



## CASE STUDY SVE Underground Manifold & Infrastructure

### DESCRIPTION

Internal demolition, civil structural renovation and subsurface construction of a large volume underground manifold designed to be hidden from view; within one half of a pre-existing house, located in a densely populated, long standing residential neighborhood. The pipework consisted of sixteen conveyance pipes varying in size between 14", 12" and 10" in diameter for removal of petroleum hydrocarbons below the neighborhood. The entire internal working space was only 1900 square-feet (sf) with less than 9 feet (ft) of headspace, with internal excavation required to 11ft below ground surface (bgs). The entire lot area was less than 3000sf leaving a small perimeter footprint. A 16ft deep excavation with shoring (within 30ft space between back of house and block wall fence) was also performed under power and comm lines. The overall excavation required exacting planning and execution to perform all tasks safely and efficiently. To meet current industrial structural code, the house required structural modifications (while maintaining the original façade) before and after the manifold construction.

### MAIN TASKS

- Structural Demo and Modification to Existing House - demolition of internal house pad and house structural framing, installation of footings, and modification to ceiling and wall framing structures.
- Excavation of Class A soil to depth of 11 feet below house, 59 feet long and total area of 960 square feet.
- Extensive shoring was used in the primary area where the 16 large diameter manifold pipes had to be stacked and fitted within a total width of only 10 feet.
- Pipe and Lower Manifold Construction: The subsurface horizontal piping with

wye risers to intermediate flanges were constructed.

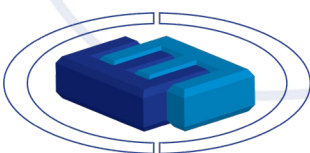
### CHALLENGES

The project required completion within 38 working days. Working hours were limited due to the project location within residential neighborhood. Excavation challenges were compounded by the small footprint, low headroom and the temporary structural shoring of the new, much larger beams that needed to be installed prior to construction of permanent posts and wall footings.

The approach angles of the pre-existing pipes that fed into the house required substantial field adjustments and the use of small-angle couplers with precise rotation to achieve accurate placement and connection of the manifold pipes. Space constraints, low hanging overhead power lines, 16ft high perimeter sound barriers and railroad easement abutment to the property, presented significant challenges to complete excavation safely and within schedule.

### INTERESTING POINTS

Pipe fitting of the large diameter piping within tight space constraints, required precise cutting and dry fitting before final assembly. QC of welded joints was highly critical to ensure pipe could sustain pressure testing of 7 psi (14.25 in Hg) for 1 hr. Extensive sacrificial anchoring was required to ensure zero movement of highly buoyant pipe during the slurry backfilling process. E&E was successful mitigating any damage to external stucco and veneer materials during structural renovations, termite repairs and movement of heavy equipment around and within the house so that the external house maintained the original appearance of when it was originally built, allowing it to remain seamlessly integrated aesthetically into the surrounding neighborhood.



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