Below the Turf COMPANY

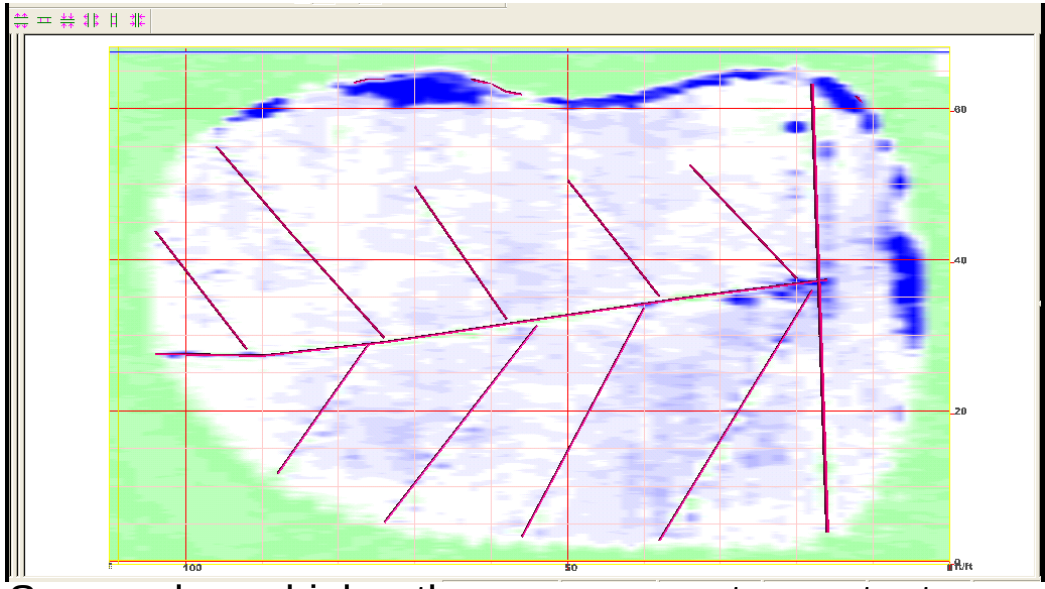
Subsurface mapping and analysis of critical areas on a golf course

Fast **Practical** **Non-destructive**

Find out what's going on below your turf … today

GPR (ground penetrating radar) is used to collect data, which is processed into 3-D images that identify subsurface features and conditions:

- Unknown pipe and cleanout locations
- Impaired surfaces due to…
  - Water leaks
  - Poor drainage
  - Status of topsoil/sand layers
- Underground geology and hydrology



Survey shows higher than average water content, as indicated by dark blue areas. Drainage pipes were mapped and are shown in red. Note short length on some pipes, contributing to water problem.

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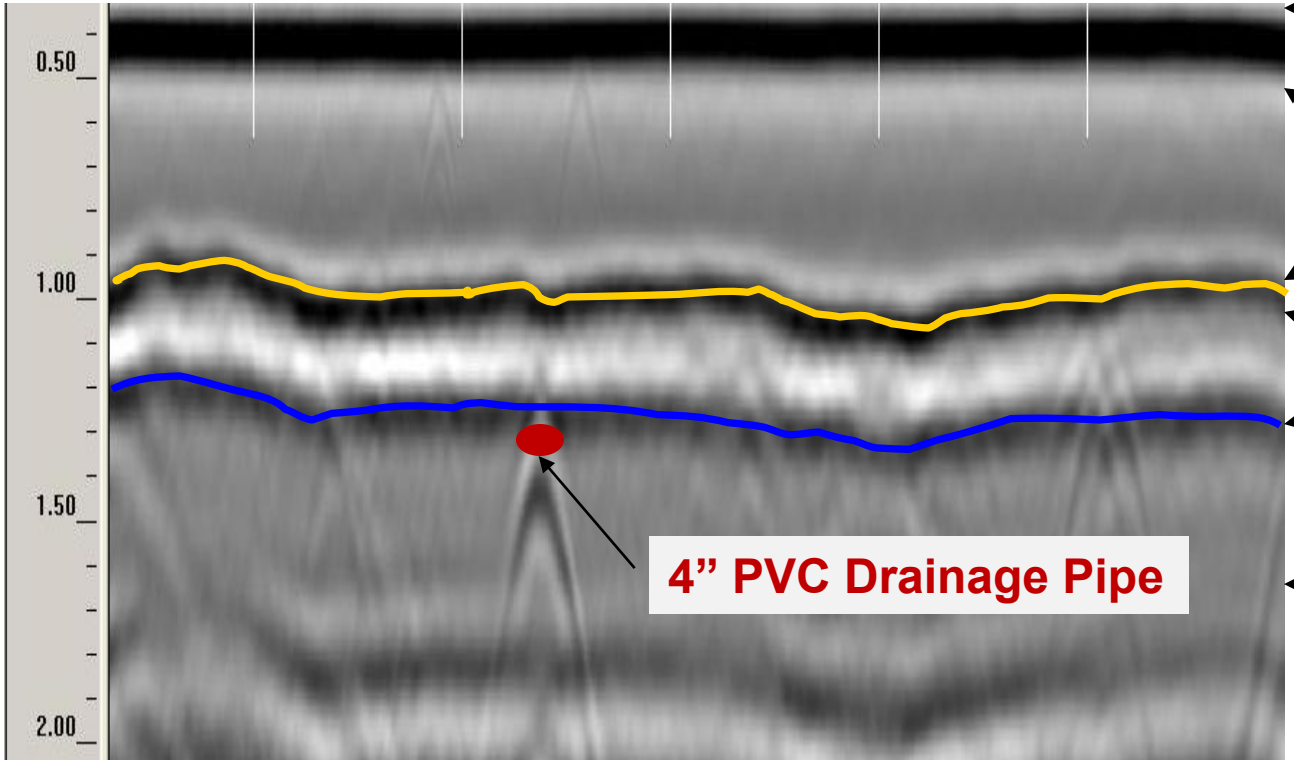
A mole's eye view of real-time golf course green construction detail from GPR data output during a survey.



