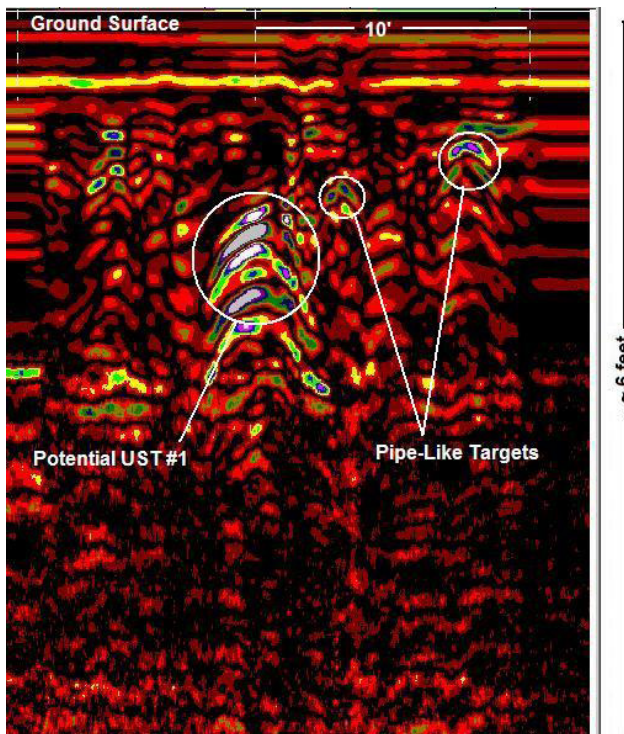


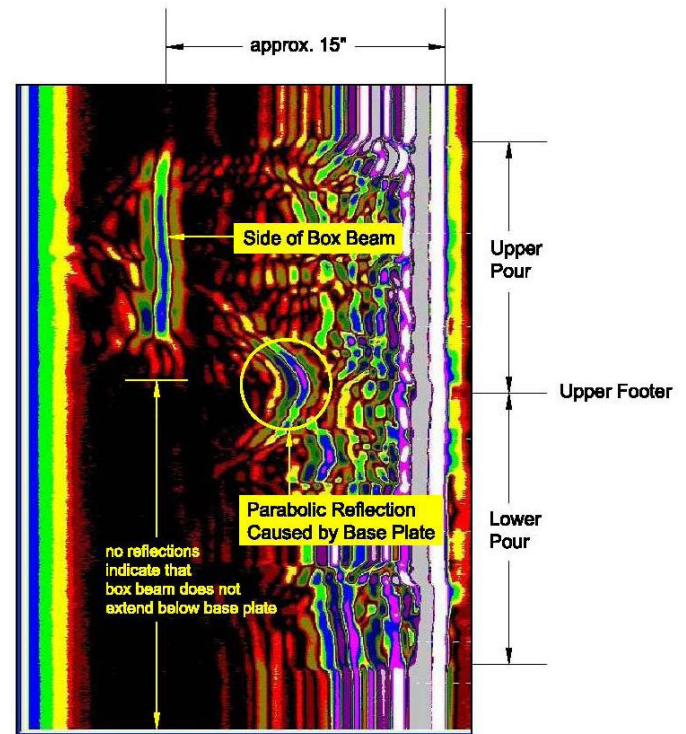
# Ground Penetrating Radar (GPR)

Ground Penetrating Radar (GPR) is a non-destructive, high-resolution, subsurface profiling geophysical method. It incorporates an antenna that rapidly transmits a high-frequency electromagnetic wave into the subsurface. At the boundary between materials of contrasting electrical properties, such as the soil-rock contact or concrete slab-soil interface, some of the wave energy is reflected back to the surface where it is detected by the antenna, amplified, and then displayed as a graphic image in real-time. The process is analogous to how a fish-finder works.

Quantum owns and operates two GPR systems with the following antenna frequencies: 200 MHz, 400 MHz, 1.5 GHz, and 2.0 GHz. Higher frequencies provide better resolution of near surface features whereas lower frequency antennae provide better depth penetration. GPR has mainly engineering and environmental applications. Because of its relatively shallow depth of investigation, GPR is generally not used for groundwater exploration.



GPR profile of underground storage tank (UST) and buried piping



Using GPR to determine the depth of load-bearing column in footer

## Quantum uses GPR to:

- Identify USTs and buried piping
- Identify voids at the base of concrete slabs
- Determine the thickness of concrete slabs and locate rebar
- Identify shallow soil raveling/piping associated with sink activity.