



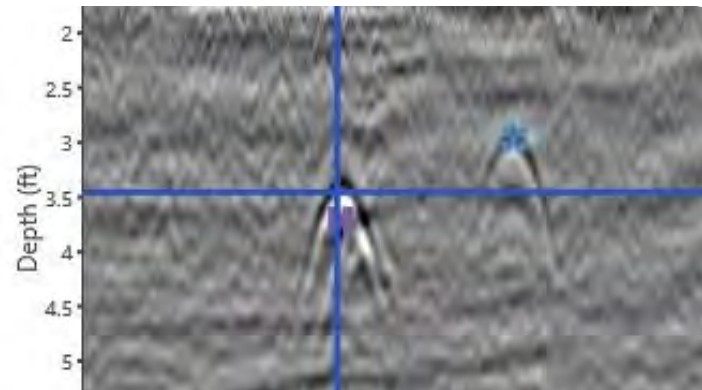
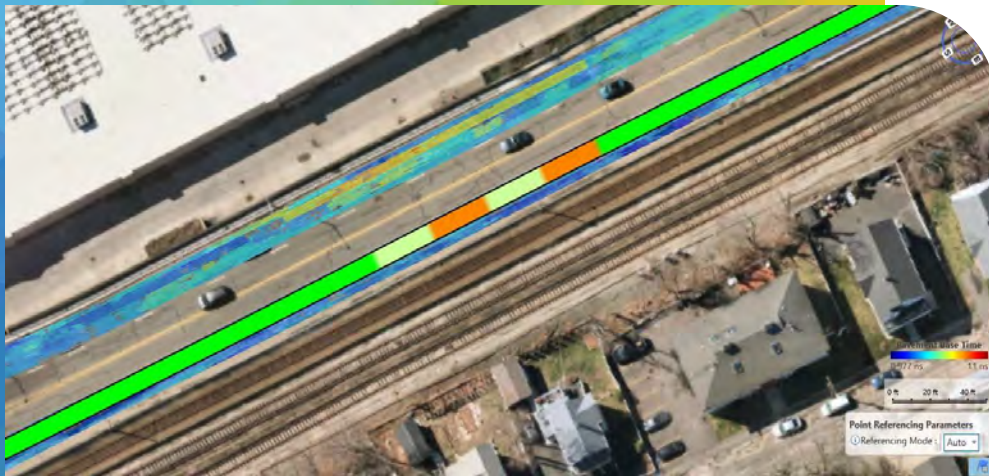
Building the future of GPR exploration In Alberta

Mitch Liddell, PhD GIT

More with less using 3D GPR

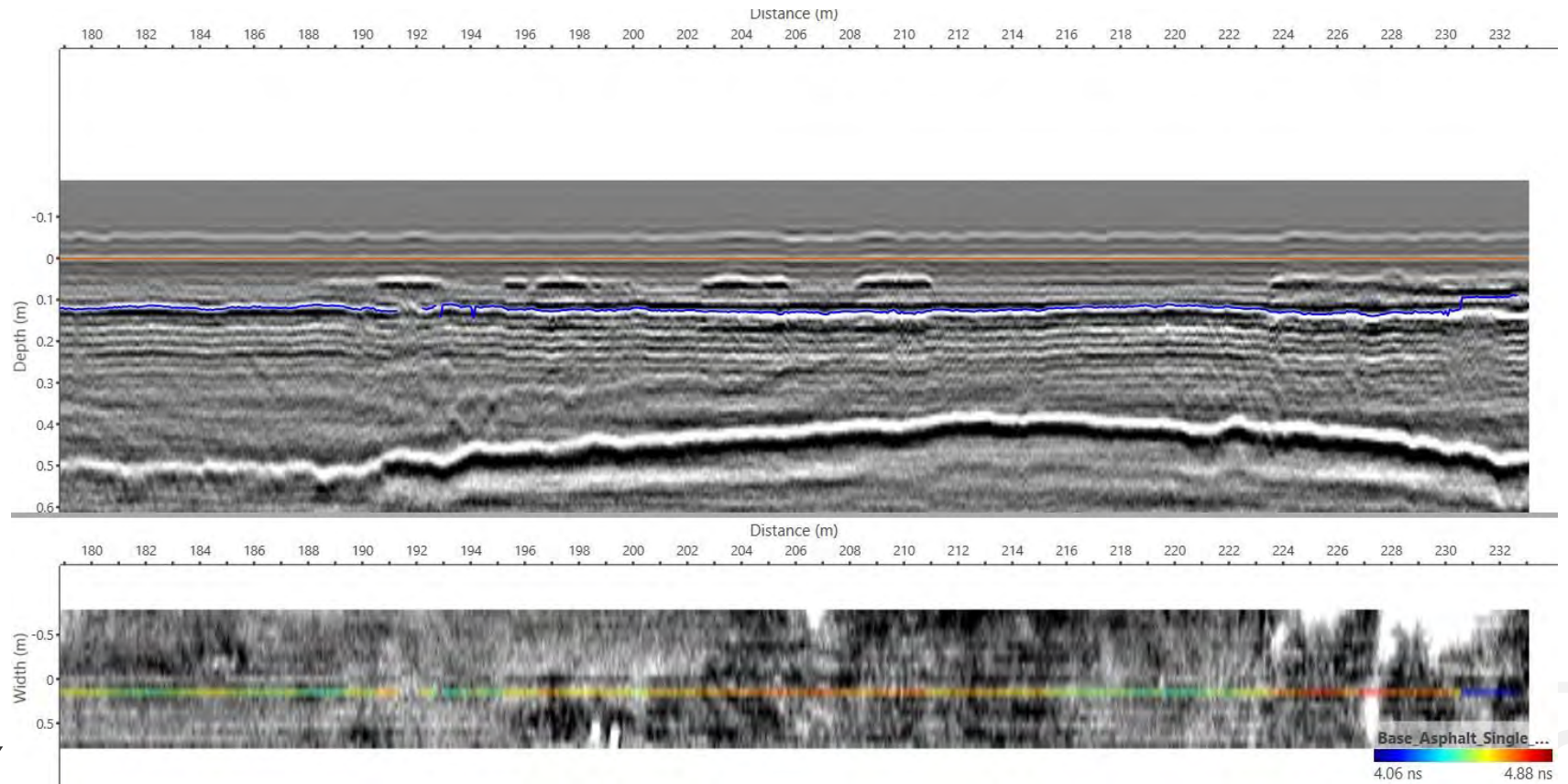


1. 25 channels, 2.1m wide collection swath
2. Broadband frequencies (0.1-3GHz)
3. Traffic-speed collection
4. Fast analysis tools
5. High quality, geolocated deliverables