Surface

Mix Layer

Gravel Layer

Natural Soil

Provides quick feedback on areas and degrees of settling … and/or an indication of poor construction

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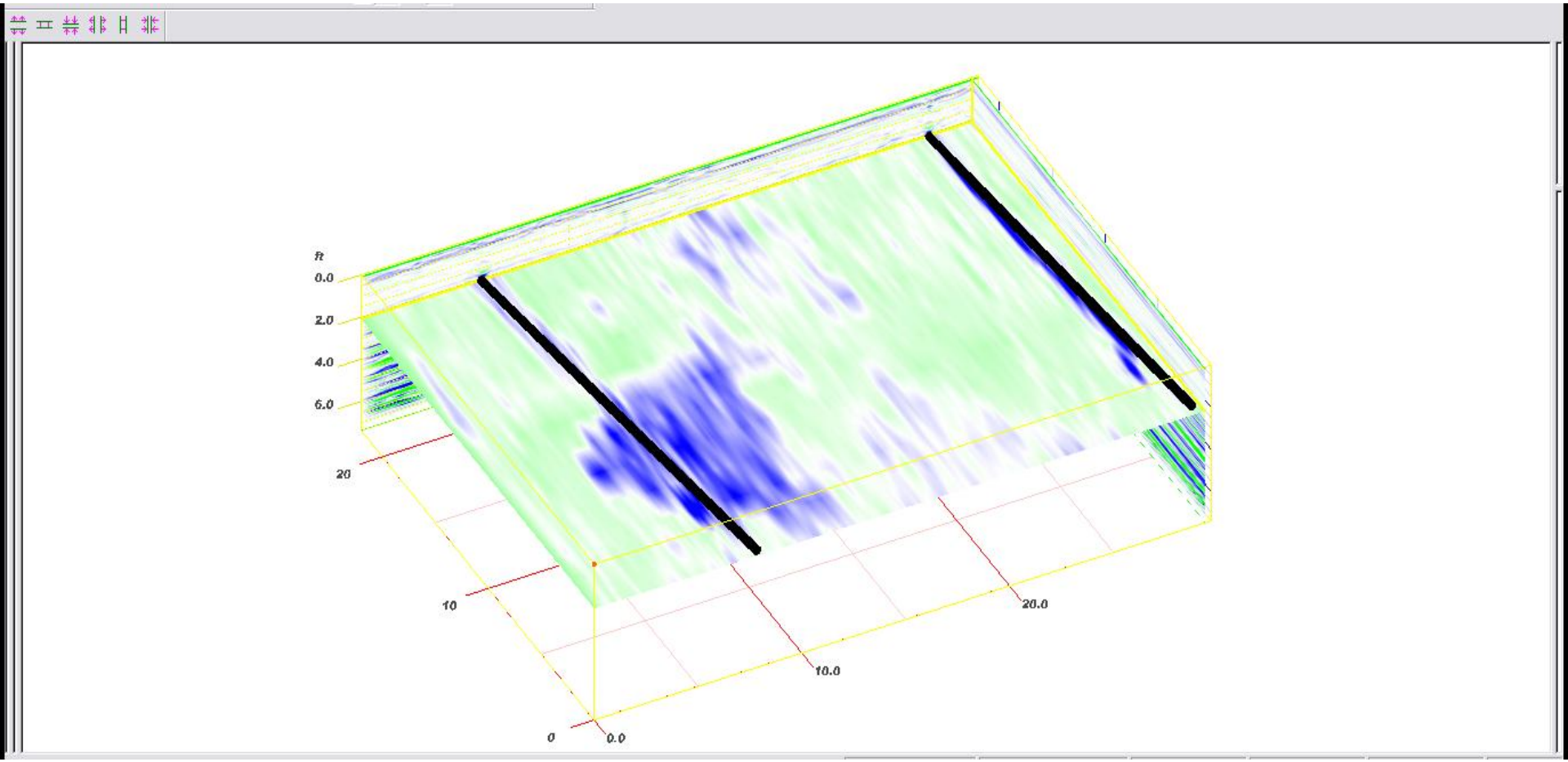
Screen shot shows two irrigation pipes and a leak from one – in blue.
Horizontal ‘data slice’ depth is at 2 feet.



