

Horizontal Electrodes to Minimize Business Impacts – Installation Strategies and Implementation

Abstract #: 240 | Session: H9
Chris Thomas



TRS

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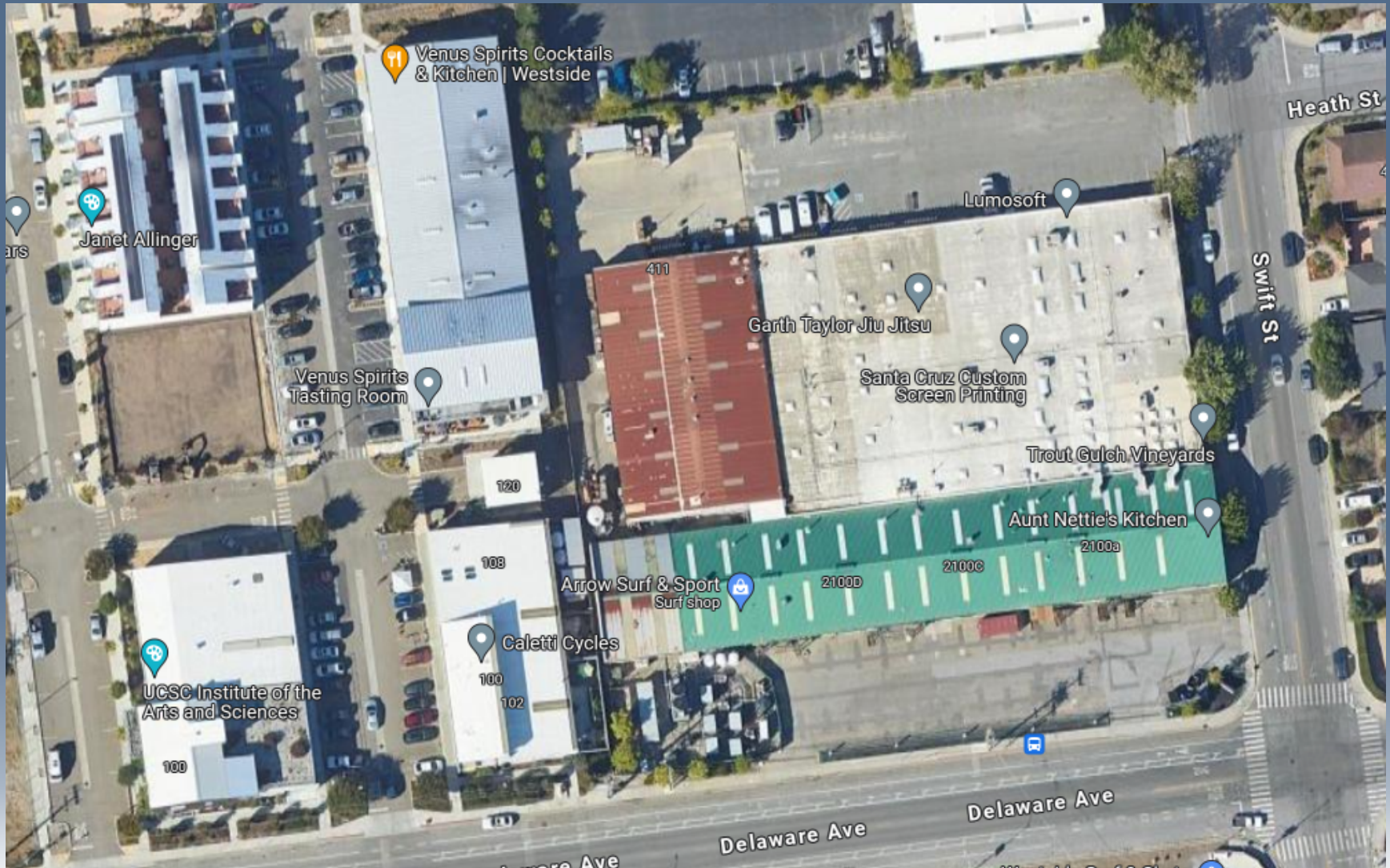
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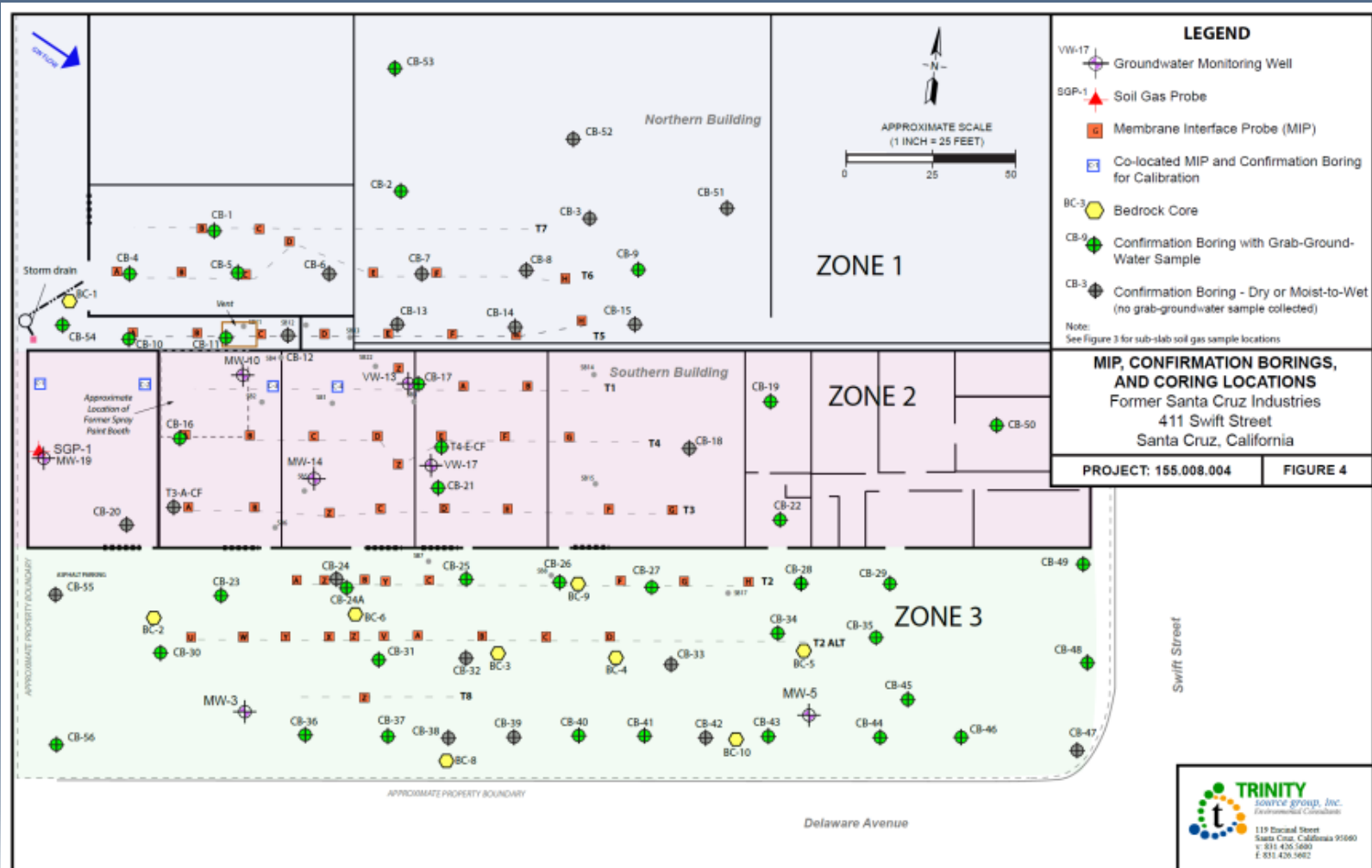
Team and Site Location



