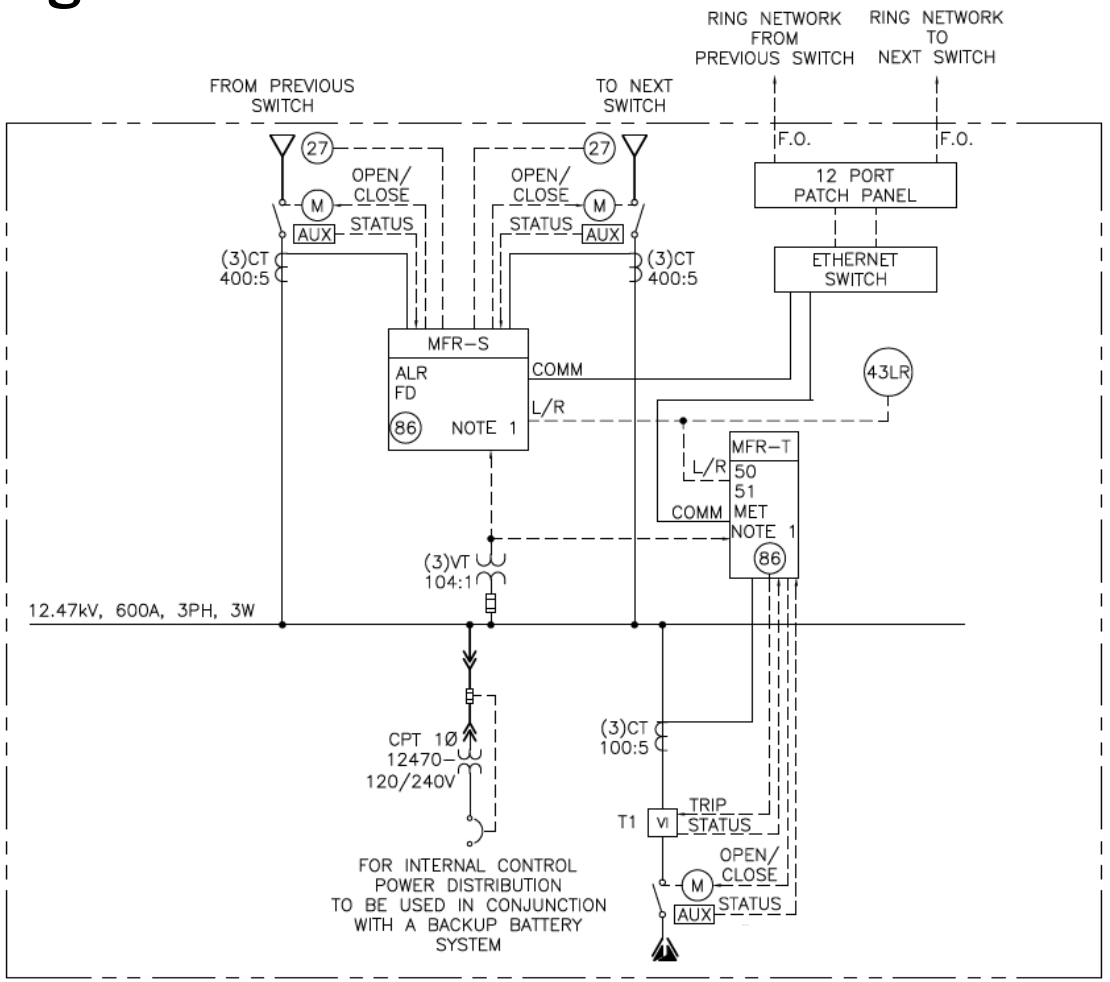
# AUTOMATION

## Sectionalizing Switch Detail



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# CONCLUSION

- New Infrastructure Creates Safer Operation
- Automation Improves Distribution System
- Lower Cost Achieved Through Automation
- Future Projects Considered