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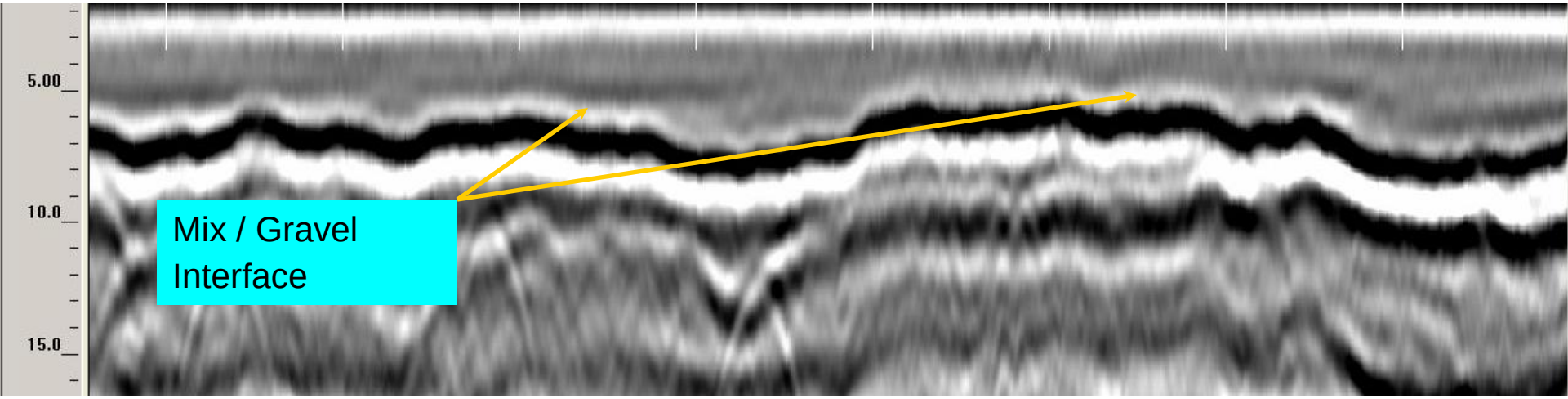
Real time data showing a variable poorly constructed mix / gravel interface. For a PGA green, the mix layer should be 12 inches +/- 1 inch thick.



