



Oklahoma State University Electric Distribution Voltage Upgrade

February 28, 2019



Introductions

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 - FSB Design Project Manager
- **Craig Spencer, PE**
 - Director of Energy Services
- **Dale Alexander**
 - Electrical Distribution System Project Engineer
- **Mike Hume**
 - Flintco Senior Project Manager
- **Steve Jordan**
 - Flintco Regional Safety Director
- **Ron Warner**
 - Flintco Project Director



THE WHY?

- Purchase Power Agreement
- Retire Power Plant – Construct New Central Plant
- Upgrade Phase 1 – Demo the Power Plant
- Power Distribution Center (PDC)
- Upgrade Phase 2 – Demo the OSU/Poultry Substation



Old switchgear lineup in Power Plant

Project – Summary

- 2400V electrical distribution system is generally in poor condition
- Connect new University Substation to the campus distribution system to share load with McElroy Substation
- 2400V system must be upgraded to 12.47kV in order to demolish the existing Power Plant (Phase 1)
- Power Distribution Center (PDC) Construction. The center for all power distribution on campus
- Voltage upgrade (Phase 2) must be completed prior to demolition of the Poultry Substation



Existing Power Plant



Existing Poultry Substation

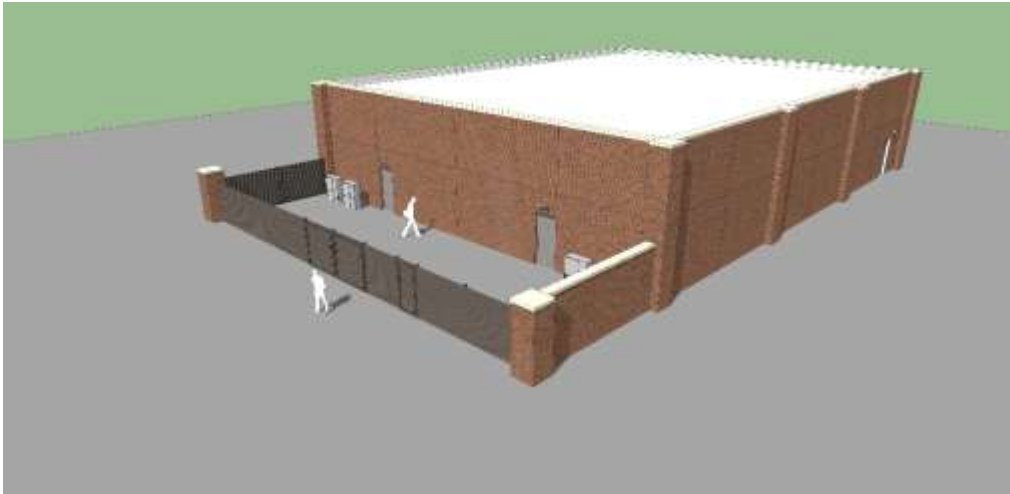
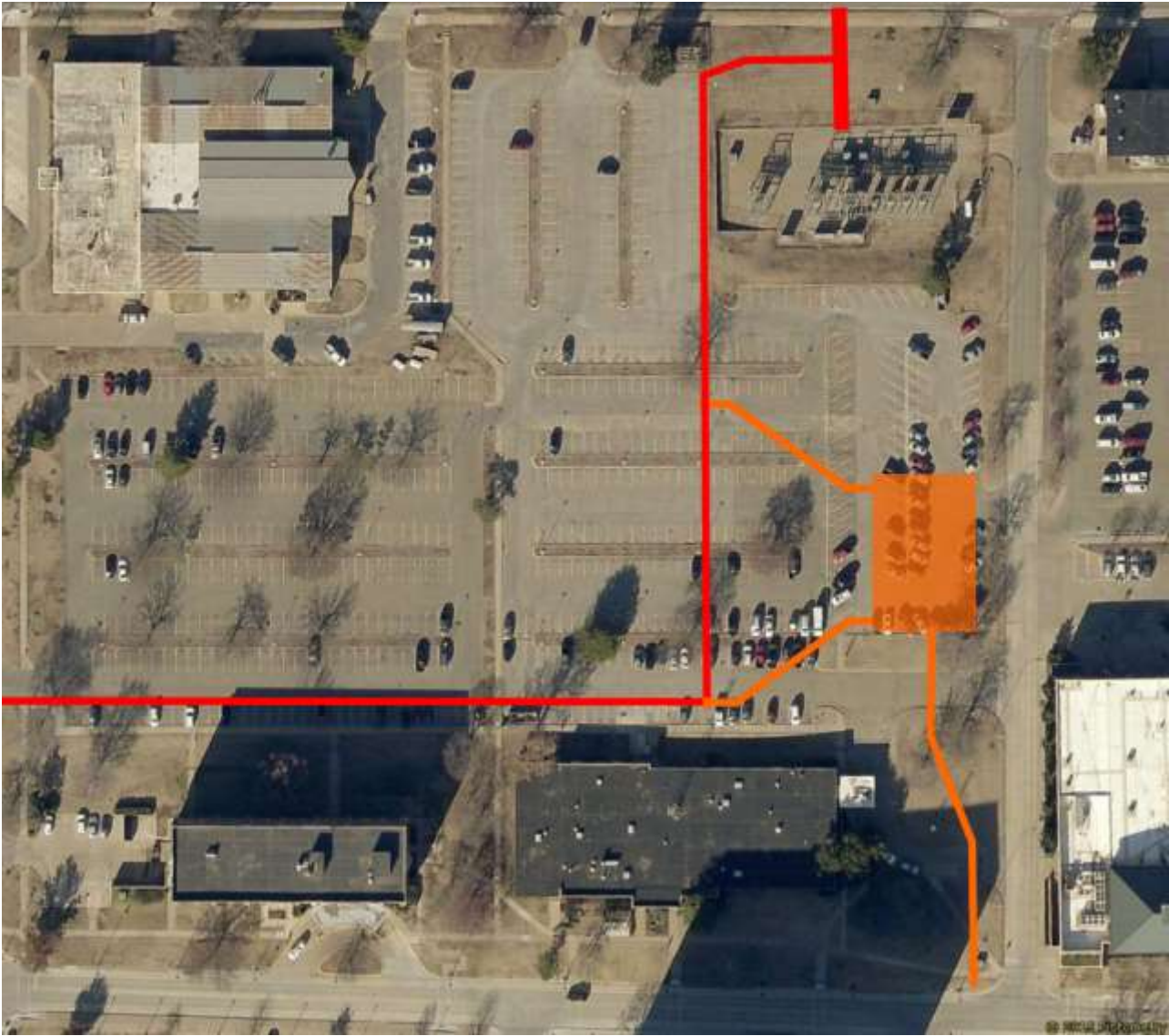