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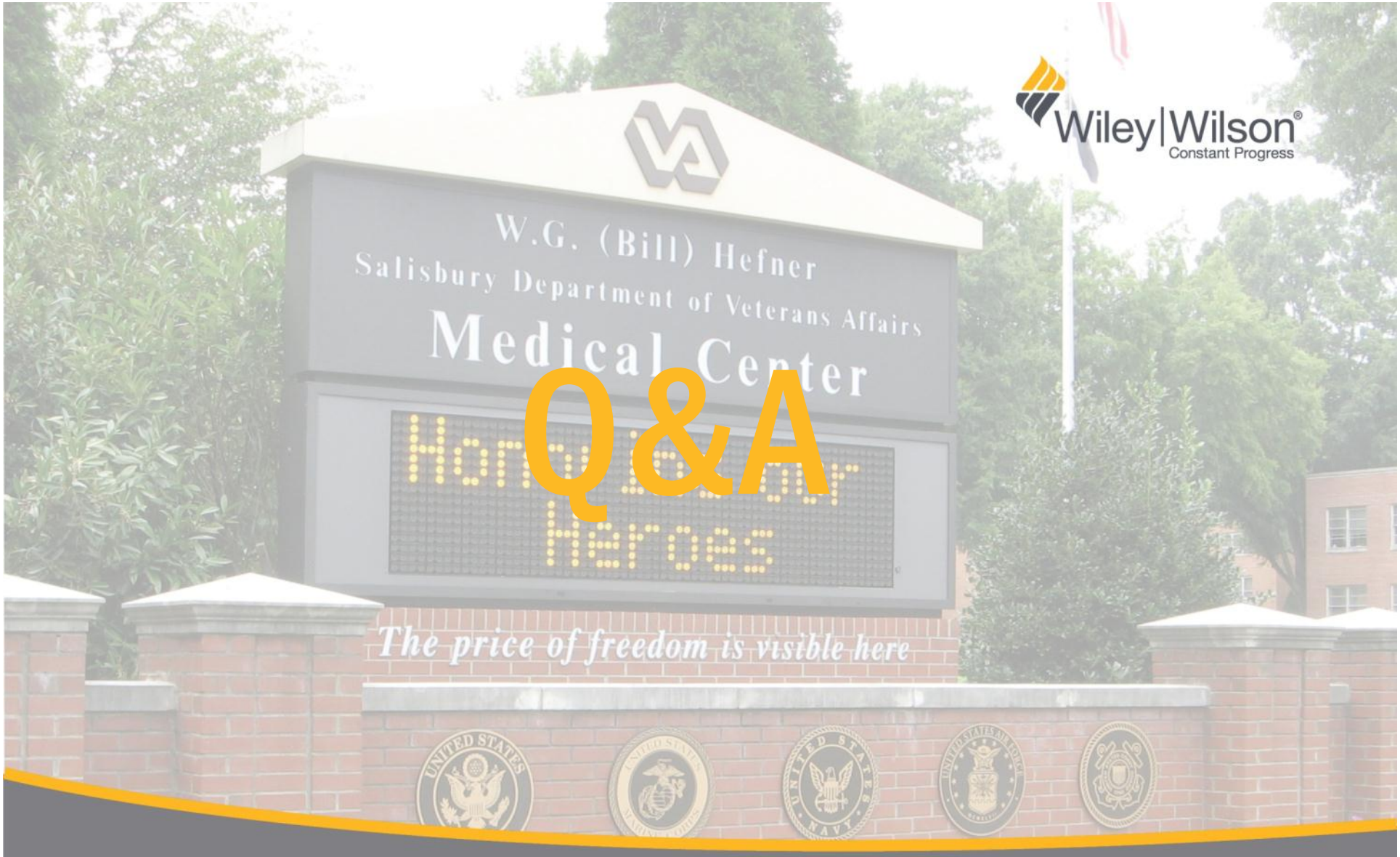


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# Q&A

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