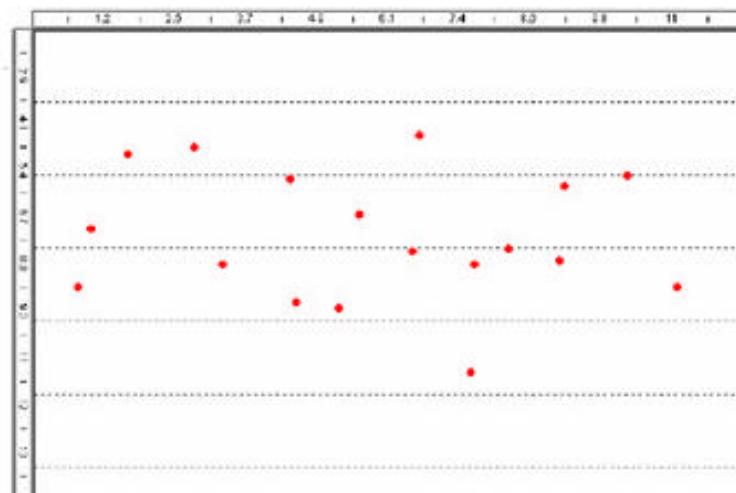


## TRU™ (Tree Radar Unit) Non-Invasive Inspection of Tree Roots and Trunks

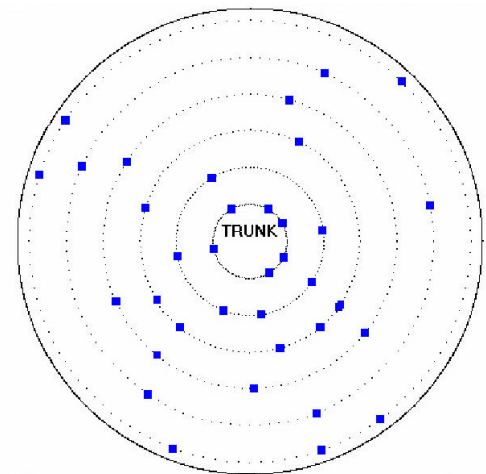
### Root Inspection – "Virtual Excavator"



- Rapid, Non-Invasive Inspection of Subsurface Structural Roots
- Also detects buried pipes, cables, ducts, etc.
- Depth Penetration down to 1 Meter
- Minimal Setup & Scan Times – Typically 30 to 60 minutes for a Multi-Line Scan
- Scan either in Straight Lines Parallel to Tree or in Concentric Circular Lines around Tree
- Detection of Structural Roots as small as 0.5-inch (1.3-cm)
- Subsurface 2D image of Root Location and Depth for each Line Scanned – "Virtual Excavator"
- Top-Down 3D Image of Root Layout and Density
- Detect and Image Roots under Covered Soil such as Asphalt and Concrete
- Professional Analysis Report



**Virtual Trench - 2D Planar Depth Image of Root Location (top scale, ft) and Depth (left scale, in) for One Scan Line**



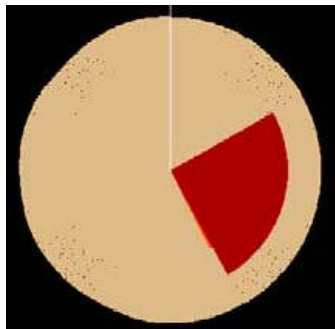
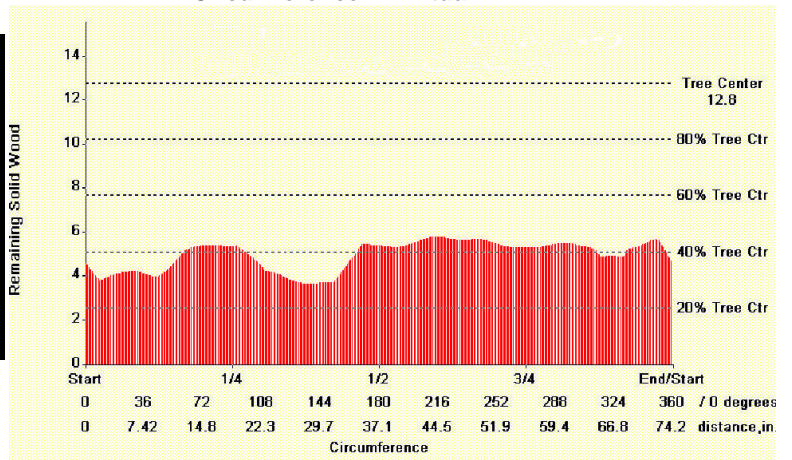
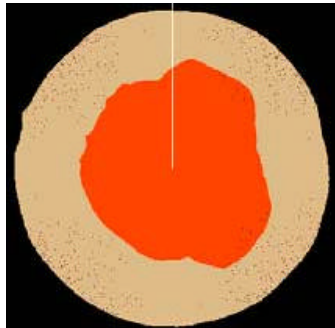
**3D Top-Down Image of Root Layout and Density**