- ## NEW CENTRAL PLANT

Voltage Upgrade Overview



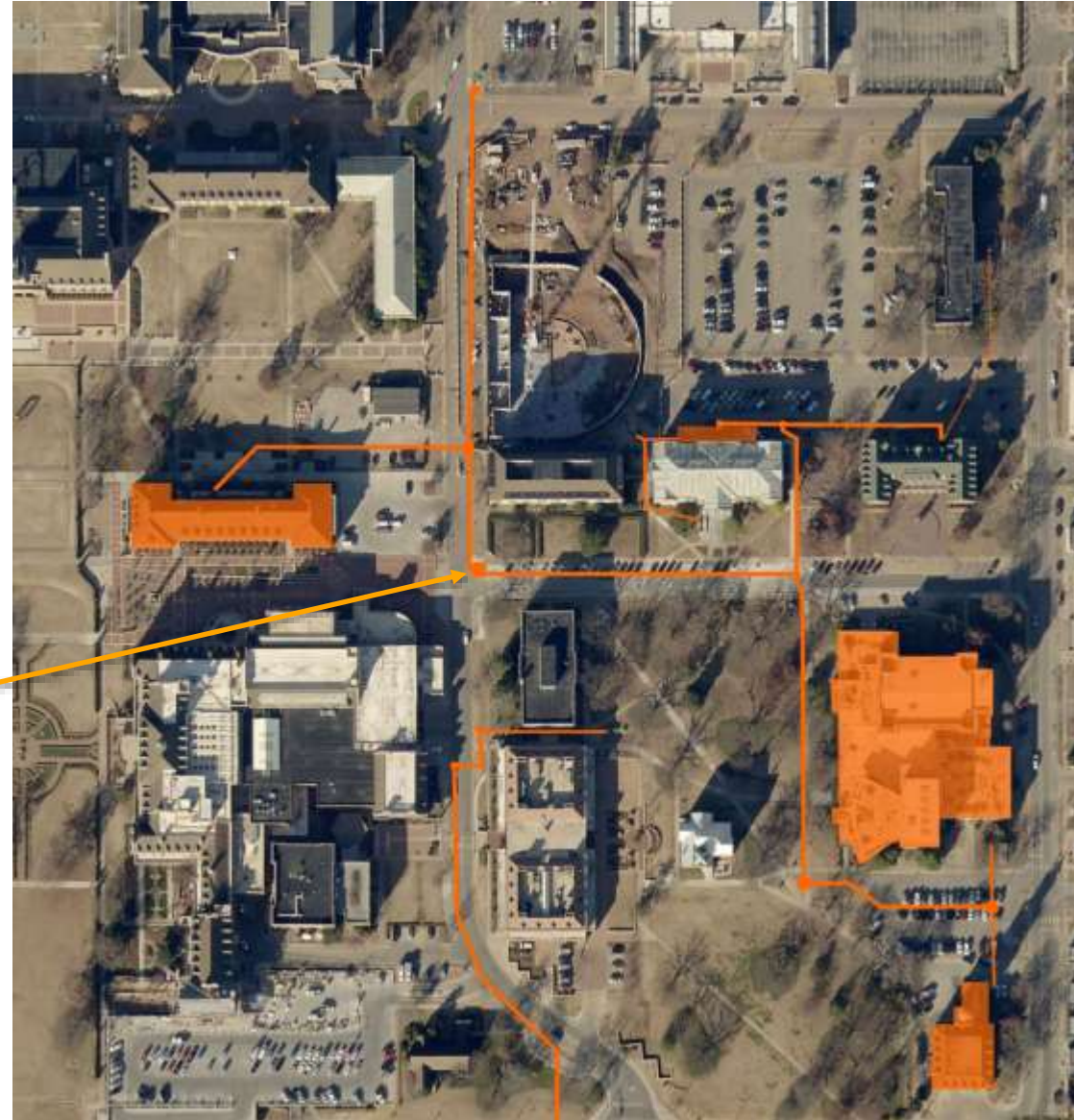
