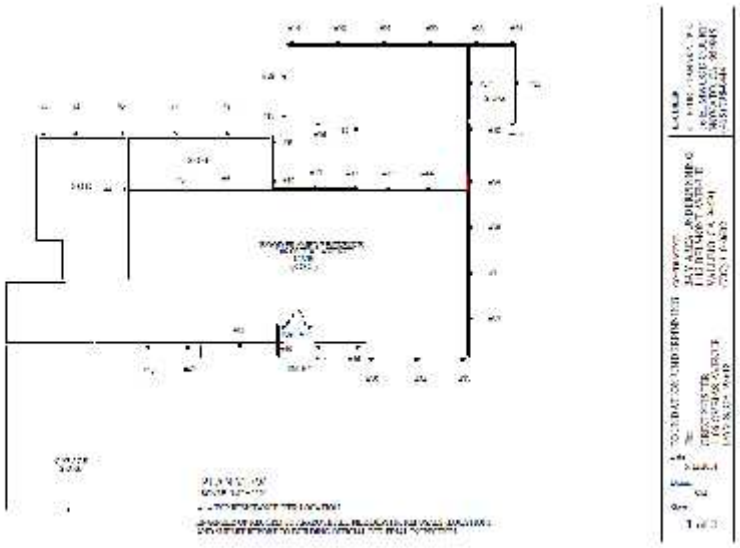
Case History

ECP PPB-300 Steel Piers™

Settling Bay Area Home Repaired Rock Solid

Earth Contact Products' Steel Piers™ were used to raise this settled residence. The engineer of record calculated that the structure weighed slightly less than 1,000 pounds per lineal foot at the perimeter. Calculations determined that the concrete footing would be able to support a span between piers of 7-1/2 feet with an average working load on each ECP Steel Pier™ of 12,700 pounds.

ECP PPB 300 Steel Piers™ were recommended to be installed on the perimeter of this structure to provide support and to recover lost elevation. The ECP Steel Pier™ system with the under the footing bracket was selected and installed at each pier placement location. Because this product provided ease of installation and each pier placement required only a small, hand dug excavation, there was minimal disruption to the yard during construction.



Each pier was advanced through the consolidating soil until the pier encountered firm load bearing. Once end bearing was reached, each ECP Steel Pier™ was field load tested to a proof load, or test force, between 11,800 and 17,800 pounds. The proof test on each and every pier installation insured sufficient capacity to safely lift the settled foundation to the design elevation and to provide long term structural support.

Project Summary			
Project:	**Phister Residential Restoration**		
Engineer:	**Clifford Tanaka, PE – Novato, CA**		
Installer:	**Bay Area Underpinning - Vallejo, CA**		
Product Installed:	**ECP PPB-300 Steel Pier™**		
Number of Placements:	**43**	**Depth to Bearing:**	**45 to 70 feet**
Ultimate Limit Capacity:	**68,000 lb**	**Recovered Elevation:**	**Up to 4-3/4 in**
Average Test Load:	**14,850 lb**	**Average Lifting Load:**	**4,100 lb**
Average Factor of Safety:	**3.6 : 1 Test Load to Working Load** **16.6 : 1 Ultimate Limit To Working Load**		

Field load testing each pier after reaching end resistance verified that the bearing stratum deep below the structure was suitable for long term support. This load testing also determined a factor of safety for each pier placement against future settlement. In the case of this project, the field test loads were on average 362% percent above the working load requirements providing an average factor of safety over 3.6!

Once all piers were installed to end bearing and the load capacity verified, the structural load was transferred from the failing soil under the structure to the verified bearing stratum deep below the surface. One jack was installed on each pier bracket to accomplish the load transfer and structural lift to recover the lost floor elevations. This gentle and uniform load transfer was accomplished by banks of hydraulic jacks that were all connected through manifolds to hydraulic pumps.

There was minimal disturbance to the building's occupants during the restoration process. Because ECP Steel Piers™ were installed using quiet, vibration free hydraulics, it was "business as usual" in the house during the underpinning installation. During the lifting process, Bay Area Underpinning made floor elevation adjustments to the floor joists in the crawl space under the house.

The total structural load support provided by the 43 ECP PPB-300 Steel Piers installed on the perimeter of this structure was estimated at 176,000 pounds!

Bay Area Underpinning of Vallejo, CA was able to complete the project quickly and accurately and with minimal disruption to the owner and his property.

The project was inspected during construction and the finished job was approved by the engineer.

Photographs:

Photos 1 & 2 are views showing the preparation of the area for pier installation. The small excavations are hand dug and then a technician uses a chipping hammer to prepare the edge of the footing smooth and vertical and the underside of the footing smooth and level.

Photo 3 shows an ECP PPB-300 under footing bracket carefully installed to the foundation.

Photograph 4 shows a technician installing the steel pier pipe into the soil. Each section of pier pipe is 3-1/2 feet long and the process continues until the pier encounters rock or a suitably firm bearing stratum.

Photo 5 is a close detail of the finished installation prior to backfill. The ECP Steel Pier™ Assembly is easily adjusted should geologic conditions change.