

## Waterfront Housing Burlington, Vermont

**Owner:** Housing Vermont & Burlington Community Land Trust

**Services Provided:** Civil, geotechnical and structural engineering, plus construction inspection & testing.

**Problem:** Build a 40-unit apartment building on a site containing marginally stable slopes on the east and north sides of the project site. This instability had resulted in sloughing and a 15-inch settlement of Depot Street, which bordered the eastern portion of the project site.



**MSE Wall at Parking Lot (Southeast)**

**Investigation:** Knight Consulting Engineers set-up a 2-phase soil investigation program in order to assess both slope stability and the soil bearing capacity. Phase 1 involved (5) upper soil borings along Depot Street and Burlington College and (4) shallow borings at the toe of slope along the north and east perimeters of the sites. Results of the soil borings were used to determine the pre-development slope stability and generate slope reinforcement design concepts. Phase 2 involved (4) deep soil borings around the building perimeter for determination of soil bearing capacity.

**Design Approach:** The selected design approach, based upon cost and aesthetics, utilized a reinforced slope between the proposed building and Depot Street and a soil-reinforced masonry wall between the parking lot and Depot Street. The minimum design Factors-of-Safety were 1.5 and 1.3, respectively. Along the northerly perimeter (adjacent to Burlington College), the design approach was to preserve most of the old tree growth and situate the building so that no slope failures with Factors-of-Safety less than 1.5 would affect the proposed building. An additional block retaining wall was required to separate the project from existing railroad tracks along the western portion of the site. Loose soil conditions resulted in bearing capacities of only 2000 PSF.



**Reinforced Slope (East)**

**Construction:** The project was constructed between the summer of 2003 and the fall of 2004.