



Owner: Santa Fe Ranch LTD.

Owner's Representative: Westdale Asset Mgmt. | Mike Charron (469) 628-5482

Specialty Engineer: Cutler-Gallaway Services, Inc. | Earl Cutler (210) 496-3326

Completion Date: January, 2008 | Contract Amount: \$2,092,668.20

Maximum Column Load: 110 kips | Lowering Amount: 12"

## PROJECT SUMMARY

### Santa Fe Ranch

**Project Description:** Santa Fe Ranch is a luxury multi-family property located in Valley Ranch, Texas. Power Lift was contacted by the management company representing the owner concerning ongoing movement and related distress at the leasing office/clubhouse. Mike Charron, Construction Director for Westdale Asset Management, indicated the problems associated with the building's movement had steadily increased from the time the owner had purchased the building two years prior. An elevation survey conducted by Power Lift personnel revealed the five year old 8,000 sq. ft. structure had experienced more than 17" of differential movement.

#### **Subsurface Conditions:**

Power Lift entered an investigative contract with Westdale to investigate the cause of the movement and develop an appropriate repair solution. The engineering firm, Cutler-Gallaway Services, Inc., was retained to assist in the investigative effort. Extensive geotechnical sampling was undertaken taken at multiple locations around the site to depths of 60'. Highly





#### **PROJECT SUMMARY — SANTA FE RANCH (CONTINUED)**

expansive clays extended to a depth of 40' with a shale formation underlying the expansive clay. The investigation determined the building's problem was due to swelling of the expansive soil causing foundation heave.

**Design Details:** Due to the nature of the soil present in the Las Colinas area, the only true corrective measures for this structure would have either been demolition and reconstruction or complete suspension of the structure above the expansive soils. Due to parking lot elevations, sidewalk grades, ADA compliance, and tie-ins to adjacent buildings, elevating the structure was not an option. As the owner felt demolition and reconstruction would be too damaging to their leasing efforts, the only practical solution was to lower the structure. Furthermore, the owner charged Power Lift with the requirement that the building must remain fully operational

during the entire construction activity. Power Lift worked closely with Earl Cutler, P.E., to develop an underpinning, shoring, earth retention, and building stabilization plan that would improve the building's condition and isolate the foundation from volatile soil movements.

As the structure was built into a hillside with a deepened foundation on the downhill side, it was decided to underpin the west wall of the structure, remove a section of the west deepened foundation, and begin excavation eastward beneath the building. As the excavation progressed, shoring was erected beneath the structure for safety. As underpinning locations were exposed, driven steel piles were advanced through the unstable soil and seated in the shale at 45' below grade. Each pile was jacked to 100 kips installation capacity. The piles were comprised of multiple segments of 3", 3 ½",



#### **PROJECT SUMMARY — SANTA FE RANCH (CONTINUED)**

4 ½", and 5 ½" diameter pile material. Once excavation was complete and all piles had been installed, Power Lift's synchronized lifting system was utilized to lower the building more than 12". The piles were welded to the pile heads and secured permanently in place supporting the structure. Voids were established around the entire perimeter of the structure's foundation and void retainers installed around the exterior to prevent soil intrusion. Steel bracing was installed to provide lateral stability to the pile system. To anchor the building in place, two 36" diameter drilled shafts (one on each side of the building) were installed by Power Lift personnel and socketed into the shale to a depth of 55' below grade. The shafts were equipped with a pile cap that was doweled and anchored into the building to further stabilize the building against lateral movement. To restrain earth

movement on the uphill side of the structure, 8 5/8" diameter helical soldier piles were installed every 24" to a depth of 50' and filled with grout. Wire fabric with a geo-membrane and coarse aggregate was installed across the entire uphill side of the building behind the soldier piles. Upon completion, a strip footing was poured across the west end and cast on-site wall panels were erected to retain the backfill along the outside. Float activated sump pumps and a power ventilation system were also installed. The structure remained fully functional during the entire project with the exception of the day of lowering. The owner was extremely pleased that leasing rates remained high and were unaffected throughout the construction.