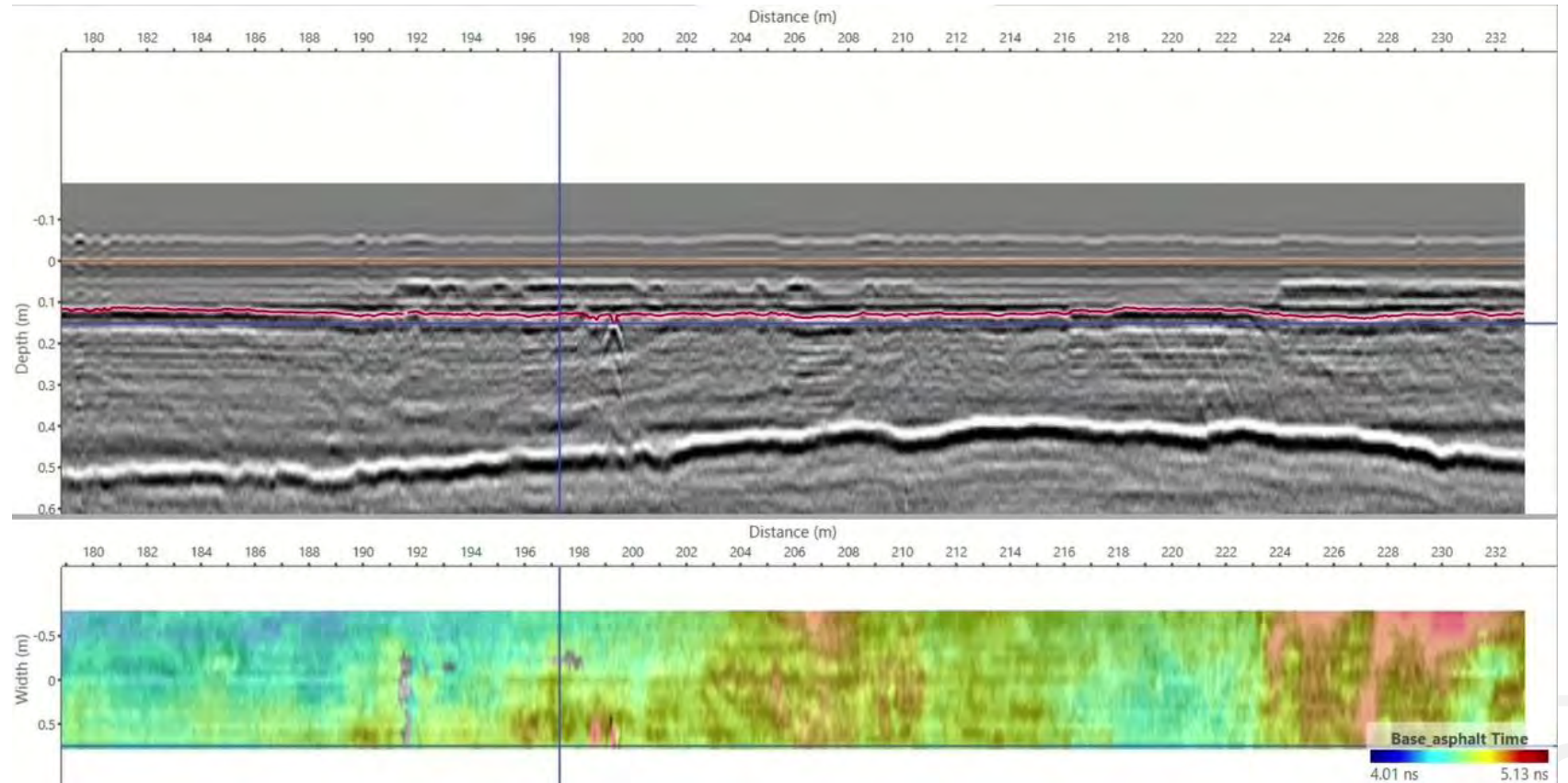
3D GPR Advantage

Multi-channel collection



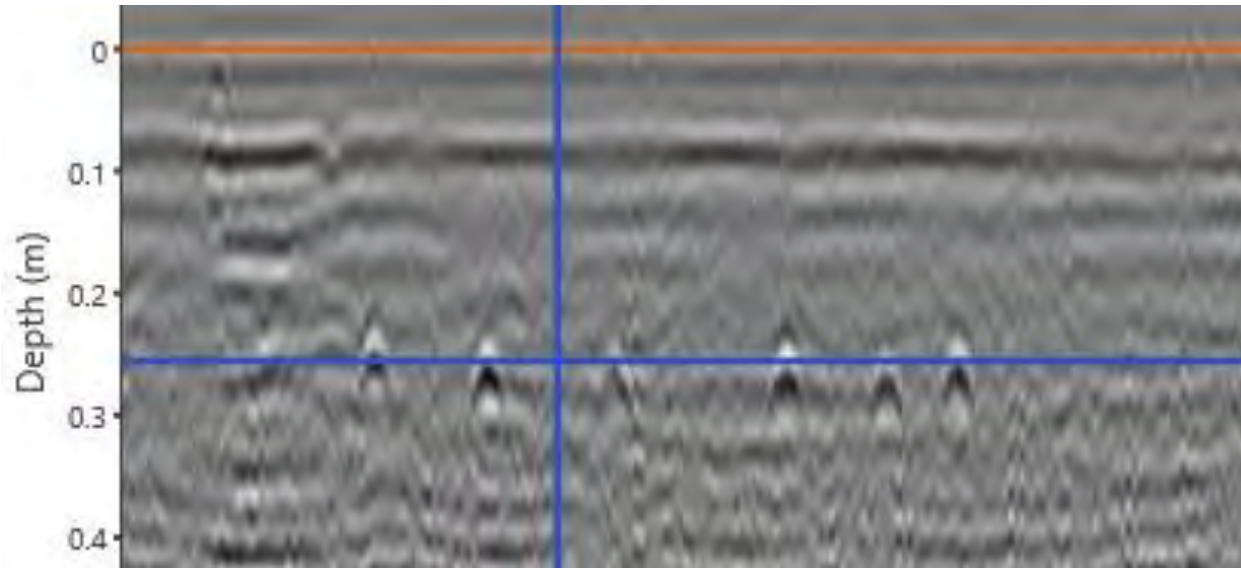
- Coloured region indicates data from one collection pass

Multi-channel collection

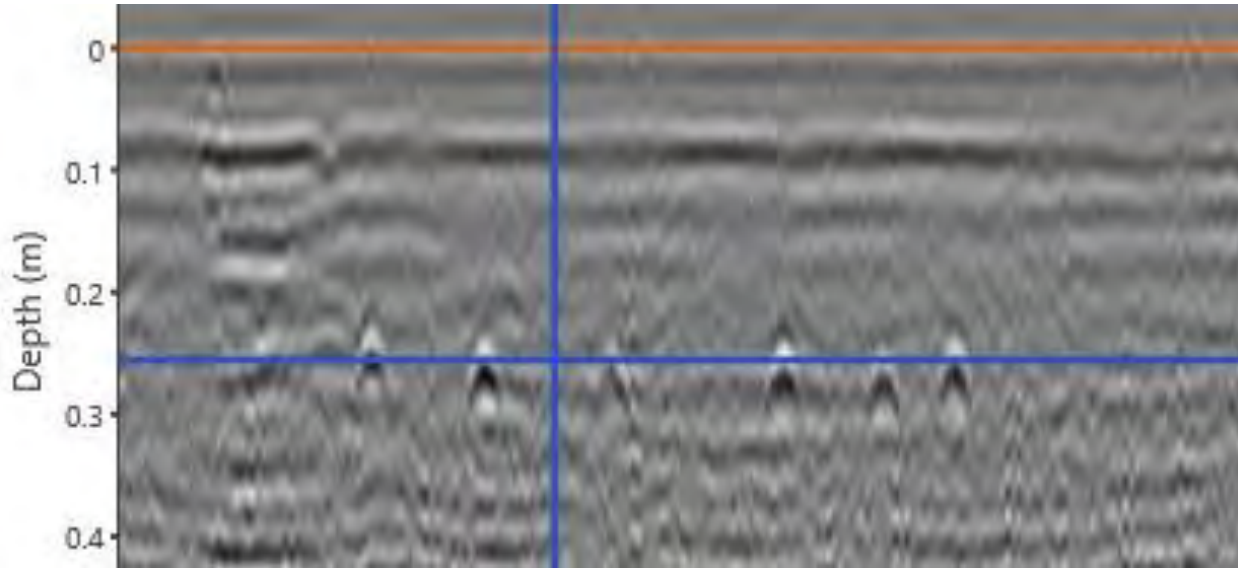


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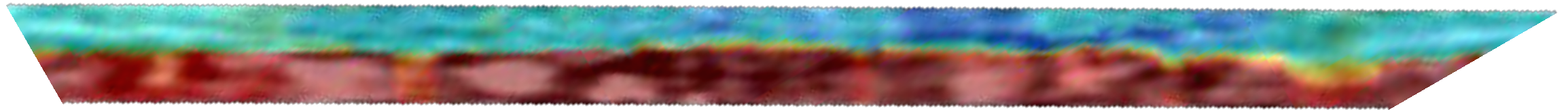
Multi-channel collection