# Trunk Inspection – "Virtual Drill"



- Rapid, non-Invasive Inspection
- Multi-Elevation circumferential scans and single point inspections possible
- Minimal Setup & Scan Times – Entire Multi-Elevation Trunk Scanned in 20 minutes
- Image of Predicted Internal Cross-Sectional View for each Elevation Scanned
- Plot of Remaining Solid Wood across Entire Circumference – "Virtual Drill"
- Detect Cavities and Decayed Wood
- "Single Shot" mode for low elevation scanning on Heavily Buttressed Trees.
- Professional Analysis Report

**Plot of Remaining Solid Wood across Entire Circumference – "Virtual Drill"**





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## Inspection Report

# TRU™ (Tree Radar Unit) Non-Invasive Tree Scans

inspection site:

**Kew Gardens**  
**Attn: John Hammerton**

scan date:

**September 21, 2005**

inspection performed:

**Multiple-Line Root Scans**

# TRU™ Scan Analysis Results

## Overview

A roots inspection was performed for the **historic Ginkgo at Kew Gardens**, at the request of John Hammerton. It was of interest to compare the root density on both sides of this tree: one side being a highly compacted, paved road and the other side being 'recovered' soil that had been aerated after shrubbery removal. It was conjectured that the root density should be significantly greater on the soil side. TreeRadar's TRU™ (Tree Radar Unit) system, employing ground-penetrating radar, was used to perform the root scans.

A series of line scans were conducted using TRU's mobile scanning cart. Three scans were performed on both the pavement and (bare) soil sides at distances of 0.3m, 1.2m, and 1.4m from the trunk. A fourth line scan at 2.4m, which is well beyond the canopy drip line, was also performed at Mr. Hammerton's request.

The TreeWin™ software program was used to analyze the data subsequent to the field data collection runs.

## Results

A schematic of the root scans is shown as the first graphics figure. This figure shows the location of each of the seven scan lines performed on both sides of the tree.

The next figure shows the three line scans – LS#1, LS#2, LS#2 – conducted on the paved and compacted surface. As stated in the Analyst Notes, there is a very sparse and shallow root distribution at all three distances from the trunk. Further, The root density falls off considerably at SL#3, which is 8ft (2.4m) from the trunk where only a few roots, centered at the trunk, are located.

