Zero Impact Campus Invasion:
Stanford Steam to Hot Water Conversion &
Replacement Central Energy Facility

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Agenda

- Introduction /Project Overview
- Underground Construction
  - Define Constraints
  - Create Schedule Flexibility
  - Execute the Plan
- Building Conversions
  - Define Constraints
  - Create Schedule Flexibility
  - Execute the Plan
- Central Plant
  - Transition Between Central Plants
  - Transition of Substation
- Q&A
Campus Conversion Overview

Four temporary regional steam to hot water HX skids
Define Constraints - Planning Time Frames

- **Academic:** 6-9 AM & 4-6 PM
- **Housing:** 9AM-4PM
- **Main Pedestrian Zone:** Nights
Define Constraints - Coordinate Site Logistics
Create Schedule Flexibility – Stockpile Piping

- **Material Availability**
  - Plan for long lead times
  - Stanford bulk ordered with 25% drawings (not recommended)
  - Need location for inventory

- **Peak of 15 Underground Installation Crews**
Create Schedule Flexibility - Minimize Footprint

- **Managing Spoils and Bedding**
  - 40,000 SF Material Transfer Station
  - Large Truck Delivery to Transfer Station
  - Small Trucks Through Campus

- **Backfill Before Hydro Test**
  - Stanford had full time inspector
  - Third Party inspector used for all welds, leak detection wiring, and joint kit installation.
  - 6 leaks occurred in 4,400 welds
Execution - Minimize Install Time

- Easier Installation
  - Shallow Bury
  - Self-Restrained
  - Direct Bury Valves
  - Eliminated Vaults, Anchors & Expansion Joints
Execution - LTHW Piping - Installation

24” Dia. LTHW At RCEF
Jack & Bore Under Tree

Joint Trench
LTHW & High Voltage (12KV)
Define Constraints - Planning Time Frames
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Create Schedule Flexibility – Stockpile Critical Equipment
Create Schedule Flexibility - Minimize Downtime

- Install T’s & Valves During Low Heating Demand
Create Schedule Flexibility - Temporary Systems

- Hot Water-Hot Water HX Skid
- Steam-Hot Water HX Skid
- Electric DHW Generator
Execute - Minimize Installation Time

- Pre-Conversion Readings
- HX Skids
  - Less Time to Install
  - Consistent for 8 Different Mechanical Contractors
- Tech Team
Transition Central Plants

Four temporary regional steam to hot water HX skids
Transition Central Plants

Regional HX Station for School of Medicine Buildings

One of four Regional HX Stations
Transition Central Plants - Heat Recovery with Thermal Storage
Transition Between Substations
Questions?