Multi-channel collection



Multi-channel collection

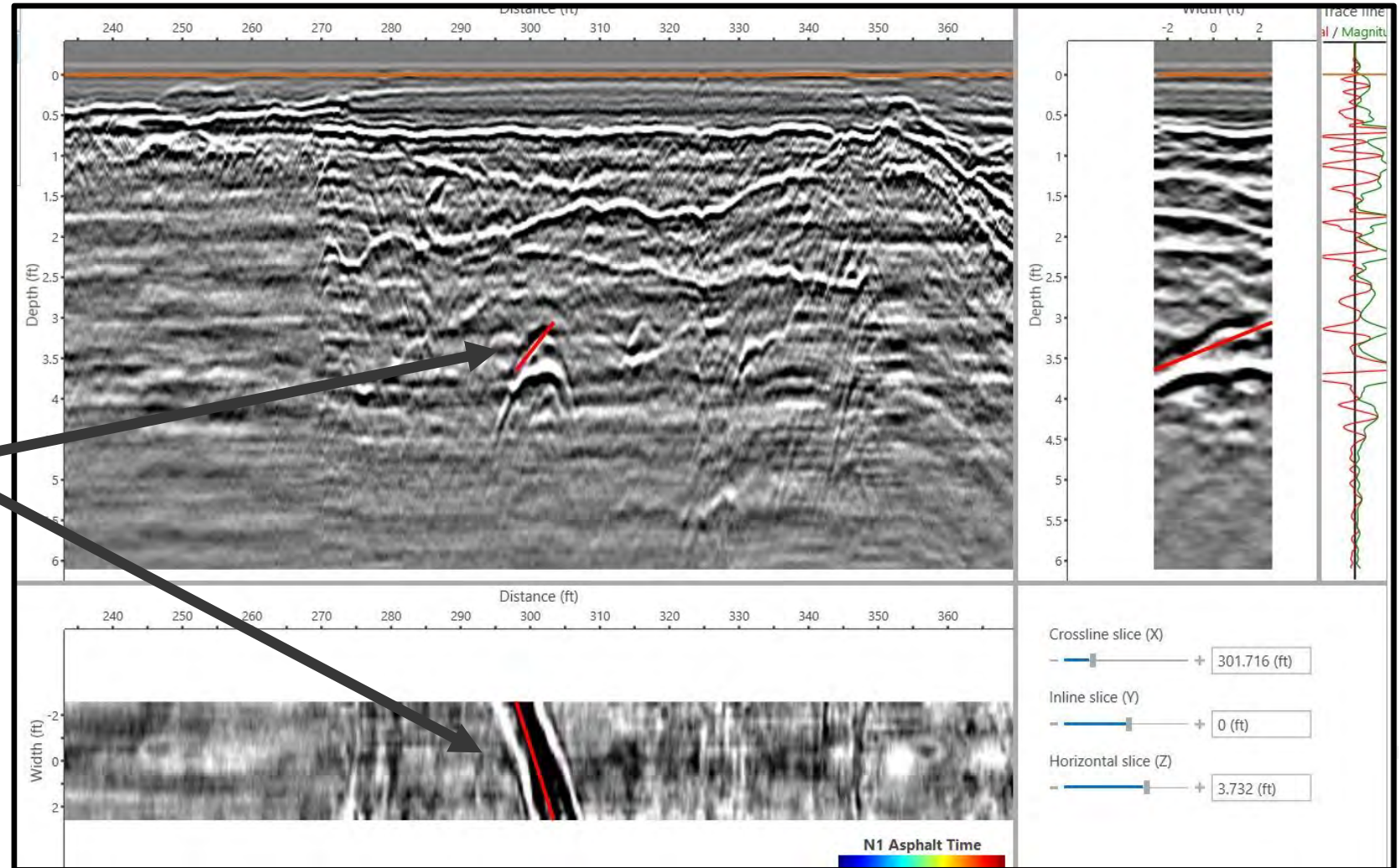


- In-lane pavement thickness variability

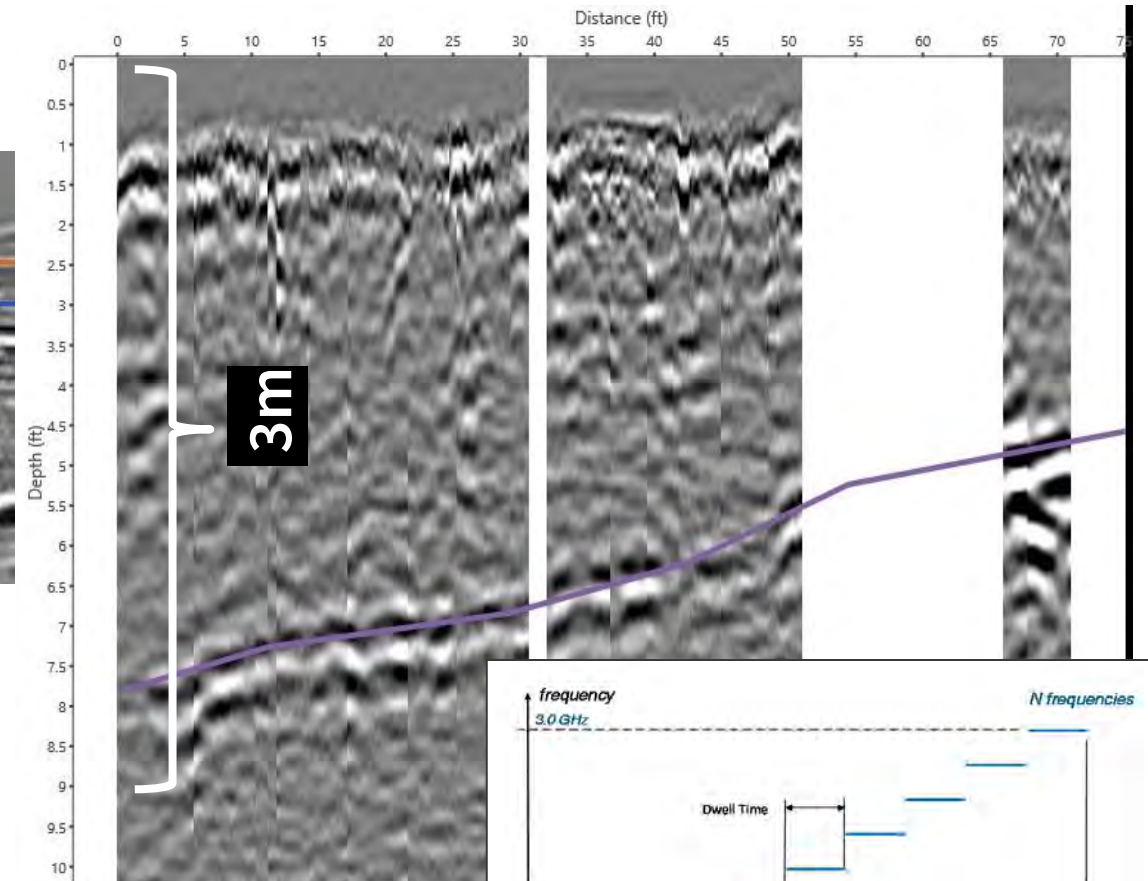
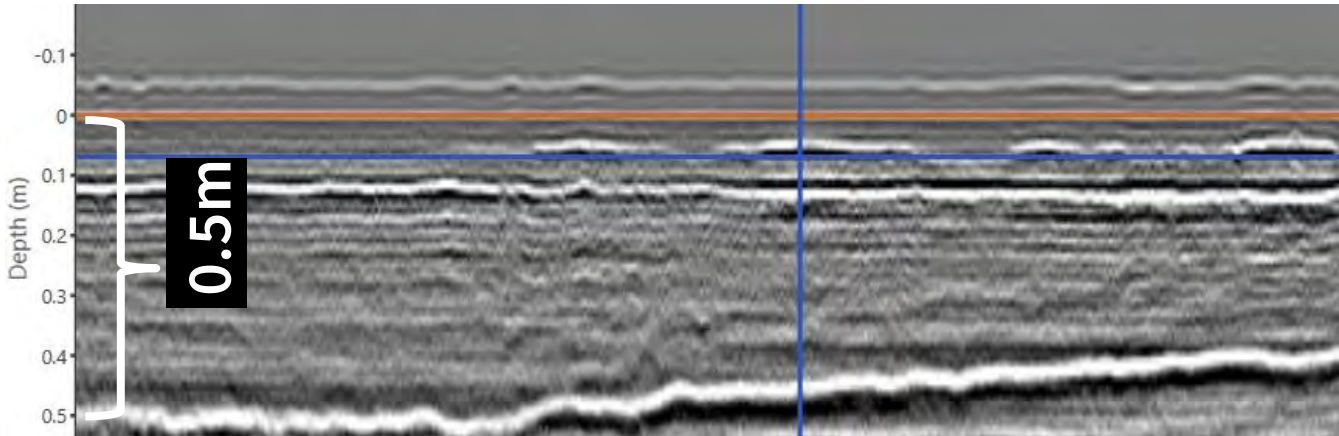