Power Distribution Center



Central Campus Infrastructure Upgrade

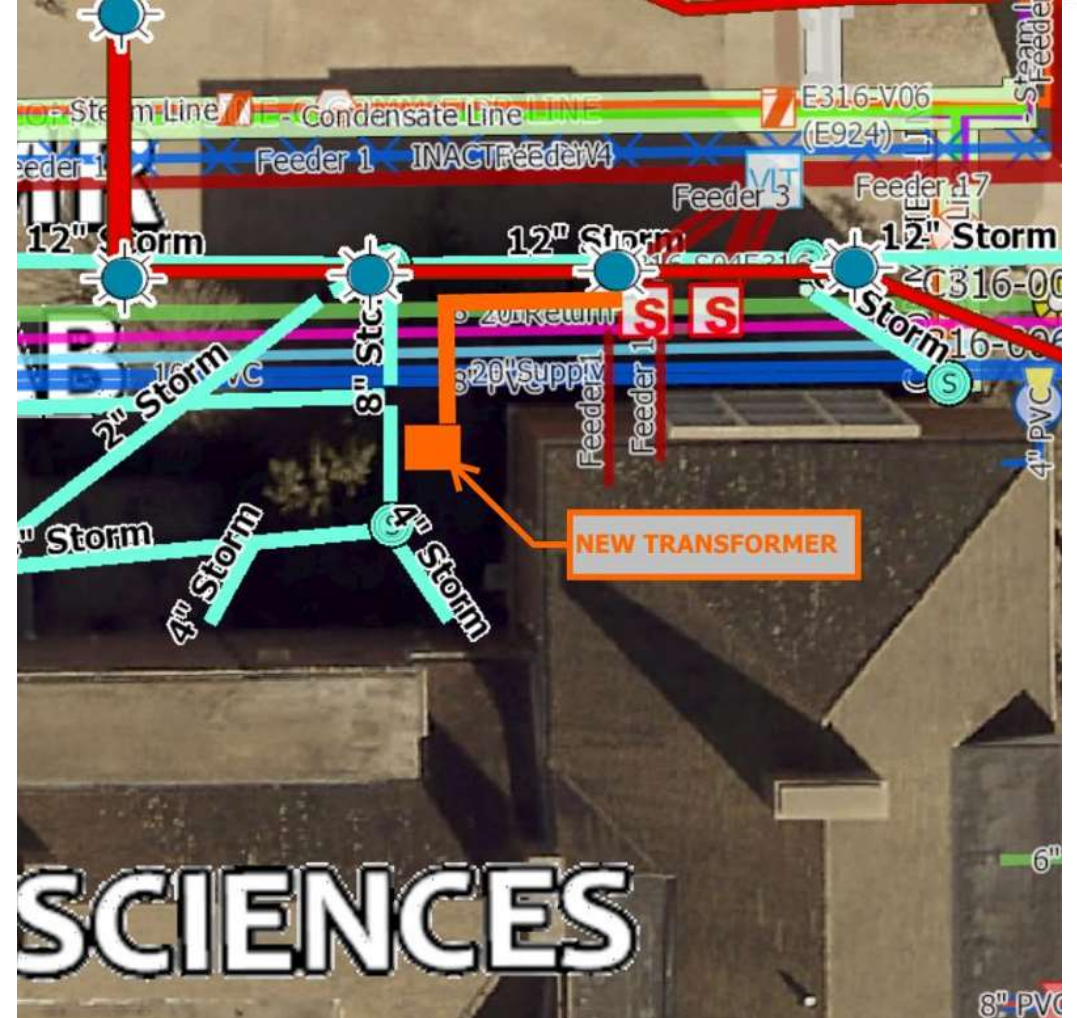


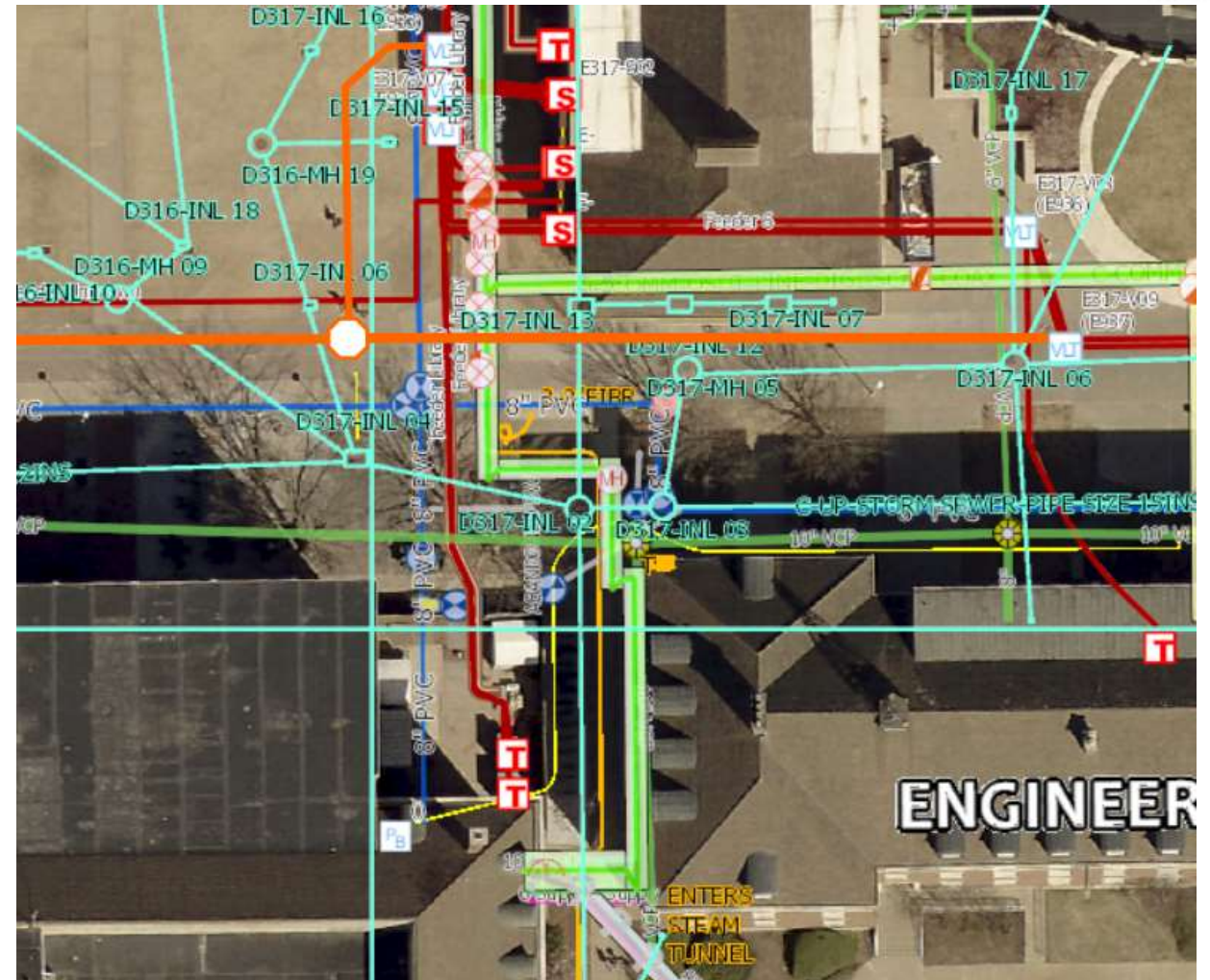