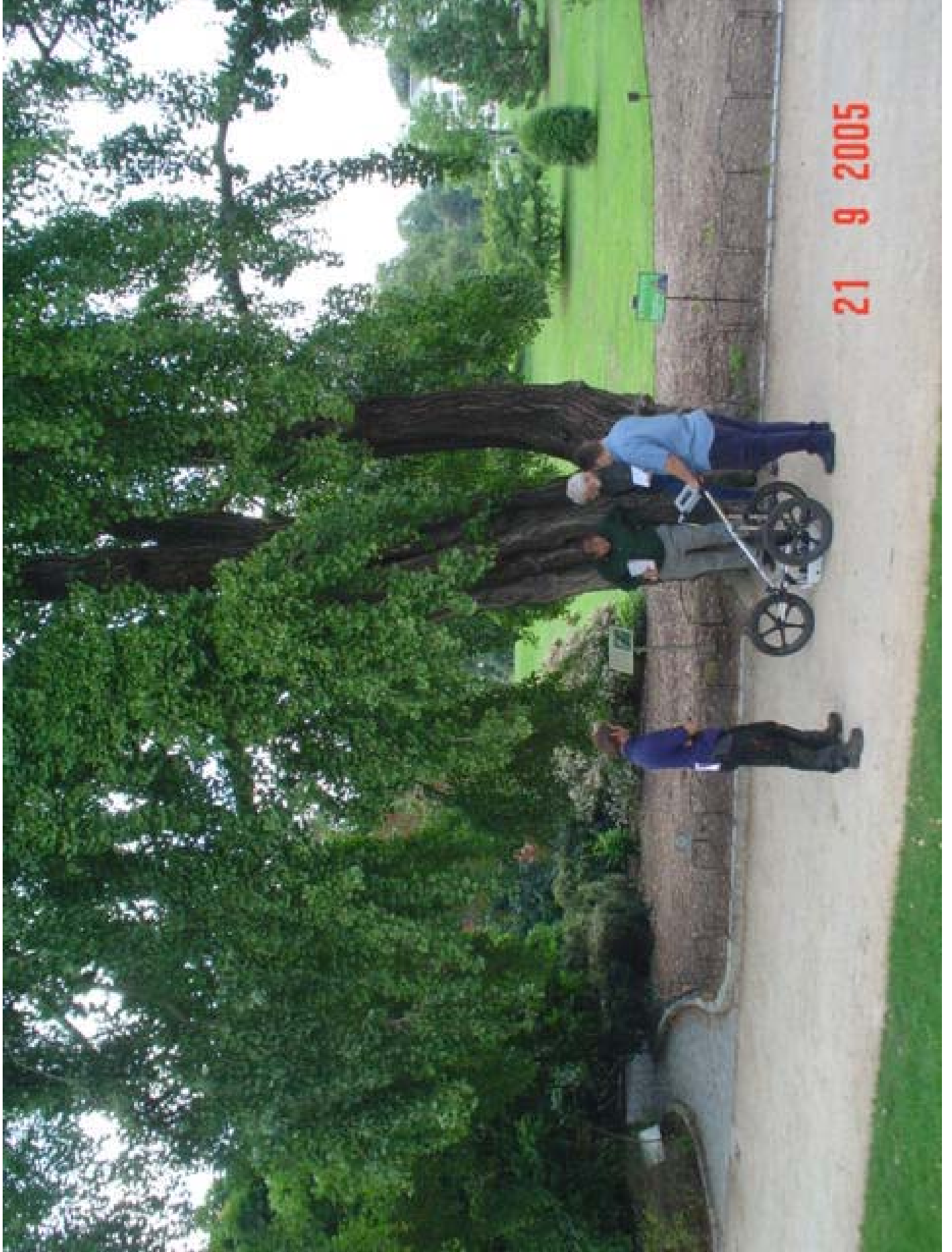
The following figure shows the four line scans – LS#4, LS#5, LS#6, LS#7 – conducted on the bare soil. As stated in the Analyst Notes, the root distribution considerably denser compared to pavement. Further, there are still detectable roots beyond the canopy at the 18ft (5.5m) distance that Mr. Hammerton asked to be scanned.

The final figure shows a top-down view of the root layout and density for all seven scan lines. The plot shows any root detected between the surface and 38 cm below the surface. This plot illustrates the dramatic difference in root density on both sides of the fence line.

These results demonstrate that the procedure of shrub removal, de-compaction and aeration has dramatically improved the growing conditions for the roots of this historic Ginkgo tree.

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Note: TreeRadar personnel are not certified arborists. These results describe what was found by the radar scans. They are not a diagnosis. They should be used by a certified arborist, in conjunction with traditional arborist assessment criteria and instruments, to assess the tree risk potential.