Multi-Channel Collection

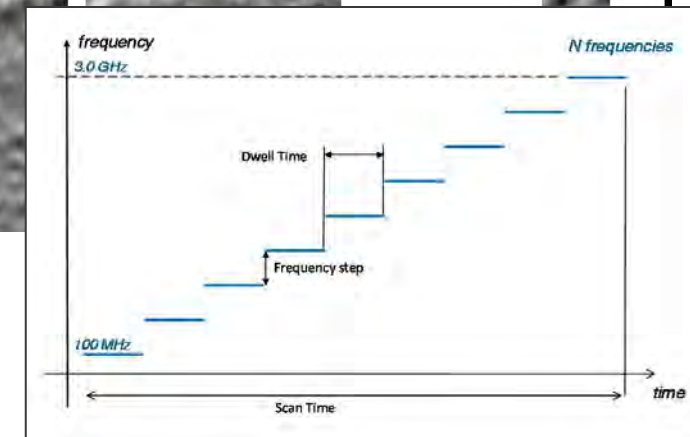
- One pass, many angles



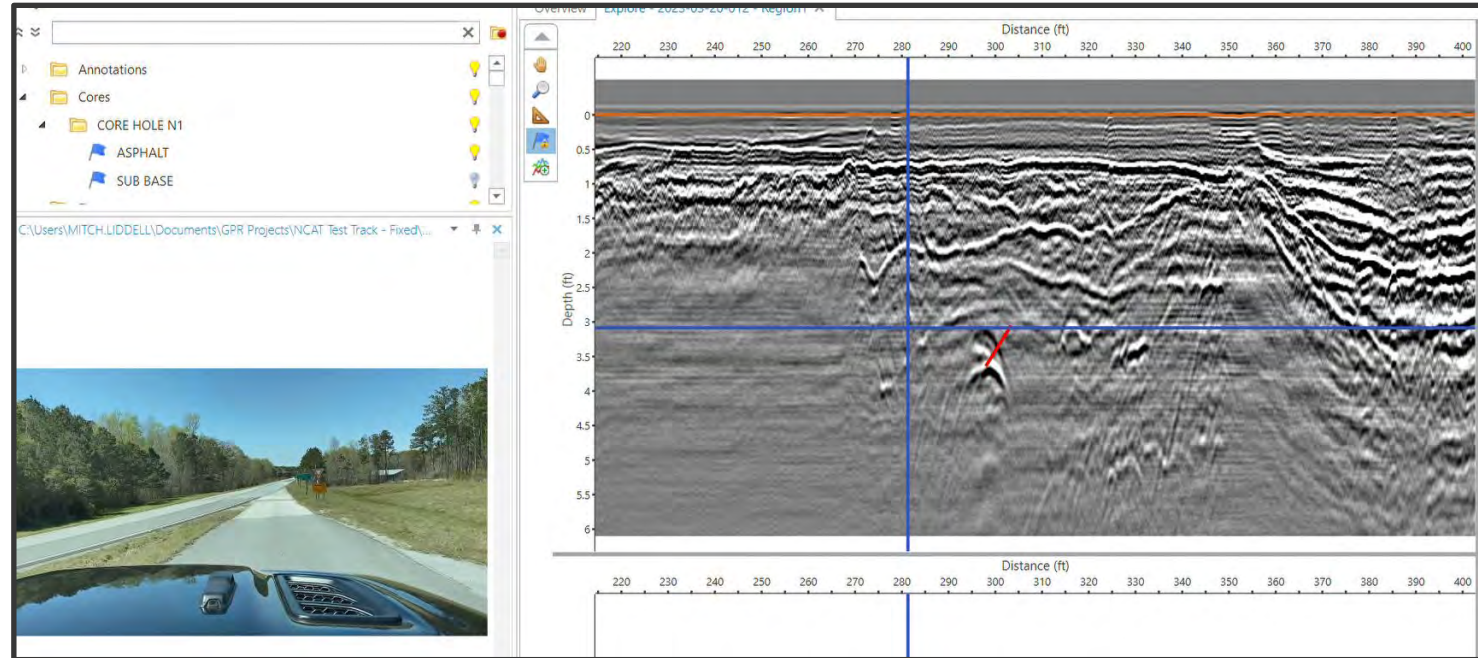
Broadband frequencies



- Step frequency system (0.1 - 3 GHz) can image both shallow and deep targets simultaneously



Fast , non-disruptive collection

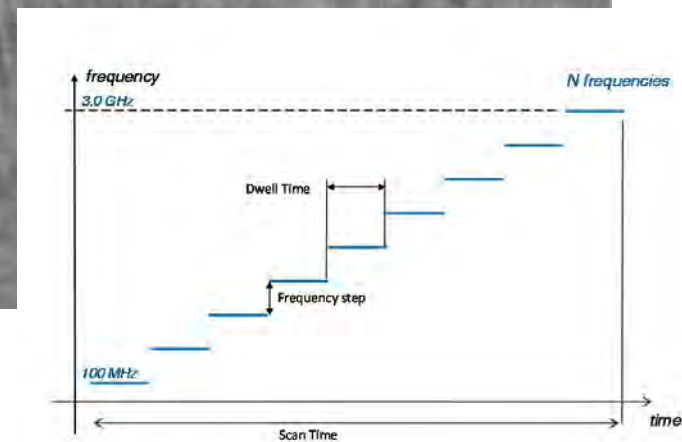
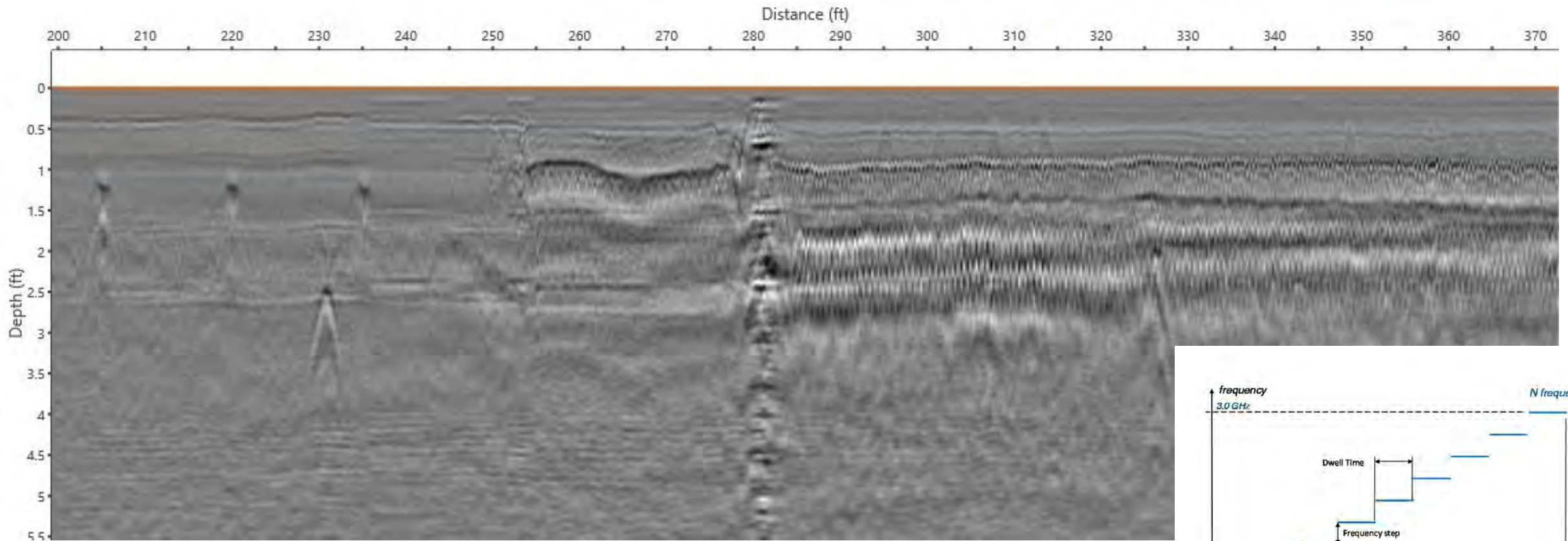


- Collection at driving speed - no traffic control necessary
- Located by RTK corrected GPS – no paint marks, no manual alignment
- Modular for off-road surveys