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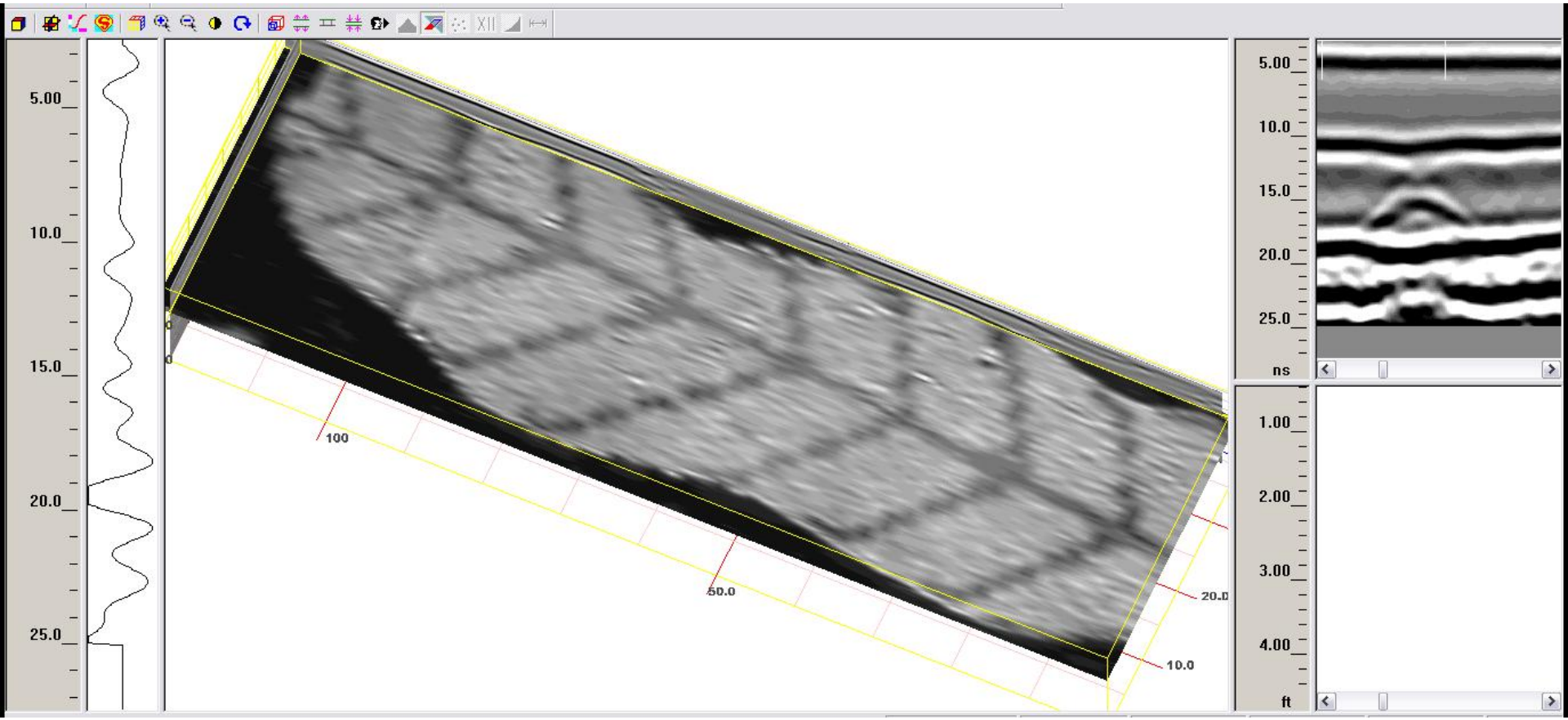
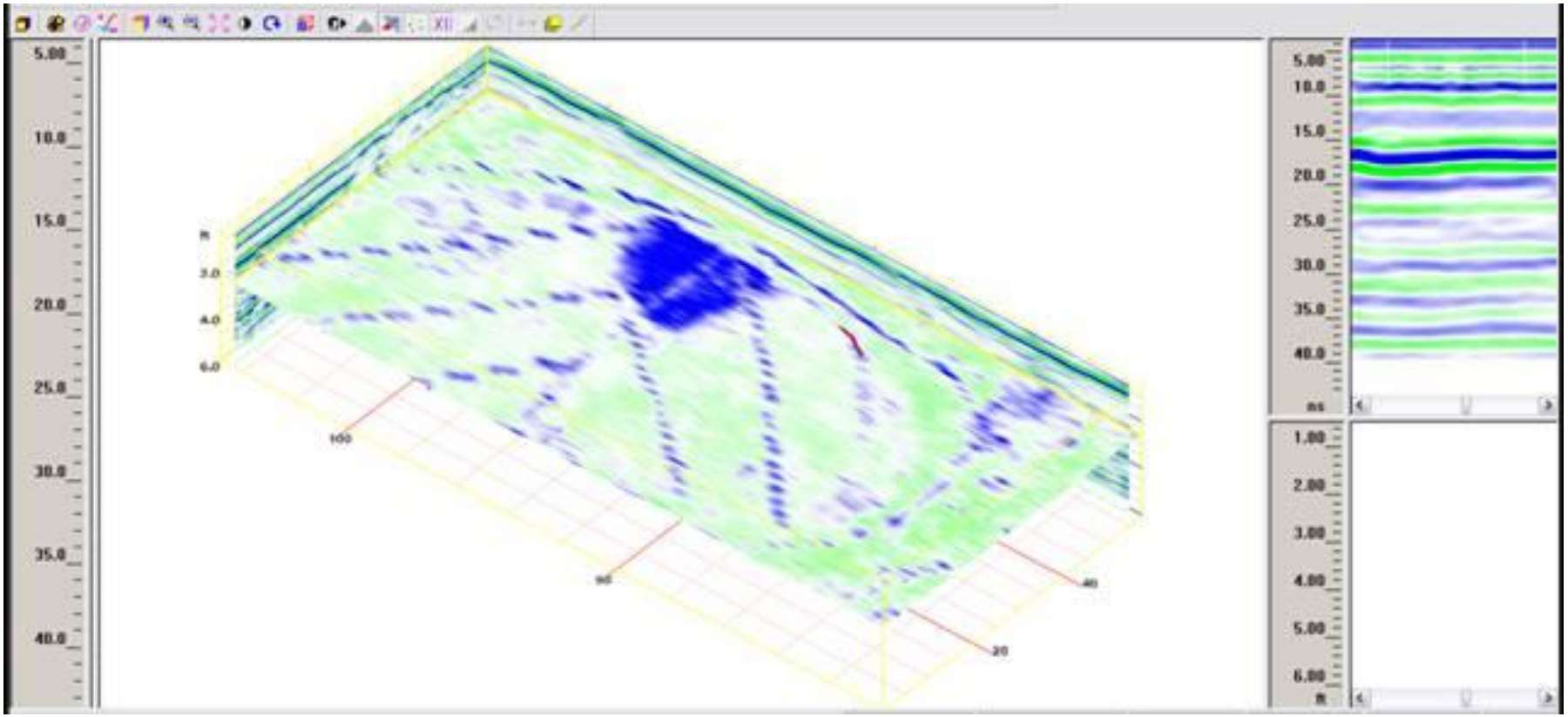
The green shows an ideal green with central pipe and herringbone pattern configuration of trenches and clear flow of water off the green.