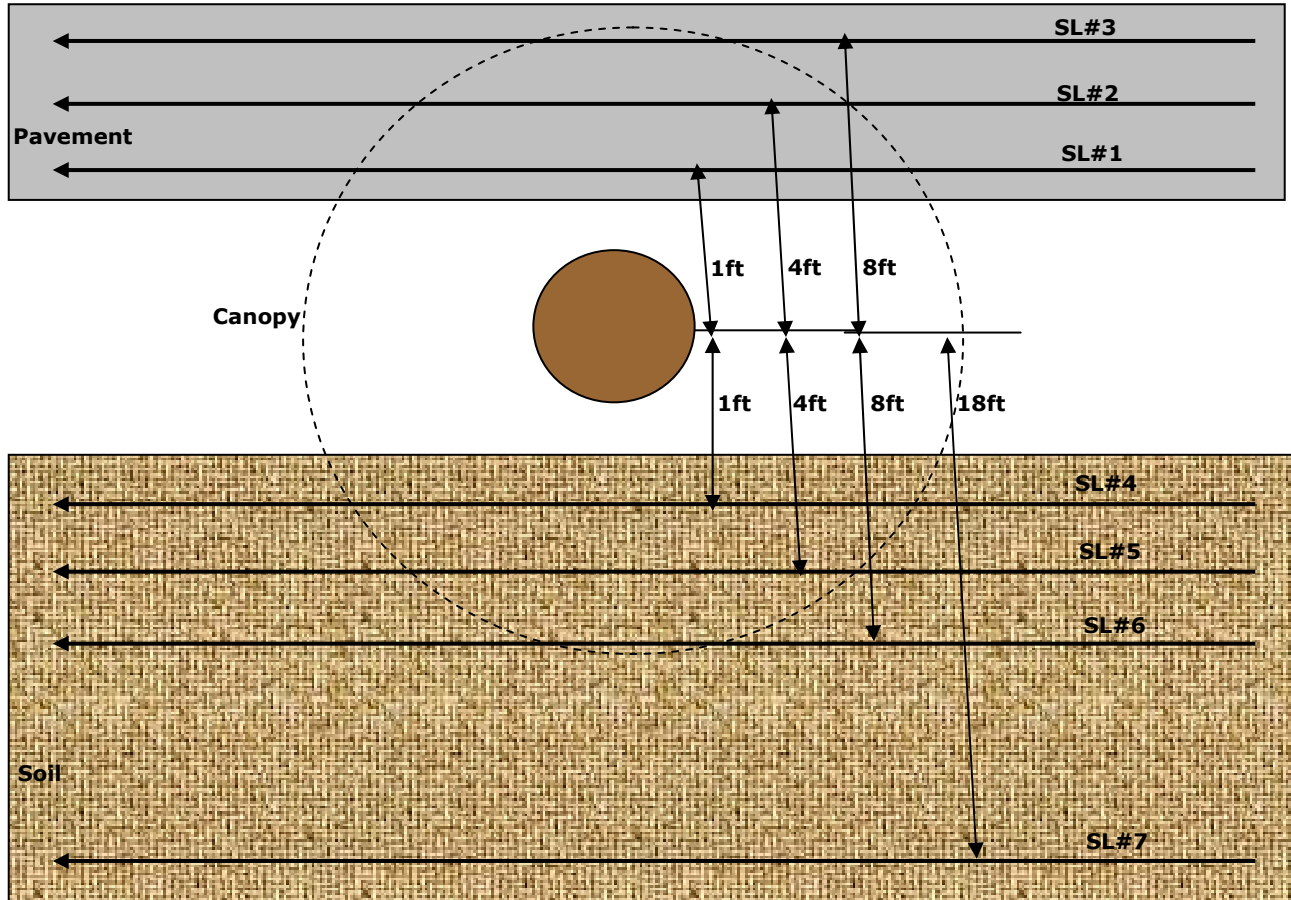


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