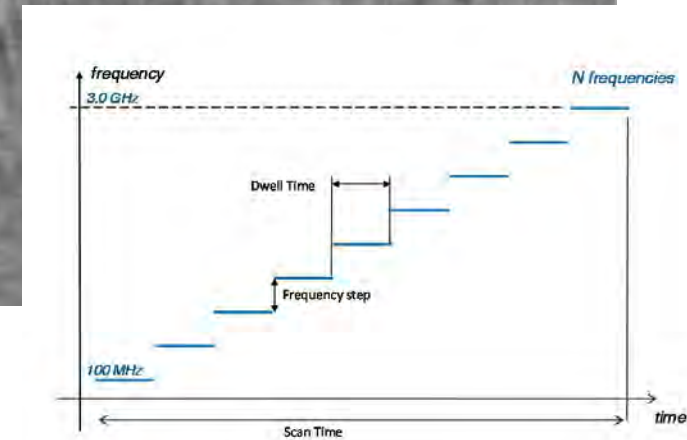
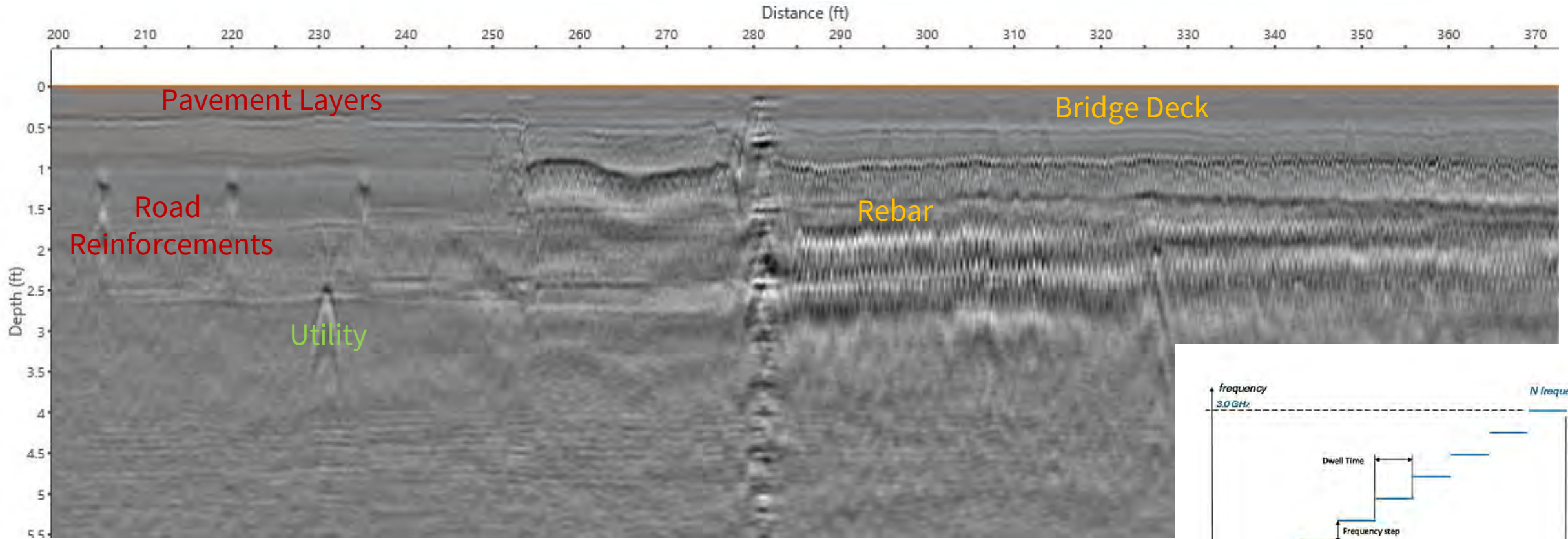
Versatility of Applications

Versatility of applications



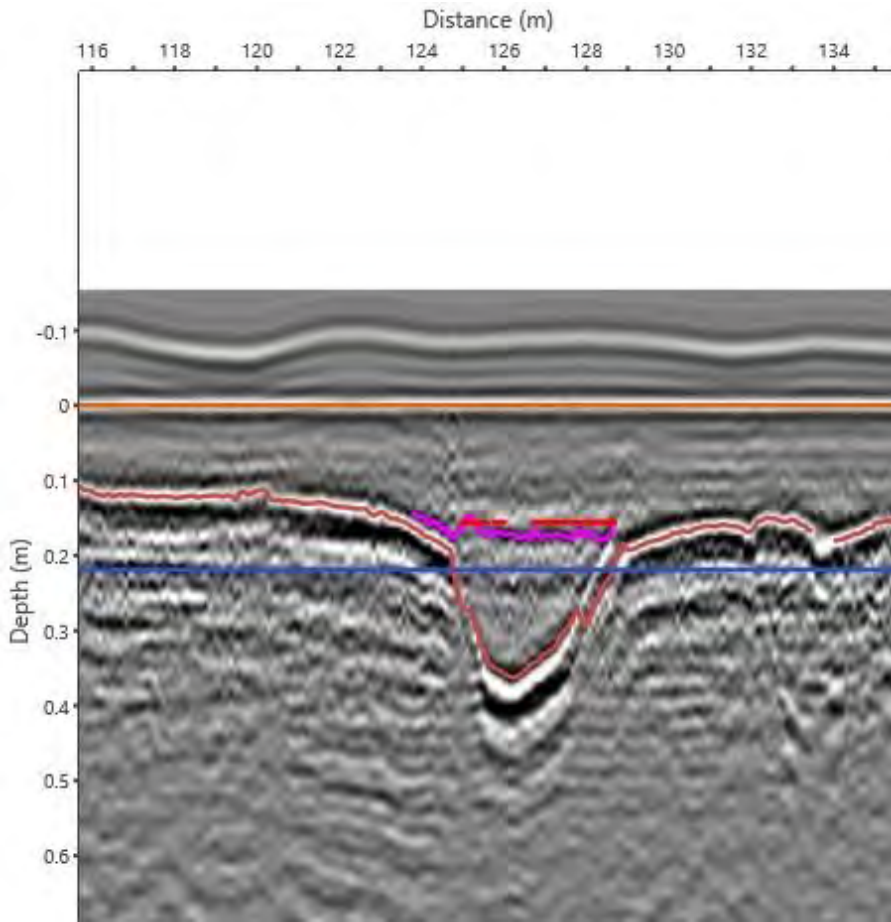
- Same system, different targets

Versatility of applications



- Same system, different targets

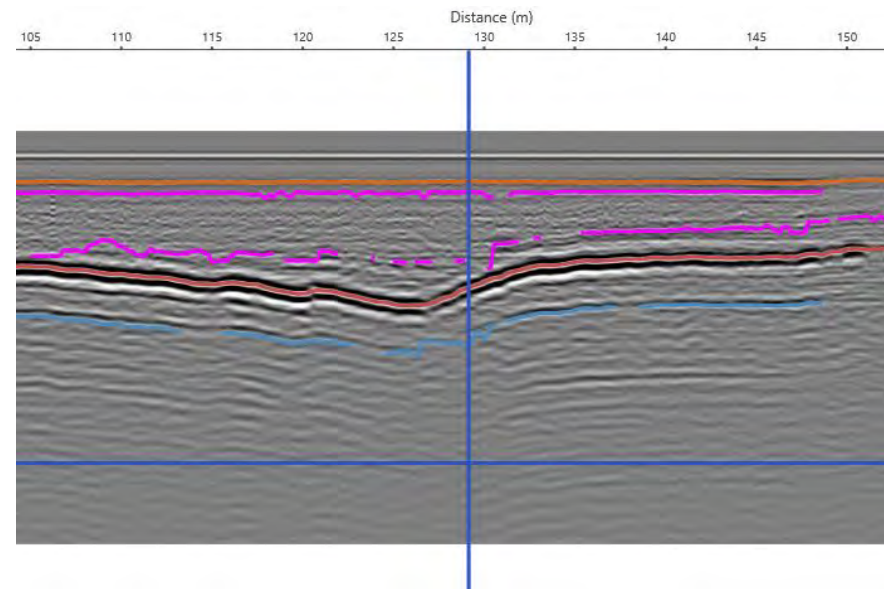
Pavement Analysis - Layer Tracing



- Semi-automatic layer tracing
- Clear data visualization to identify problematic areas