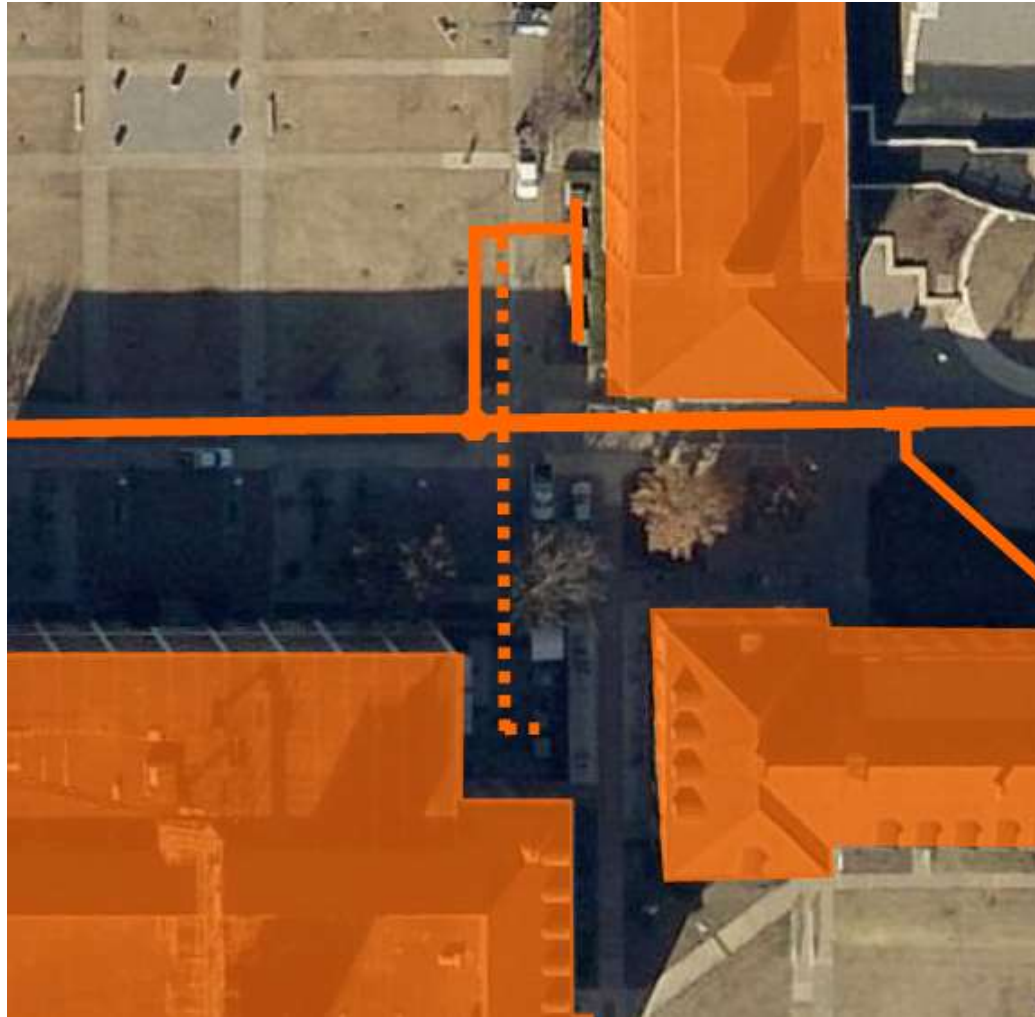
Southeast Campus Infrastructure Upgrade