Site Location



Facility Plot Plan





that is, $\lim_{t \rightarrow \infty} \|\mathbf{y}(t)\| = 0$ for all $\mathbf{y}(0)$.



Remediation Strategy



Hard to Reach Contamination

- Partial source 150ft laterally below building
- Active business
- Horizontal electrode approach
 - Installation expertise
 - Design and operational considerations
 - Tenant and public safety

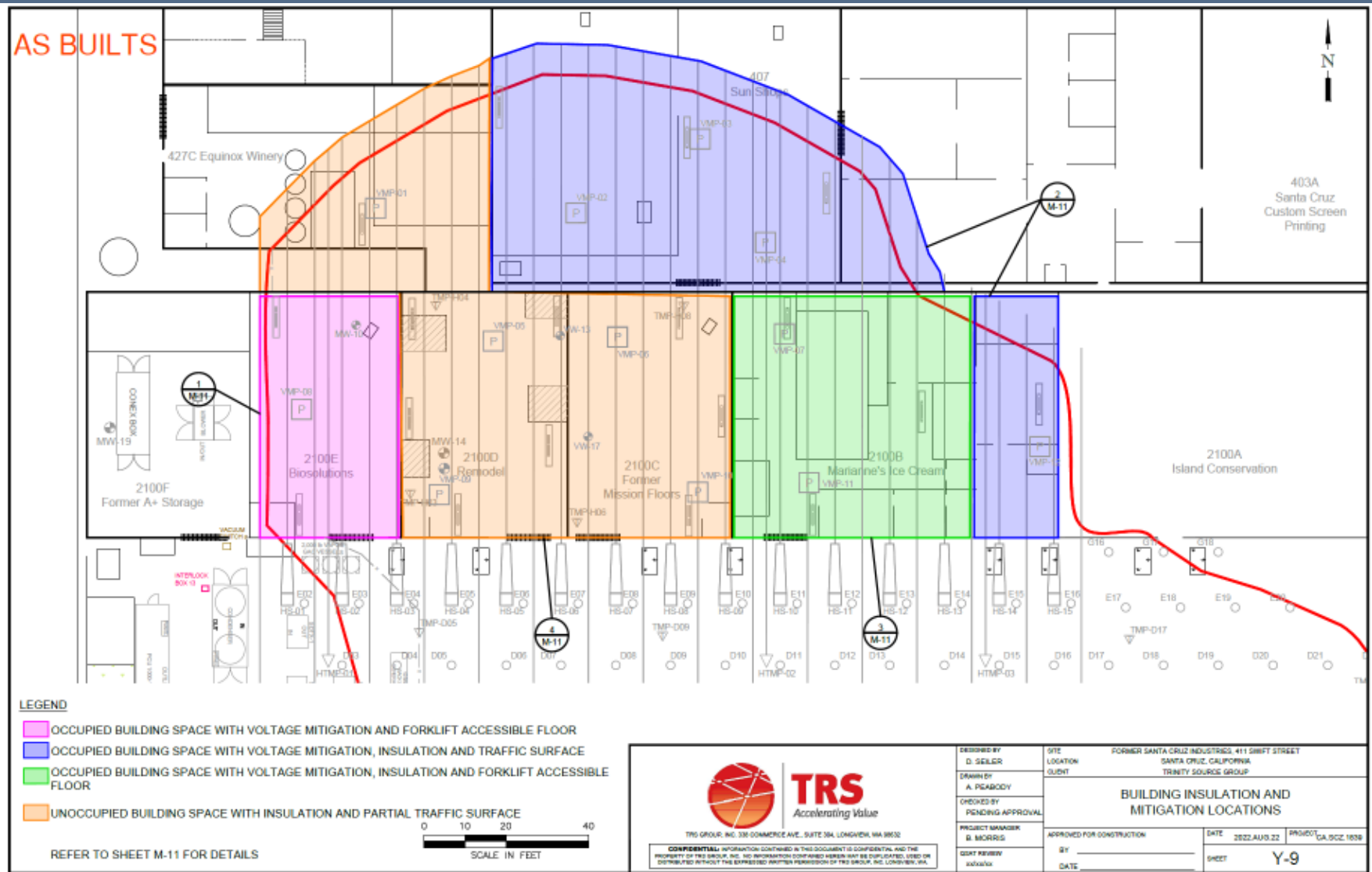
Remediation Strategy - Actions

- DTD – Ellingson – experts in horizontal drilling
 - Confirm single entry point management
 - Drill rig space considerations
 - Waste management
- Installed 4,000 ft of horizontal infrastructure in 60 days
 - 16 electrodes
 - 15 electrodes with vapor recovery