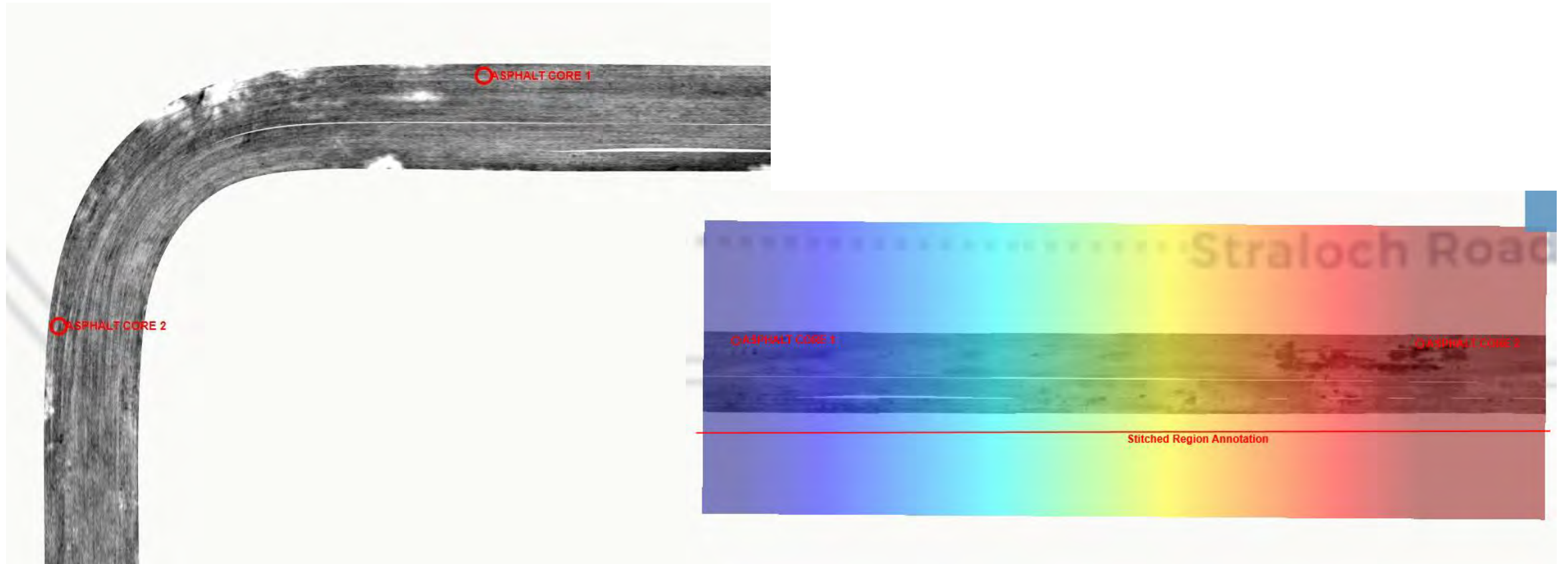
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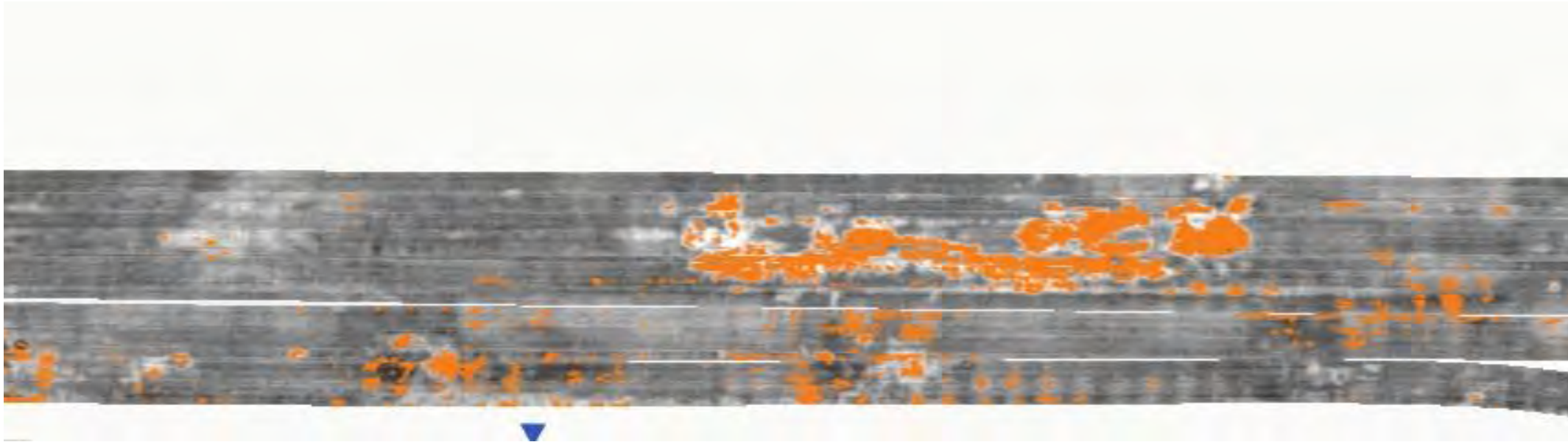


Pavement Analysis – Core Data



- Core data used to calibrate pavement layer thickness
- Pavement velocity can be interpolated between cores or adjusted manually

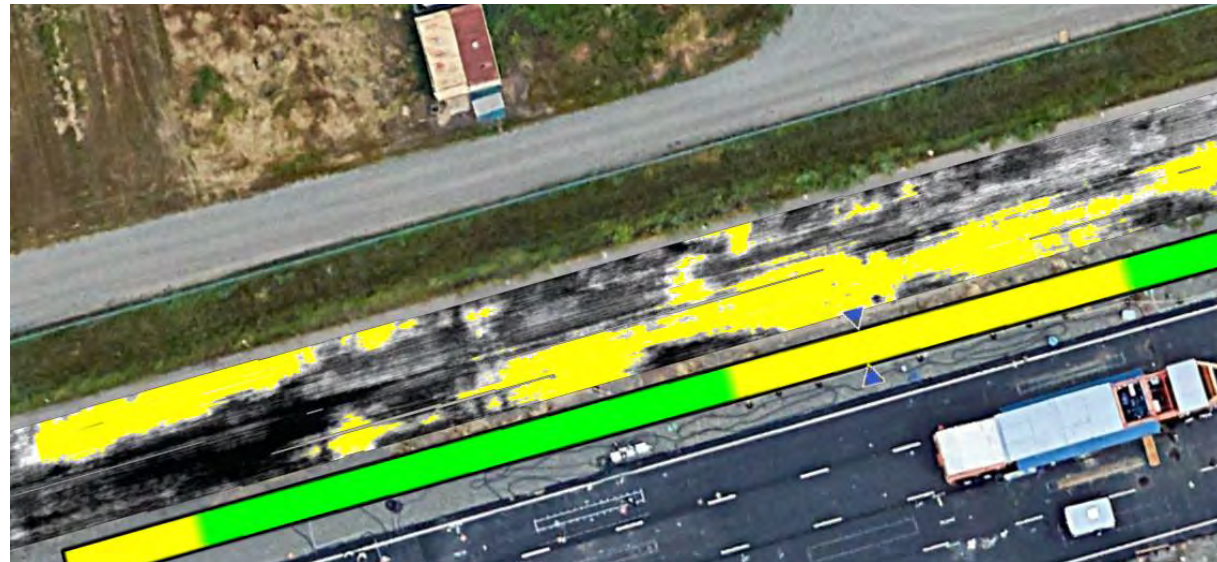
Pavement Analysis – Anomalies



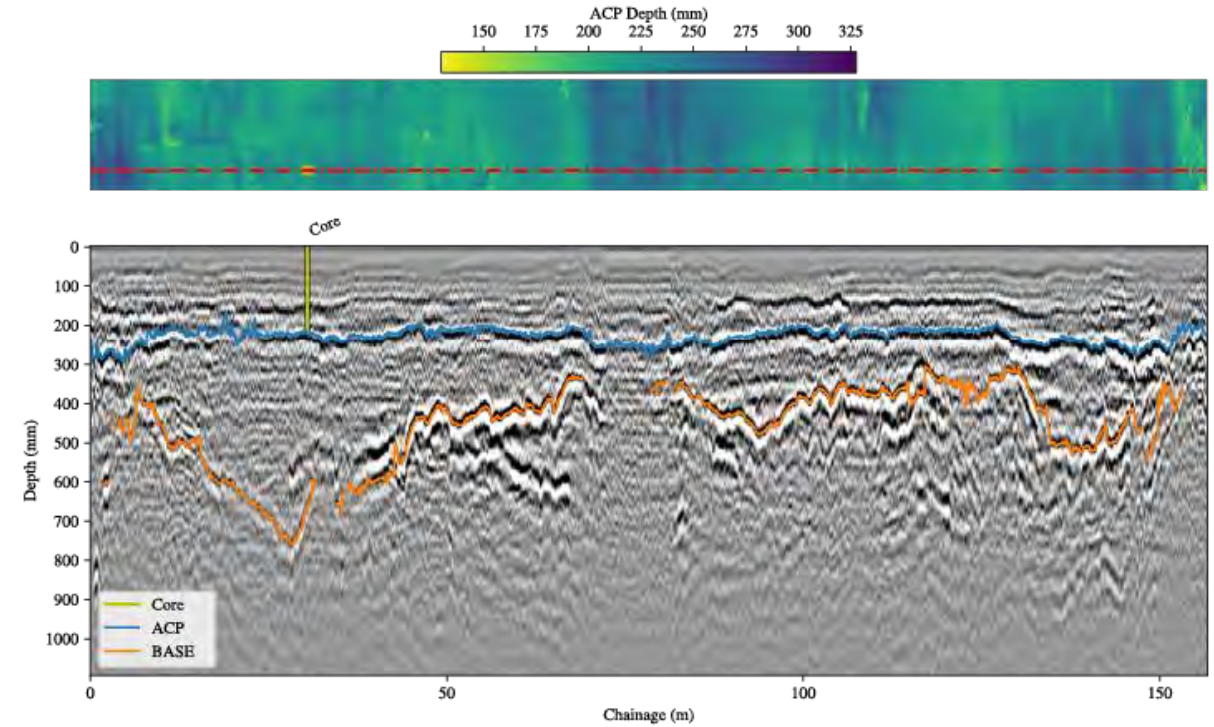
- Potential delamination based on reflectivity between the surface and base in orange