Adams Market Area







Modified Design Process

- Layout initial route
- Provide Surveyor with atlas of underground utilities
- Survey initial route and pothole each utility that intersects the initial route and note the coordinates and depth of each crossing utility
- Adjust the route as needed then re-survey and pothole
- Use the survey and pothole data to generate accurate plan and profile (P&P) drawings by the 100% Design Development milestone
- Throughout the Construction Documents phase adjust the P&P drawings as needed with drawing reviews at 30%, 60% & 90% CDs
- Go to bid knowing that the contractors are bidding on accurate information



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New Standard Ductbank Construction

Construction Keys for Success

■ Plan for Safety

- Engineer Safety into the project up front
- Pre-task planning
- Minimize or eliminate hazards
- Ventilation
- Equipment swing radii
- Non-Construction traffic control
- Access and egress
- Fall Restraint vs. Fall Protection
- Shoring (trench box, hydraulic shoring)
- Fencing



Construction Keys for Success

- **Campus Schedule Defines Work Schedule**

- Planned Campus activities (graduation, football)
- 82 work days of summer break

- **Understanding Trade Partner Manpower Pre-Bid**

- Divide the work to match potential trade partner manpower

- **Potholing and Locating Existing Utilities**

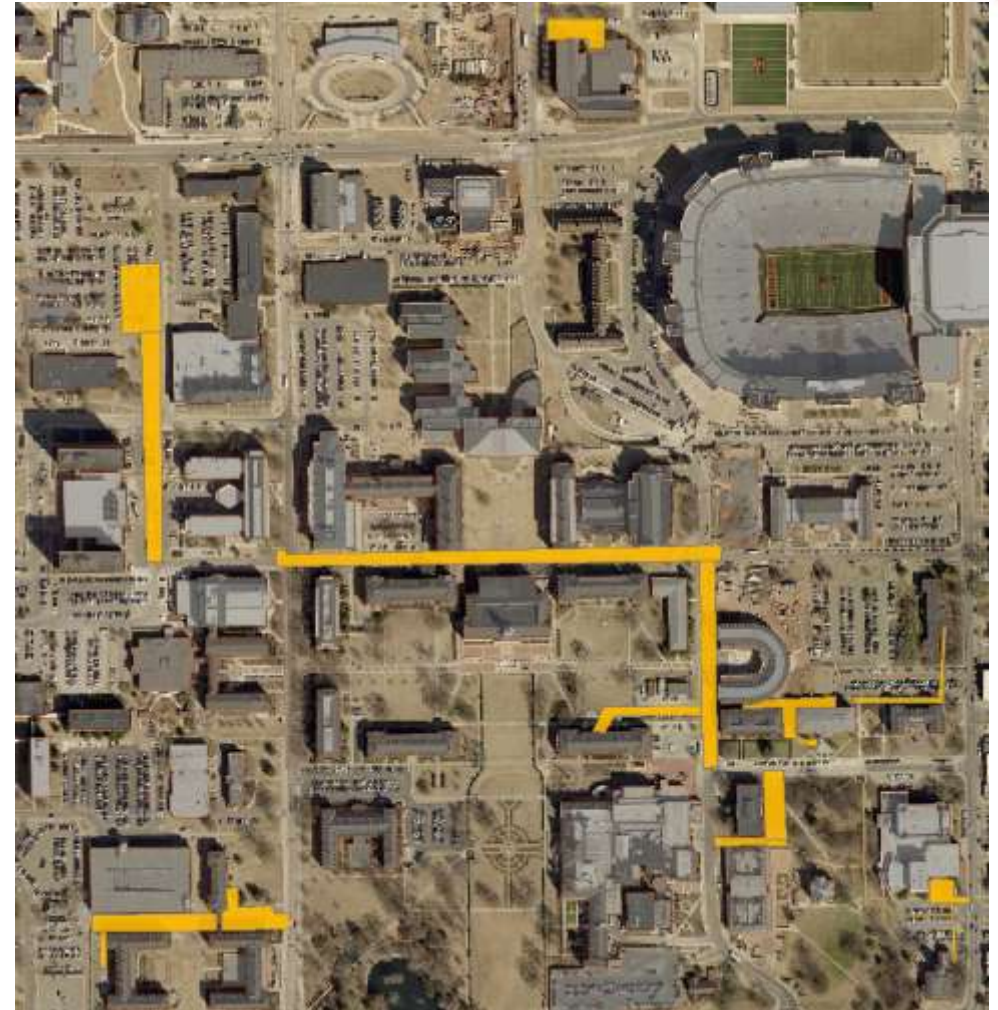
- Know what's there, avoid costly changes (time and money)
- More accurate estimate of construction cost