Horizontal ‘data slice’ at a depth of 20 inches on the green shows excess water in blue and very distinct trenches which are working as designed. However, water is backing up and accumulating where the drain exits the green.



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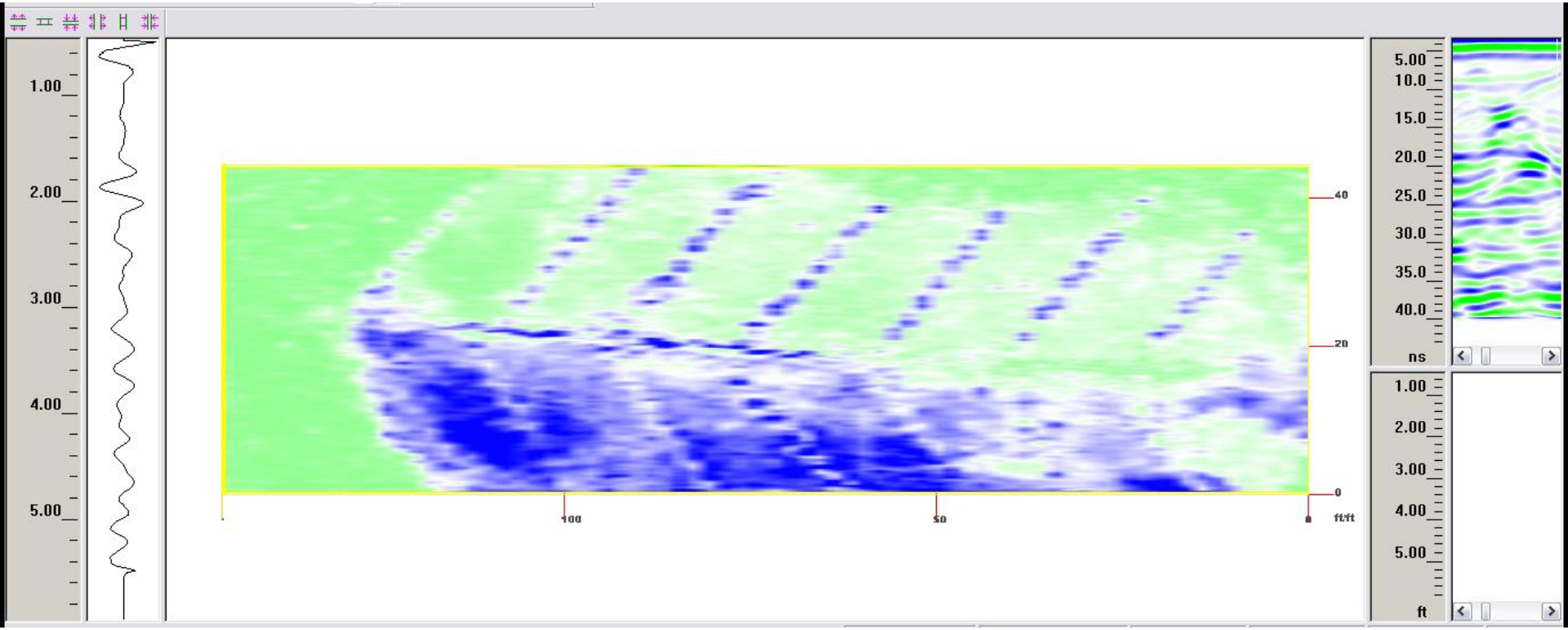
This is another example of a green showing poor water drainage on one side and very good drainage on the other.
Blue color indicates high water content.