Pavement Analysis - Thickness

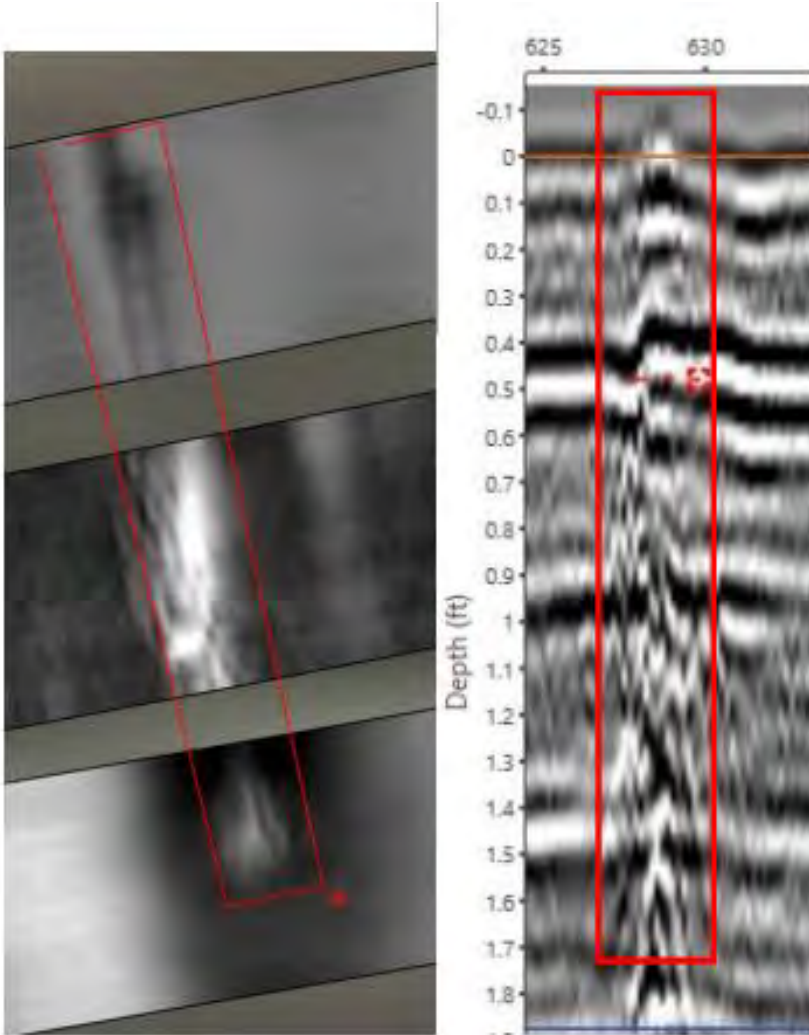


- Asphalt thickness <10cm in yellow
- Exported as kmz for location data

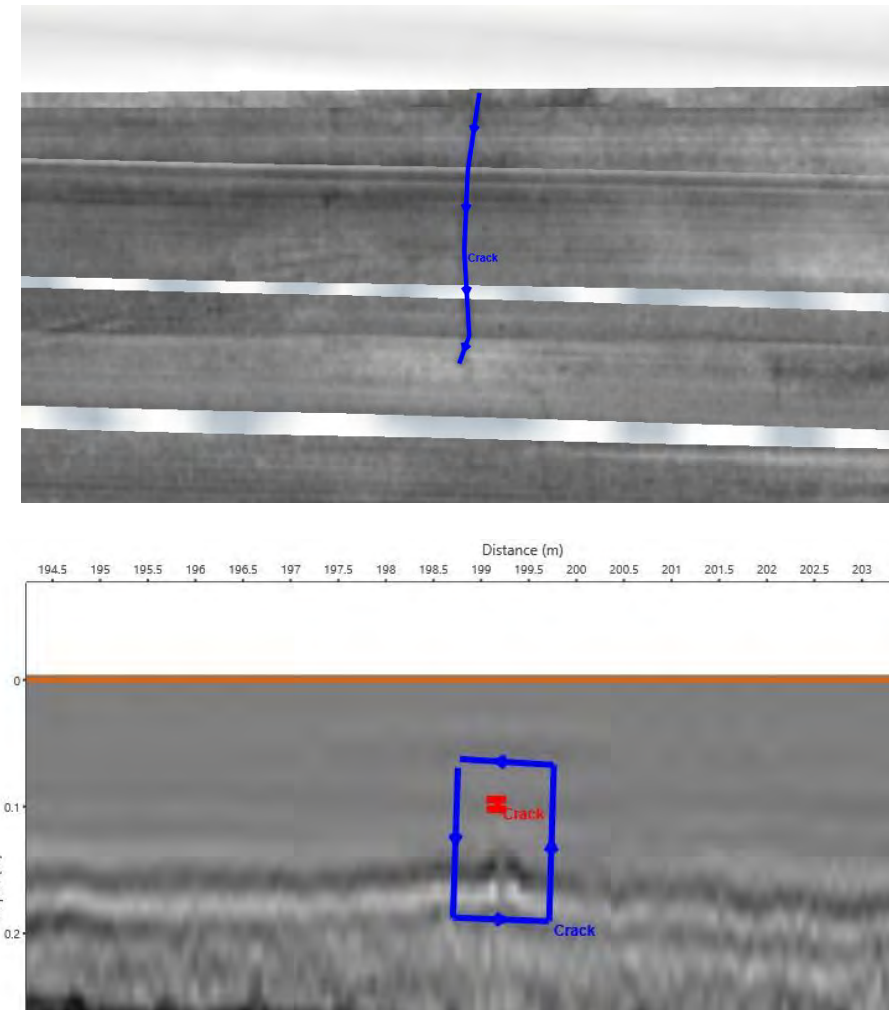


- Asphalt layers calibrated with a core

Pavement Maintenance - Cracks



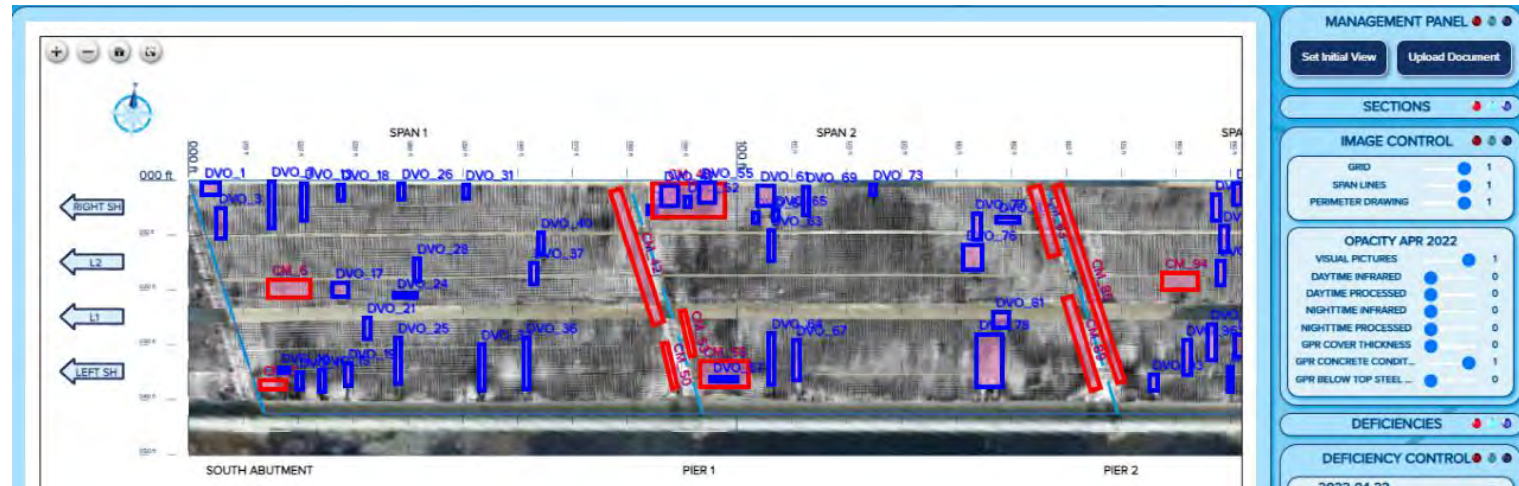
- Buried pavement cracks
- Collect year-on-year to track propagation



