When is Karst not Karst?

Geophysical Explorations Examining Pavement Settlement in Southeastern Tennessee.

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Karstic Conditions in the SE
Project Background/Objective
Methods Consulting
Field Exploration
Project Conclusions
Sinkhole opens up in Walgreen’s parking lot.

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A large sinkhole has appeared in the parking lot of Walgreen's on Broad Street in Chattanooga. According to witnesses, the hole opened up overnight and has grown rapidly. The store has been closed since the incident occurred.
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Site located in Chattanooga, TN

1 mile stretch of asphalt-paved 2-lane exhibiting settlement issues over past 20 years

Alligator cracking, potholes, birdbaths

Repeated patching efforts
Objective:

Determine if the settlement issues are related to karstic activity.
Karstic Conditions in the SE

Project Background/Objective

Methods Consulting

Field Exploration

Project Conclusions
Methods Consulting:
- Desktop review
- Drilling discrete patch areas
- CPT
- Test pits
- Geophysics

- Broad geophysical exploration
- Discrete drilling program
Karstic Conditions in the SE
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Field Exploration:

- locate utilities
- 16 shear-wave velocity velocity arrays which determine the boring locations
- 16 hollow-stem soil boreholes
SITE EXPLORATION AND LABORATORY TESTING

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SITE EXPLORATION AND LABORATORY TESTING

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~FOR COMPARISON~
Karstic Conditions in the SE
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Project Conclusions:

Investigation revealed: undulating bedrock topography with weathered-rock zones of varying thickness.

Voids or vertically-aligned zones of contrast were not observed.

Slope failures observed – wedges of fill slid.

Settlement issues along project site are associated with poorly-placed backfill.
Repair Recommendations:

Excavate and replace backfill in settlement areas with proper compaction or FDR.

Stabilize slopes using:
- drilled shafts
- soil nails
- MSE wall system
QUESTIONS?