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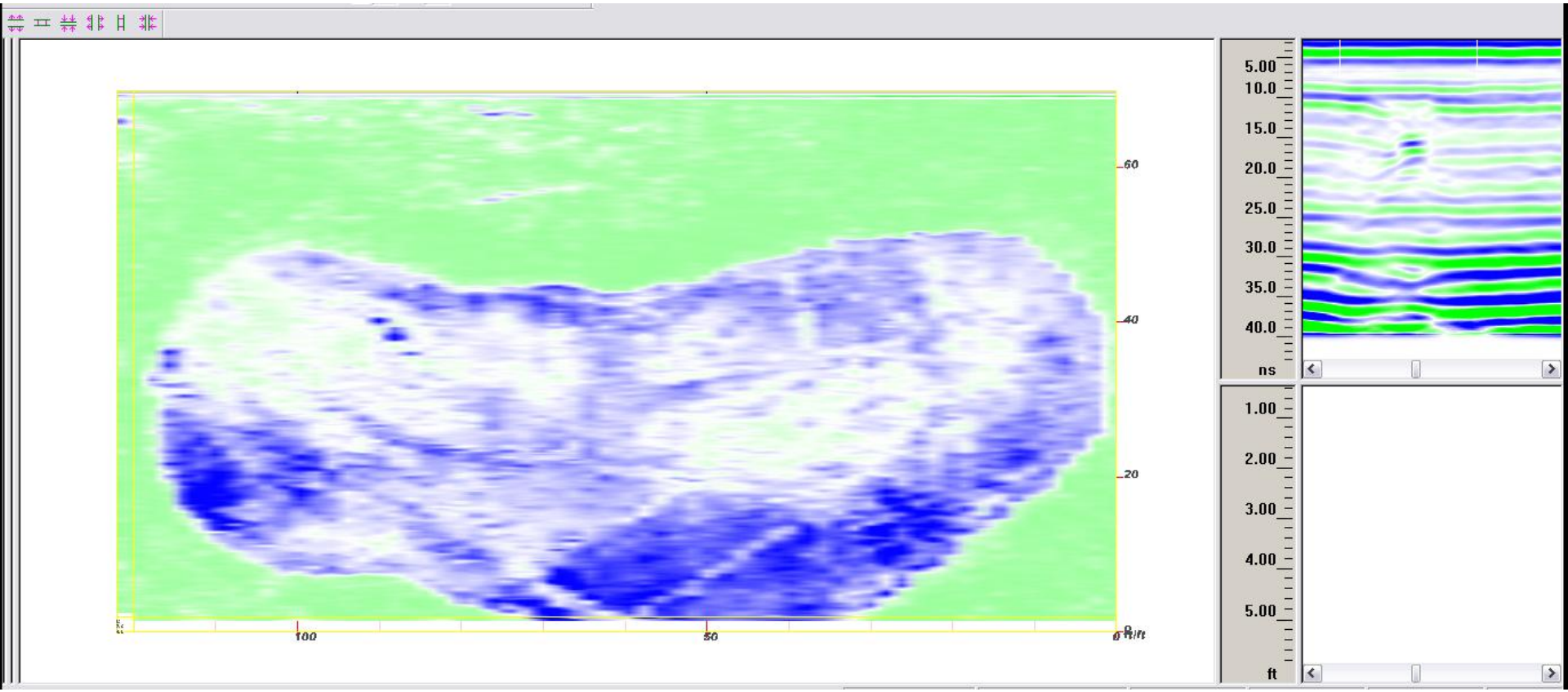
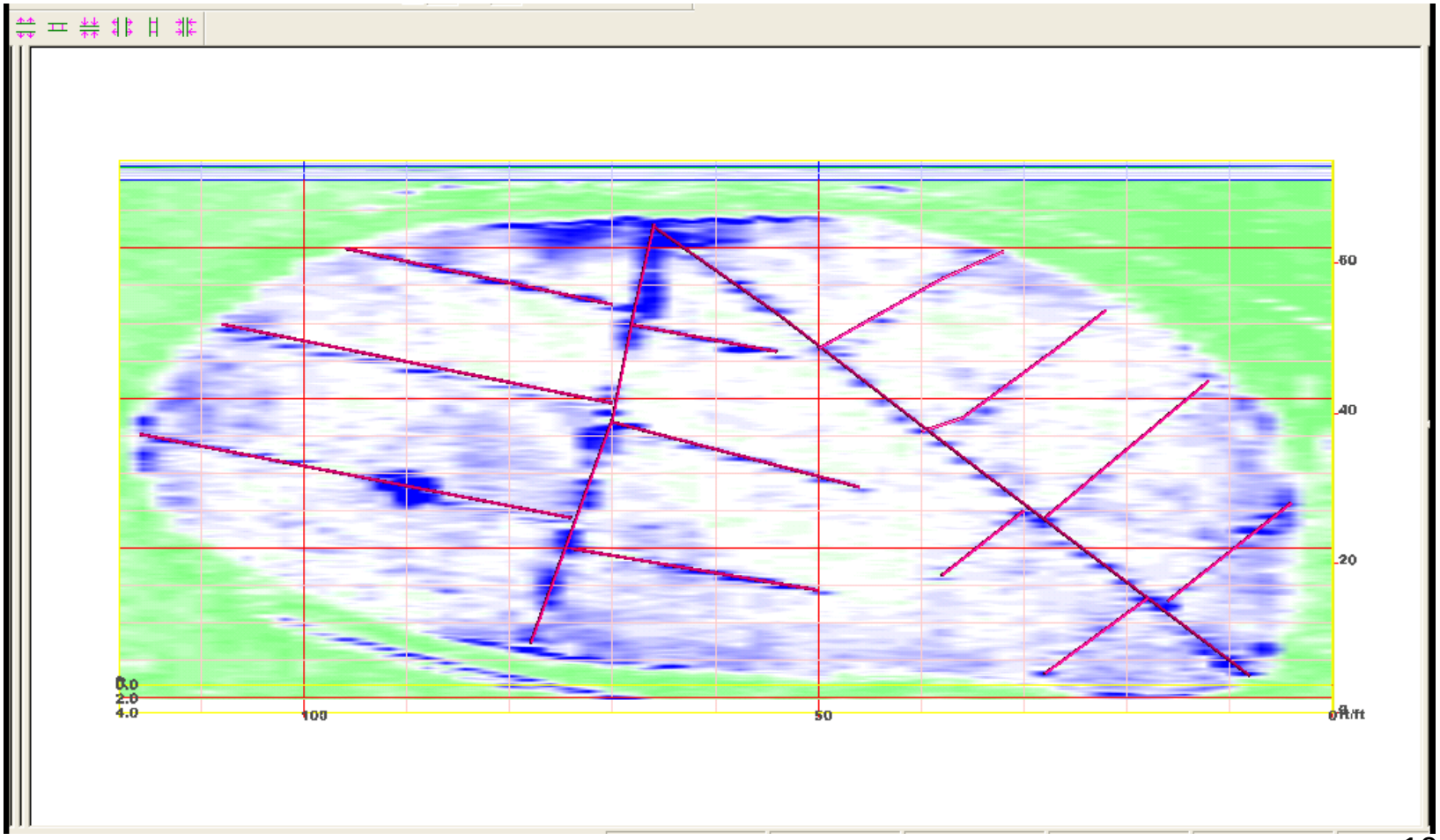