Remediation Strategy - Actions

- 80 vertical electrodes
- 6 downgradient multiphase extraction wells
- Horizontal and vertical temperature monitoring
- Piezometers in building
- Vapor recovery and steam condensing system
- 1,100 kW power control unit (PCU)
- LGAC and VGAC

Remediation Strategy



Direct Drilling Rig

South

HD-06

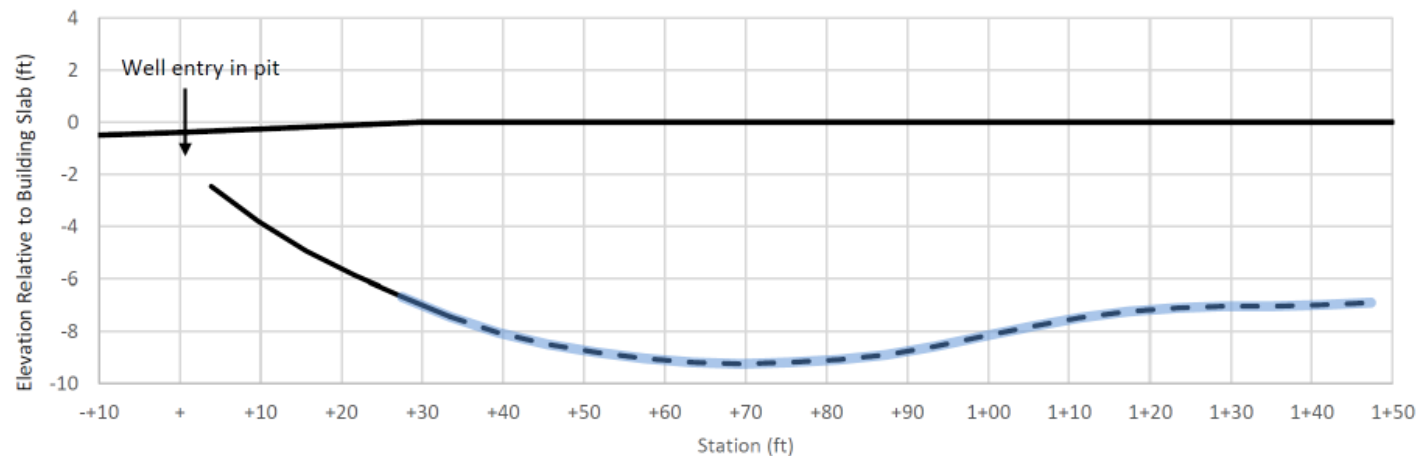
North

Trinity - 411 Swift Street

Santa Cruz, CA

Prepared by Ellingson-DTD

Vertical Exaggeration ~ 1.3x



Notes:

Drilled Length: 175 ft
Horizontal Length: 174 ft
Well Length: 162.75 ft
Well Casing: 31.5 ft 3.5 inch SCHD 40 steel riser
Well Screen: 131.25 ft 3 inch SCHD 40 steel screen
Date Completed: 7/9/20
Conductive Backfill: 850 lbs topped with 35 gal neat cement grout

