Impact-Echo Testing
Aeration Basin Walls
Wastewater Treatment Plant, Grass Valley, California

The aeration basin is a rectangular concrete tank with approximate dimensions of 242’x 98’x 21’ high. The tank is divided into several chambers with the dividing walls with thickness between 14” and 16”. The walls are reinforced with either #5 or # 6 steel bars placed at 6” CC. The hairline cracks appeared on some of the walls after a year. Reportedly, testing of the chambers for water tightness showed no measurable leakage rates. However, at some places of the walls, seepage of moisture took place through the hairline cracks. Attempts to seal the cracks were unsuccessful and concerns were raised of possible significant internal voids in the concrete. Concrete Science was contracted to locate such voids (if they exist) in the suspect walls.

Concrete Science conducted the impact-echo testing on the suspect walls. Test results were very consistent and repeatable. Analysis of the frequency spectra of all the testing showed only the frequencies associated with the thickness of the walls. Frequency variation was in generally accepted range. None of the testing results (away from the patched areas) showed frequencies associated with the interior voids. In the repaired areas of the cracks where the wall surfaces were wet, impact-echo testing showed “normal” results indicating absence of significant crack openings. The test results showed that some of the repaired patches were delaminated near the surface.