Communication

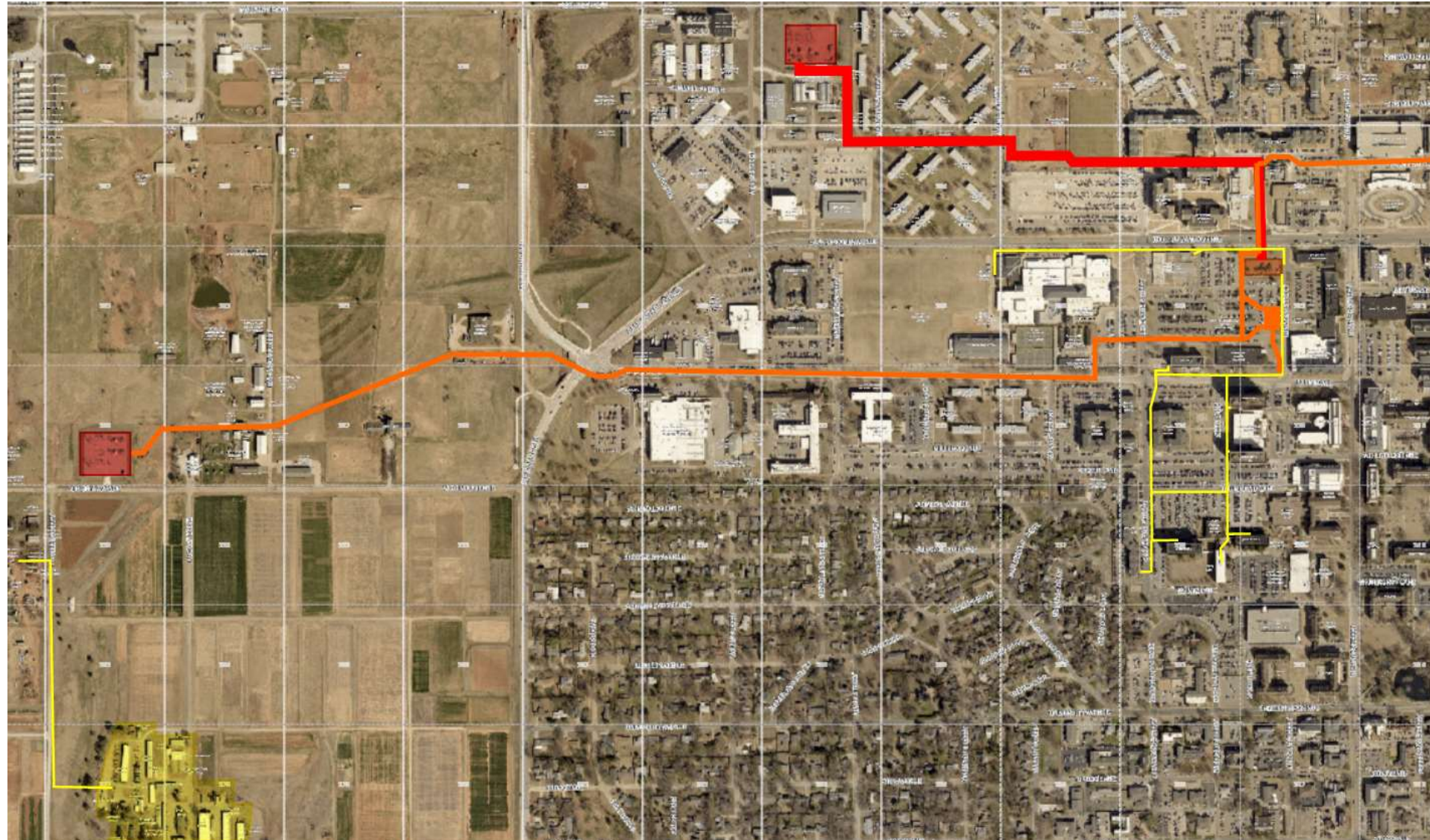
■ Communication with Campus Stakeholders

- Coordinate with Campus depts.
 - Weekly email blasts
 - Campus newspaper
 - GIS interactive map
- Other construction work on campus
 - Multiple contractors working on the Voltage Upgrade
 - Other campus projects
- Scheduled outages
- Vehicle / Pedestrian traffic & parking



GIS Interactive Map of Construction Areas Summer 2018

Voltage Upgrade Phase 2 Overview





Questions?

FUN FACTS:

- 18,428 Linear feet of ductbank so far in the voltage upgrade
- 17 transformers, 30 vaults/manholes, 8 new switchgear
- 16,300 Yd³ of excavation; 6,100 Yd³ of concrete
- Approximately 125 Tons of cable in half-filled ductbanks
- Only 2 change orders in Phase 1 due to unforeseen conditions