— Approximate ground surface
— Casing
- - Screen
Conductive Grout

Start of Screen

Station: 00+31.5

Depth below entry: -7.7 ft

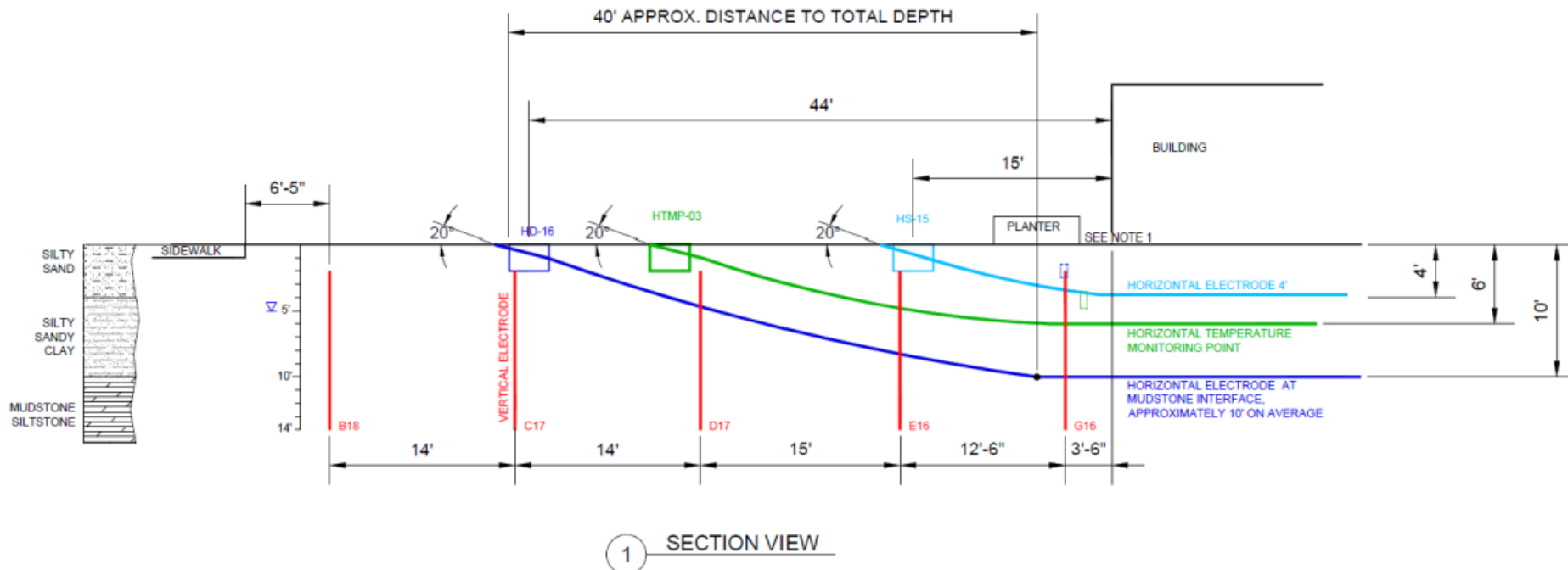
End of Screen

Station: 01+62.75

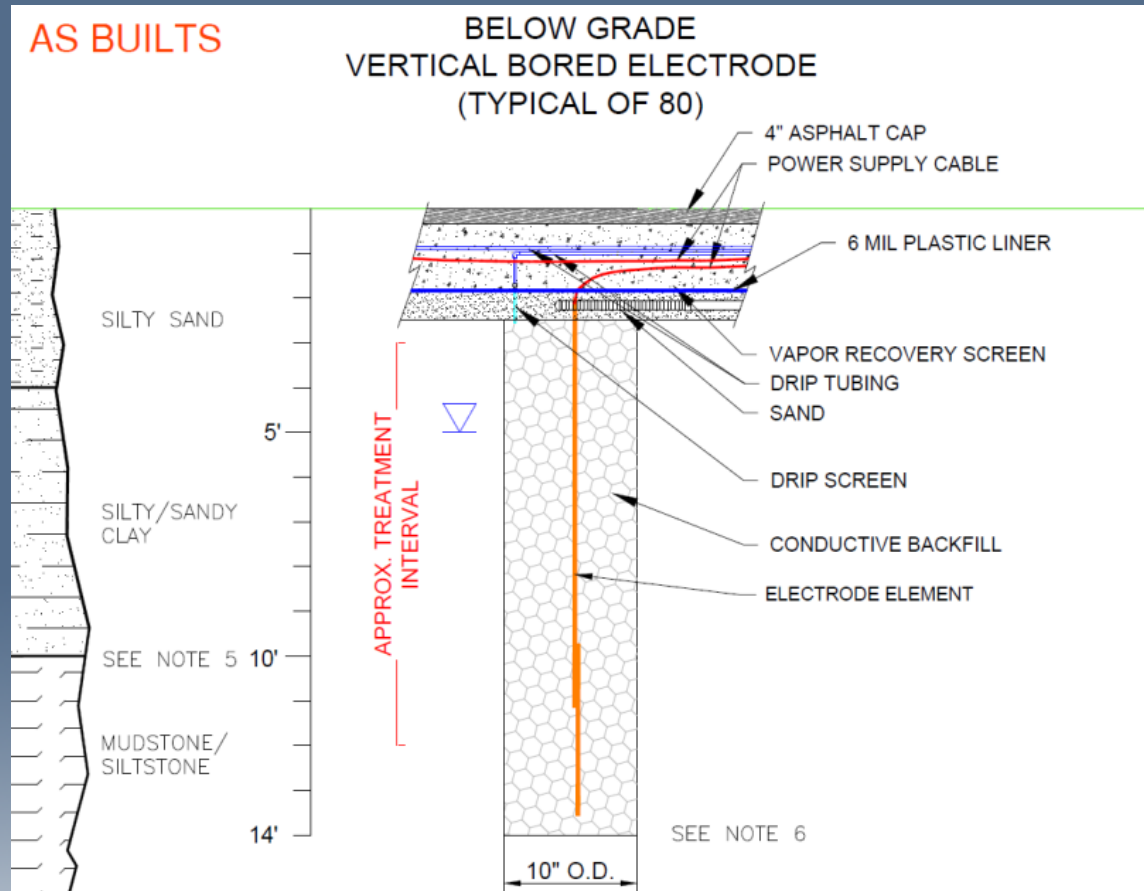
Depth below entry: -6.6 ft

(Note: Station 0+0 at Survey point for well start HD-03)

Remediation Strategy