Bridge Decks

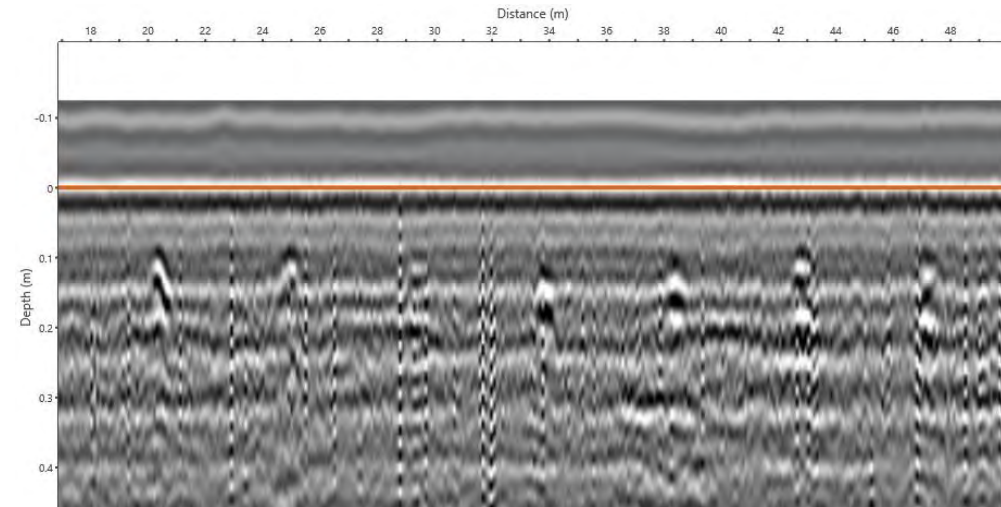


- Dense data spacing
- Collection hours → minutes
- Non-destructive, non-disruptive
- Chloride content and regions of heightened wear

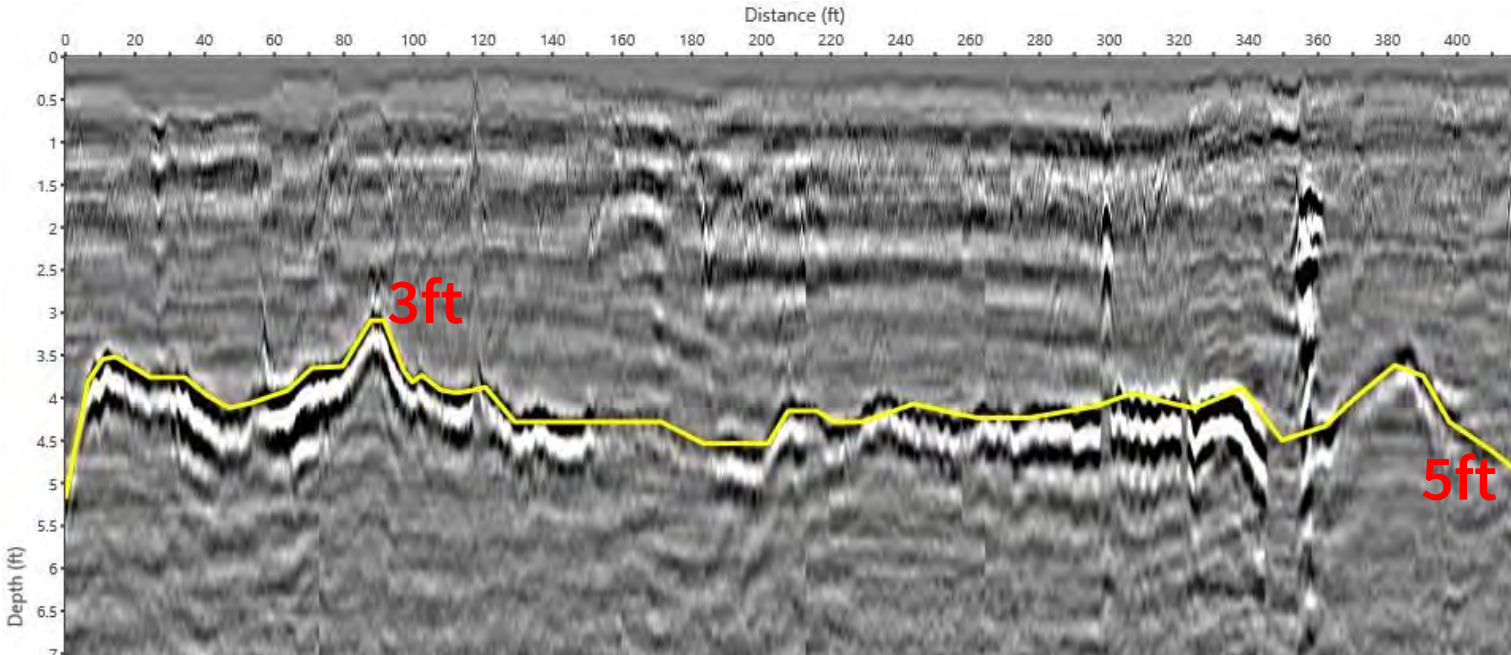


Concrete Roadways

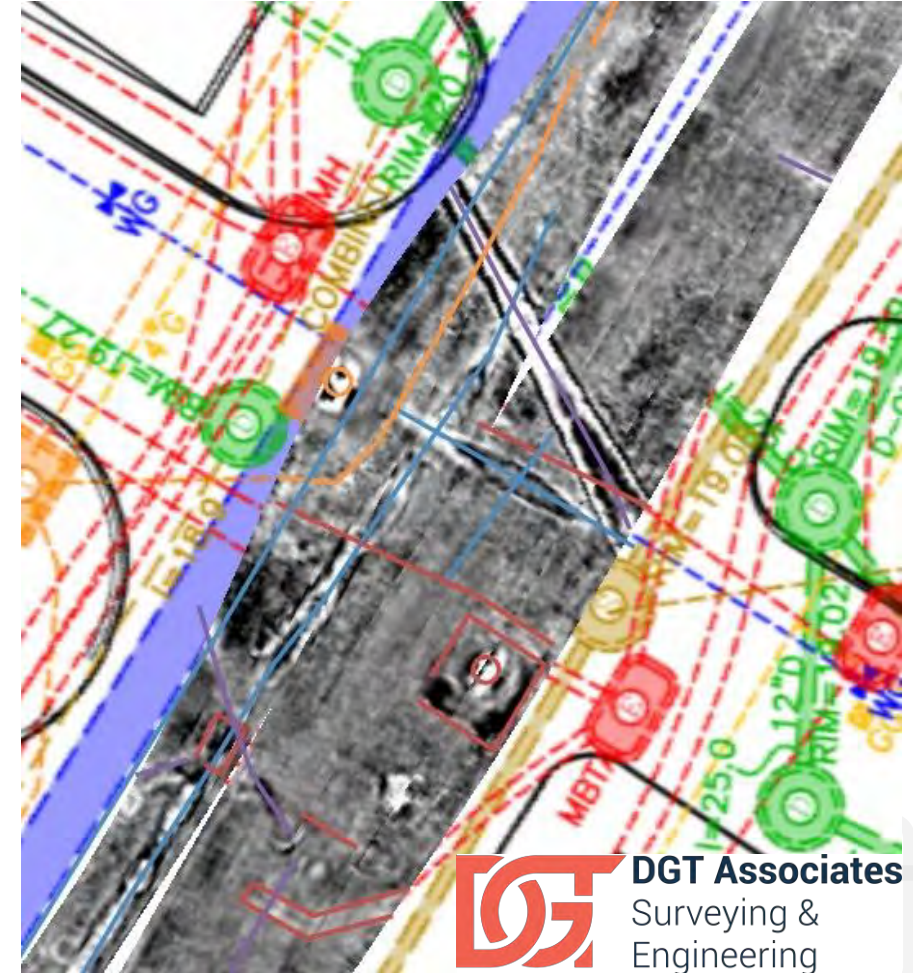
- Direct road maintenance resources efficiently
- Non-destructive condition testing



Underground Exploration – Utilities



- Track underground features across scans
- Confirm depths and locations
- Find unknown or abandoned utilities
- Image both metallic and non-metallic pipes



Reduce costly disruptions – Increase Efficiency



- Fewer + more effective test holes
- Fewer traffic disruptions
- Information is power! Reduce costly construction delays



More information, less time



1. Multi-channel
2. broadband frequency (100-3000 MHz)
3. Pavement, bridges, utility applications
4. Quick results
5. Deliverables GPS located, interactive, and informative



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