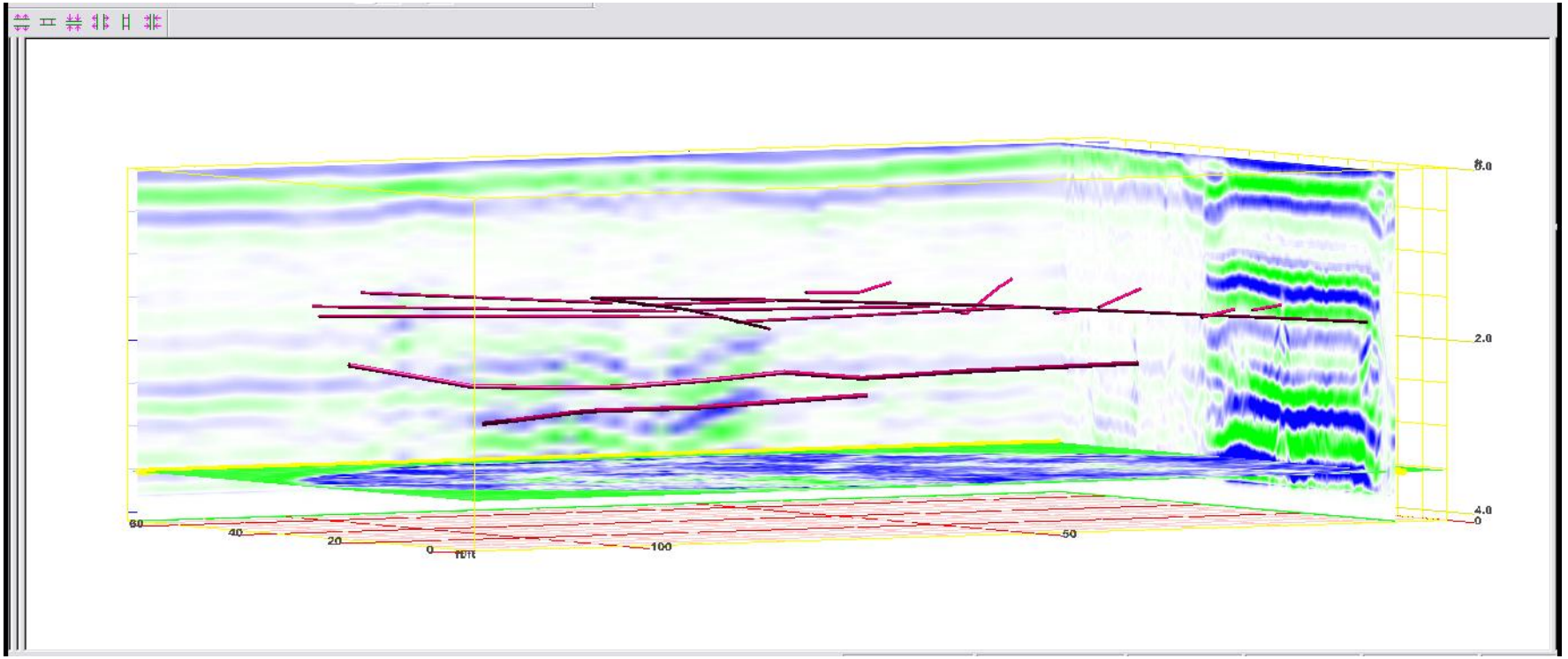
This shot shows another very old green with blocked trenches and standing water. Data slice shown is at a depth of 18 to 20 inches.