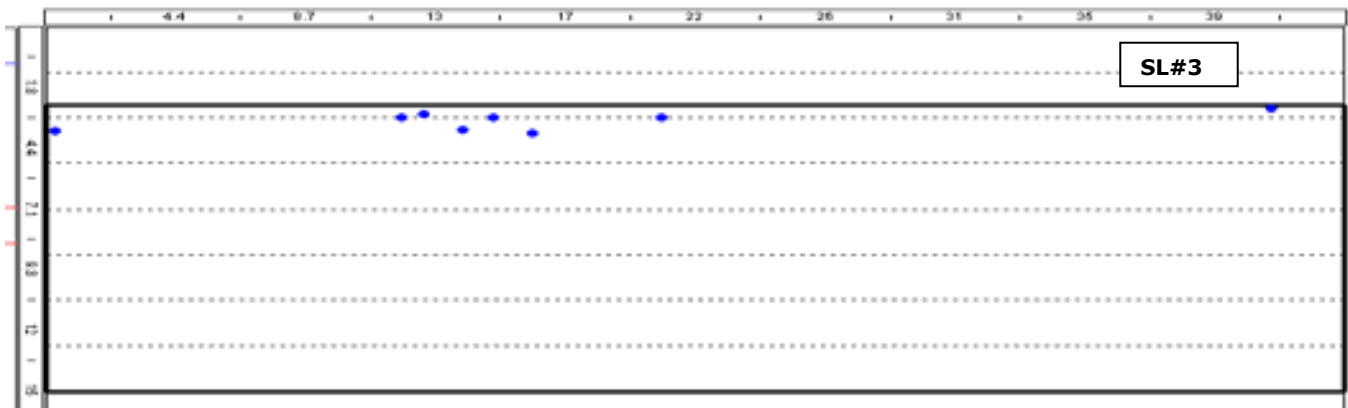
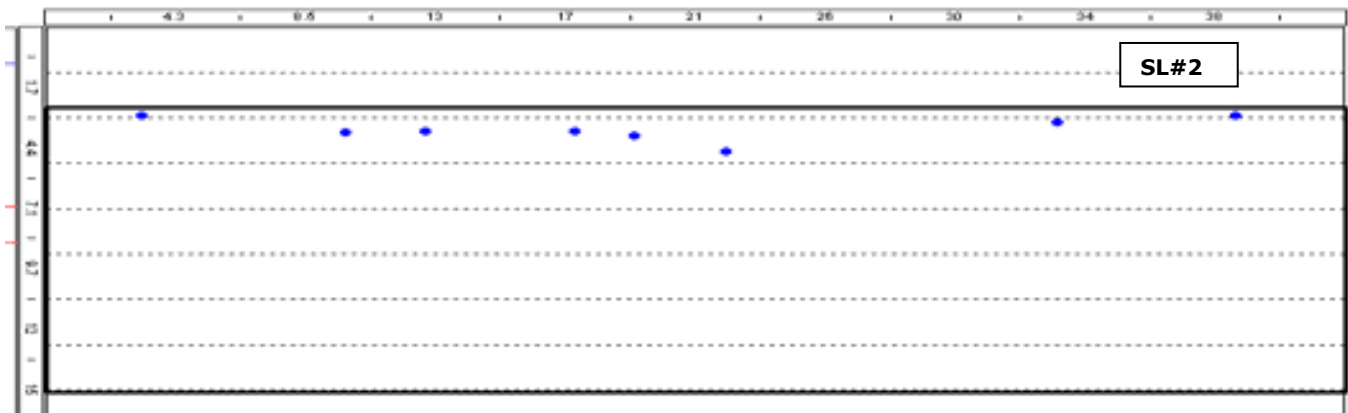
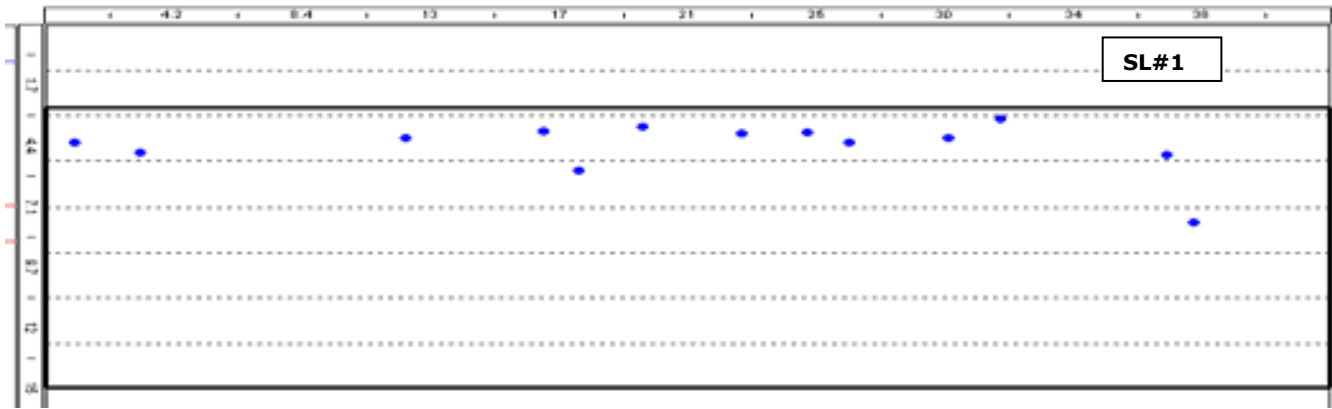
House

