Background

Ground-Penetrating Radar (GPR) has been in use for over 30 years as non-invasive sub-surface investigation technology to "see" what is underground without excavations! It is used to locate objects underground including engineering and environmental targets. It can also provide sub-surface information on historical land use including past cultivations/excavations and now, tree roots!

Equipment and specialist software has been developed that will identify and plot the location of tree roots.

GPR for Tree Roots: how does it work?

- When a GPR wave encounters a boundary between objects with different properties, it will reflect, refract, and/or diffract from the boundary in a predictable manner; software analyses these electromagnetic differences and produces predictive data printouts.

- TreeRadar™ GPR instrumentation for subsurface structural root mapping is a recent innovative application; electromagnetic differences between tree roots and the surrounding soil provide contrast and reflective properties necessary for detection. Roots in excess of 10mm diameter will be detected.

- The software analyses these electromagnetic differences and provides reliable data printouts on depth and location of tree roots.

- TreeRadar™ GPR instrumentation can also detect and analyse the electromagnetic differences in buried objects and services including plastic pipes, cables, and ducts; these can be recorded as "non-root" reflectors.

GPR for locating tree roots using automated trolley

Hand use of GPR on banks

The quantifiable results (data) provide technical information about tree root locations and condition, and, the subsurface environment.

The combination of electromagnetic radar technology and analytical software represents a powerful tool for landscape consultants, engineers, ecologist, arboriculturalists and many other professionals.

How is the data provided?

Root data printouts would normally be:-

- A top-down view showing root location and depth of roots and "non-root" reflectors, set out against datum points, etc plotted against a scale from which the root positions can be mapped out on the ground/plotted to a site plan.

- Virtual trench face showing depth and position of roots set out against datum points plotted against a scale. Where required positions of "non-root" reflectors (services etc) can also be given.

- An annotated virtual trench face showing strata, possible sub-surface disruption and "non-root" reflectors (Raw B-scan Data)

Top down view
x = Root location
I = Datum markers
□ = "Non-root" reflectors

Virtual trench "face"
x = Upper root location
x = Lower root location

Raw B-scan Data

Surface

Unusual strata - probably fill

"Non-root" reflector

Subsurface "clutter" – i.e. Builders trash

▪ Root positions optional