This is a green with two main drain systems exiting the green at the same place.



The same green as above but rotated on the computer screen to show the drainage system slopping down from left to right. The two irrigation pipes that circle outside the green area are also shown in red. They are about one foot deeper than the drainage system.



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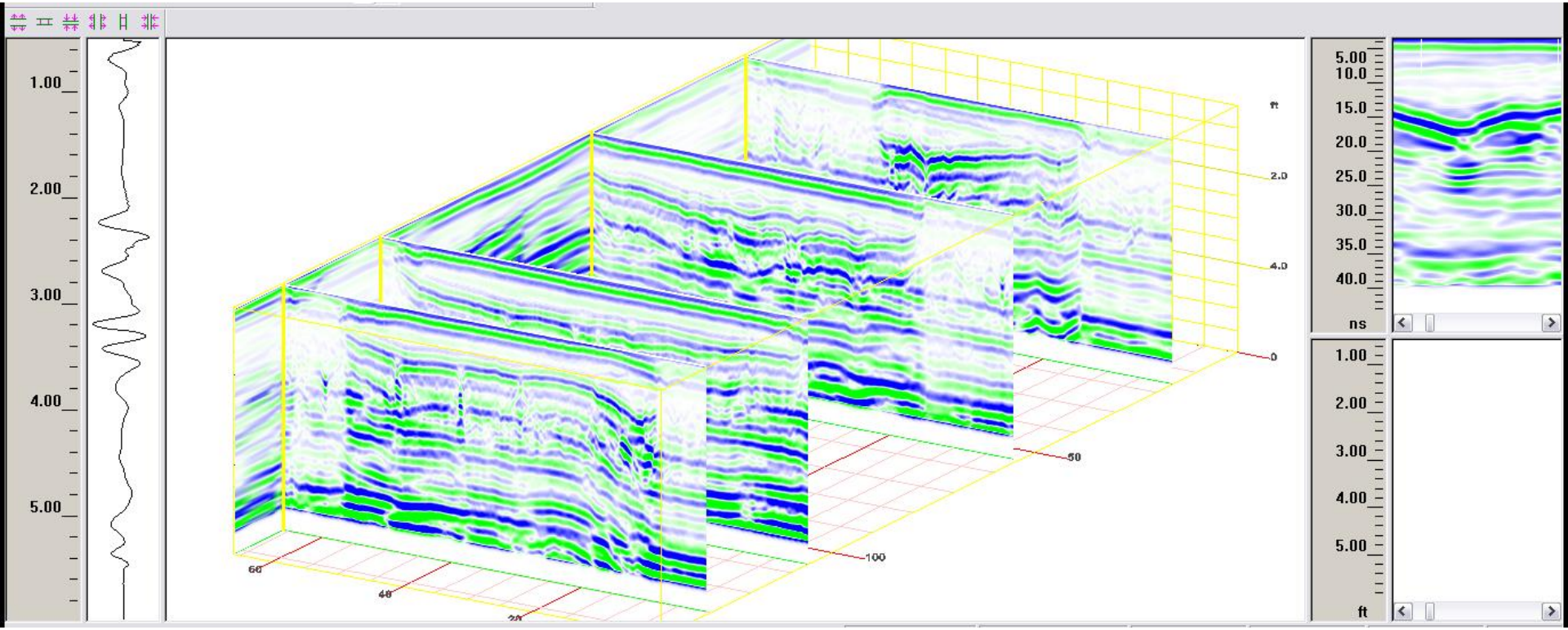
A screen shot of a green showing vertical slices – the mix layer here also varies in thickness and the result is standing water in the lower areas.



Summary of Benefits

A Below the Turf survey gives you the capability to…

- Quickly analyze problem areas
- Diagnose conditions and better plan corrective actions *prior to digging*
- Lower the cost and shorten the time required for renovation, repair and remediation
- Identify and document subsurface characteristics that are vital for longer term prioritization and planning
- Validate / update / create your as-builts

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Let us show you what's below your turf.

Contact: Linda Wilson at 603-275-2400
or Dennis Johnson at 603-490-0922
Visit www.belowtheturf.com

References provided

Thank you

For your time and interest.