Remediation Strategy



Direction Drill Rig



Directional Drilling

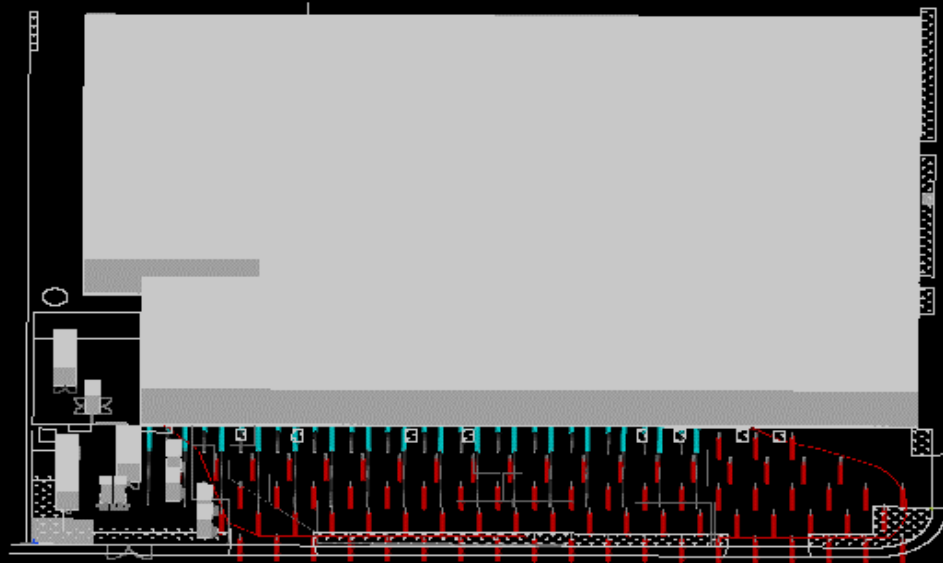


Directional Drilling



Directional Drilling





ERH Operations Summary

- 230 days: June 2022 to February 2023
- Power: 700 kW average
- Energy: 3,657,000 kWh
- NAPL Removed
- Over 95% PCE groundwater reduction
- SVE/VR remained online, post treatment