### Kew Gardens Ginkgo Root Scan (not to scale)

Scans conducted E <= W (towards house)

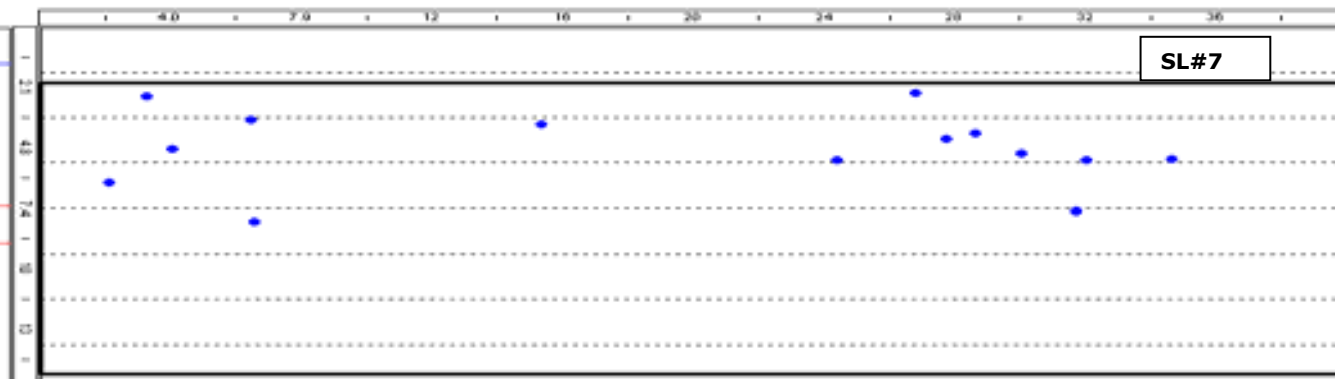
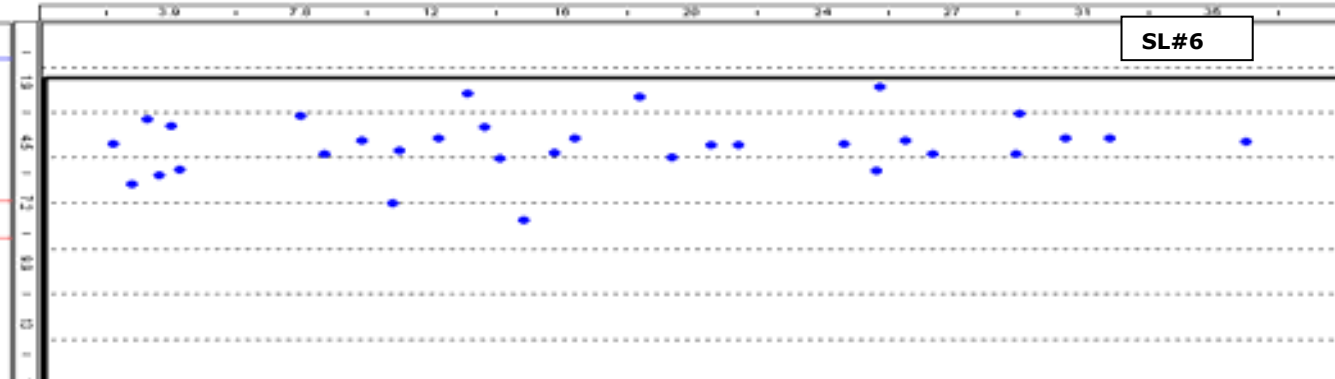
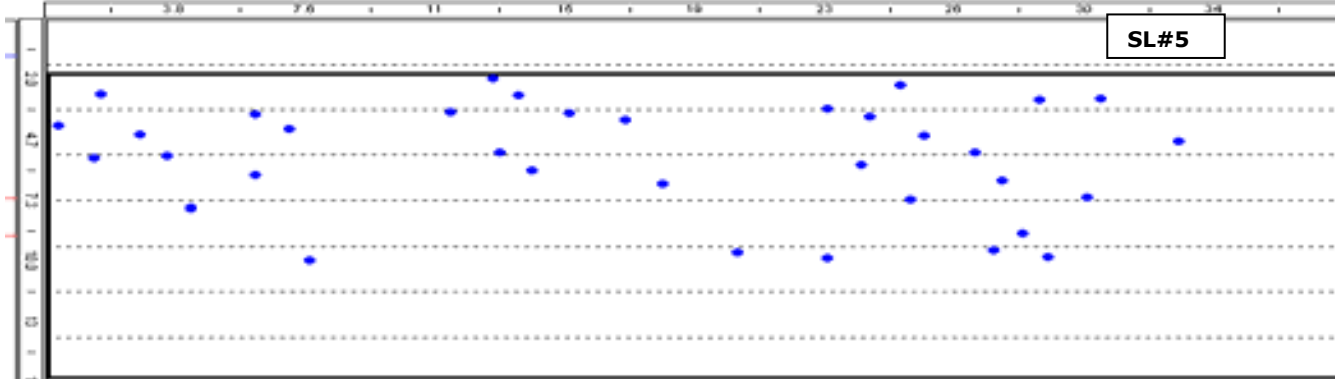
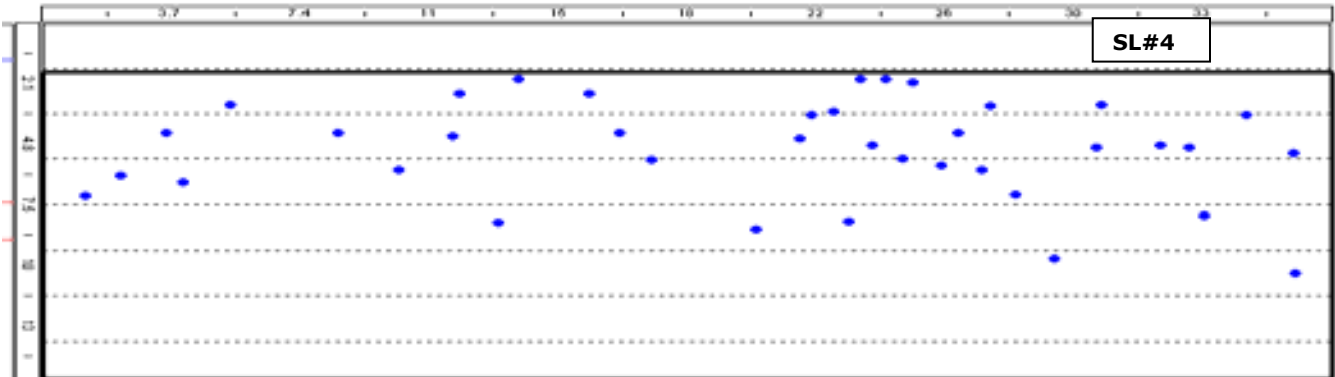


**Kew Gardens Ginkgo Root Scan**  
**Pavement Line Scans – SL#1, SL#2, SL#3**



**Analyst Notes:** Very sparse and shallow root distribution at all three distances from the trunk. The root density falls off considerably at SL#3, which is 8ft (2.4m) from the trunk where only a few roots, centered at the trunk, are located.

**Kew Gardens Ginkgo Root Scan**  
**Soil Line Scans – SL#4, SL#5, SL#6, SL#7**



**Analyst Notes:** Considerably denser root distribution compared to pavement. There are still detectable roots beyond the canopy at the 18ft (5.5m) distance.

**Kew Gardens Ginkgo Root Scan**

**Top-Down Plan View of Root Layout & Density**

**Pavement Line Scans – SL#1, SL#2, SL#3**

**Soil Line Scans – SL#4, SL#5, SL#6, SL#7**

