



VERTICAL AND INCLINED JET-GROUTED COLUMNS FOR FOUNDATION ENHANCEMENT OF CONDOMINIUMS

Location: Derby Loft Condominiums, Salem, MA

Structure Specs: The existing structure consisted of two abutting structures, approximately 150 ft by 170 ft (total) in footprint, built during a period of several years during the early 1900's. The installation had to be carried out under limited (approximately 10 ft; 3m) headroom.

Subsurface Conditions: Caissons belled on the top of the marine clay, which underlies the urban fill approximately 16 ft (4.9m) (average) below the basement floor slab.

This project consisted of enhancing the foundation support system of an existing four-story condominium to support the construction of three additional floors.

In order to meet the Massachusetts Building Code (Sixth Edition) requirements for seismic design, the existing foundation system needed primarily additional lateral support capacity. Upon GSI's recommendation, a varying number of inclined jet grouted columns with radial symmetry were placed around the individual caissons at the same elevation as the belled caissons. The existing cap of the caisson, and grade beams were integrated into a larger cap structurally incorporating the new jet grout columns. There were 62 jet-grouted columns installed.

During the initial phase of the construction two test jet grout columns, and several production columns were excavated and exposed partially. It was observed that in unobstructed areas the jet grout columns were about 5 ft (1.5m) in diameter within the granular fill. For the base of the jet grout columns formed in the silty clay, a 3-ft (0.9 m) diameter was considered in estimating the added support capacity in the design.

The addition of the jet grouted columns provided the necessary vertical as well as lateral foundation support.