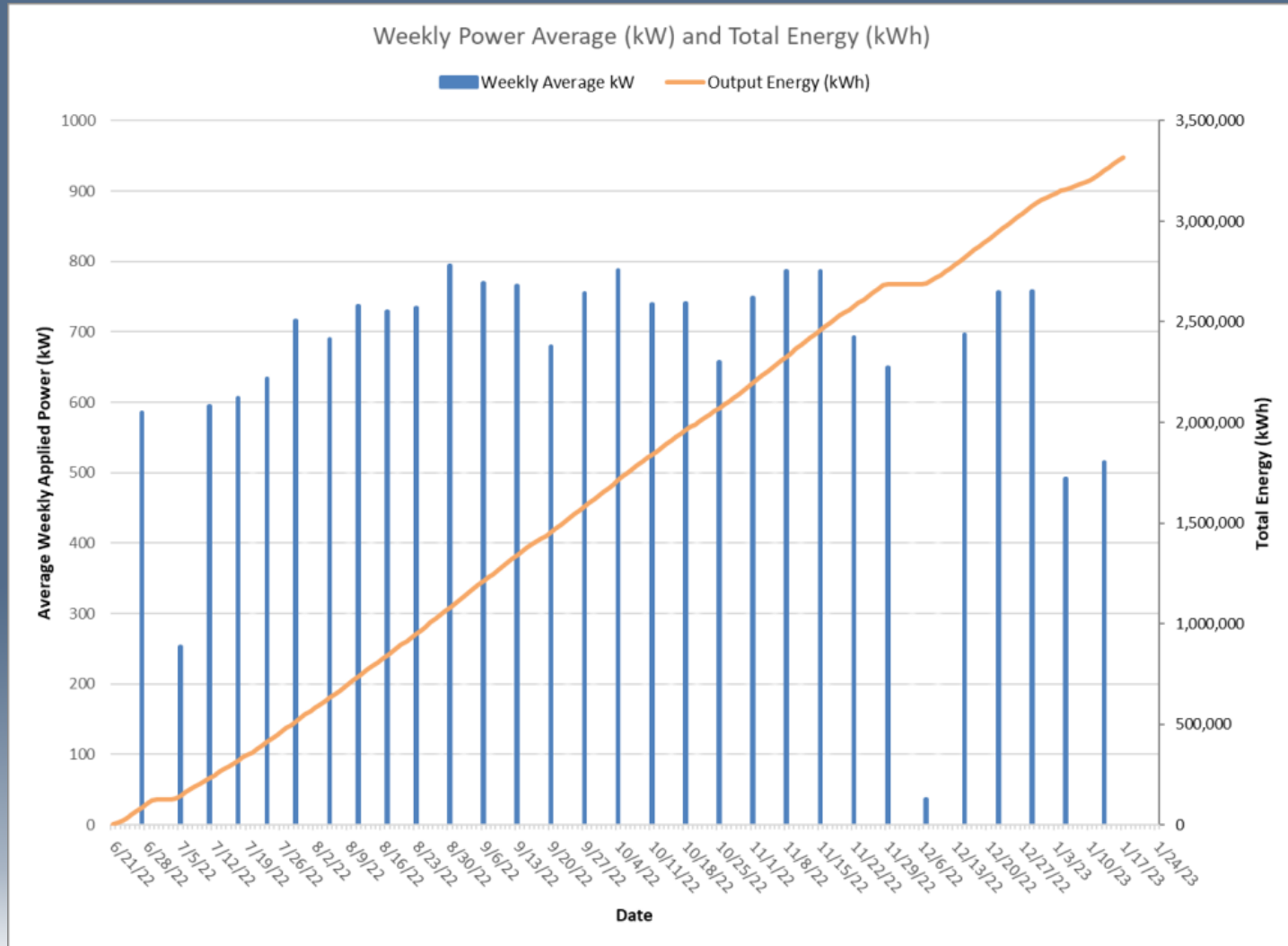
Treatment Compound



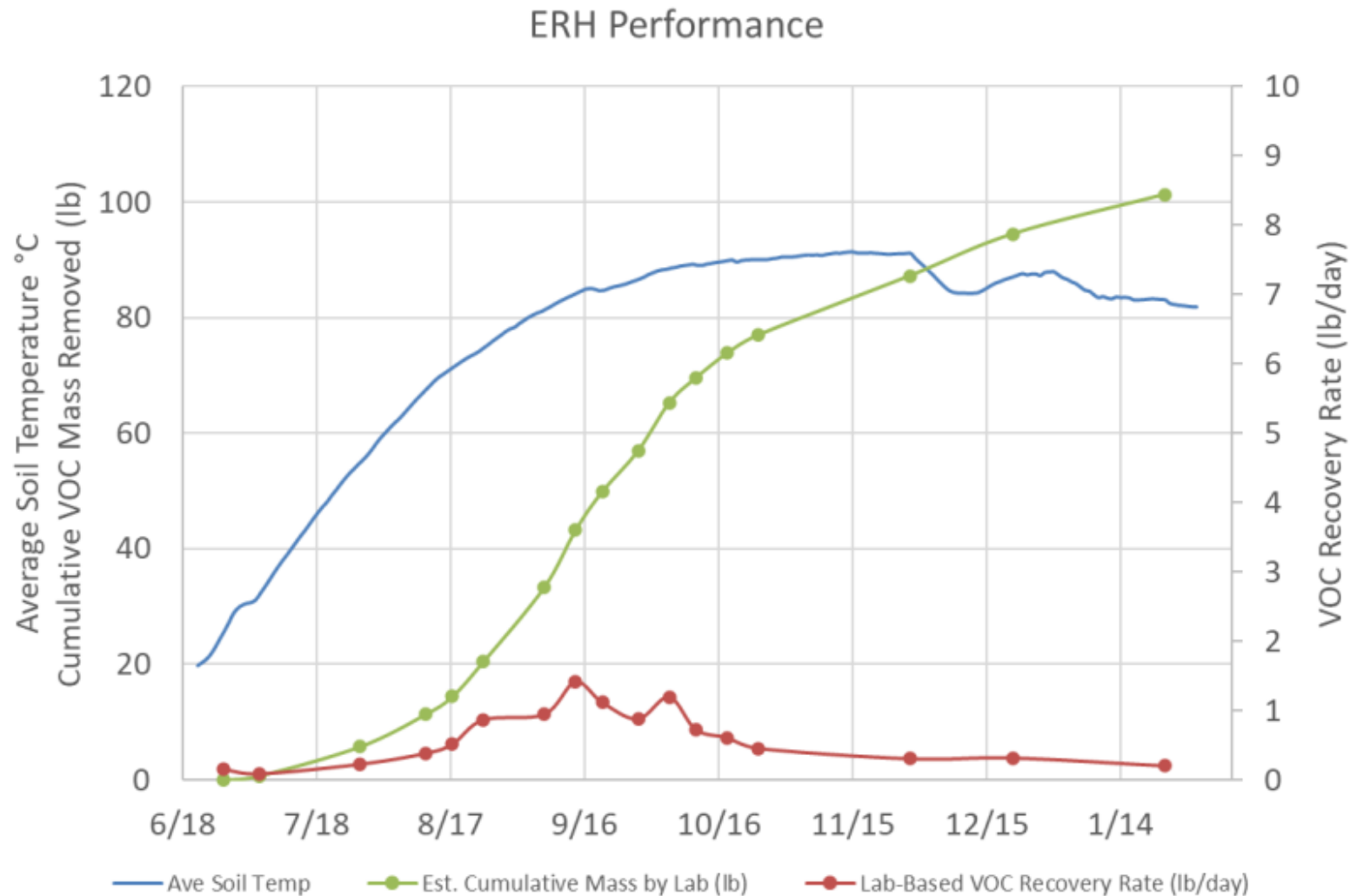
Treatment Compound



ERH Operational Performance



ERH Operational Performance



Conclusions

- Single entry installation effective
- Mud recycler reduced waste
- Horizontals exceeded power expectation
- Tenant health and safety maintained
- Achieved temperature goals
- 95% reduction in peak PCE concentrations

Contact Information

Chris Thomas
TRS Group, Inc.
847-376-3691
cthomas@thermalrs.com
www.thermalrs.com

