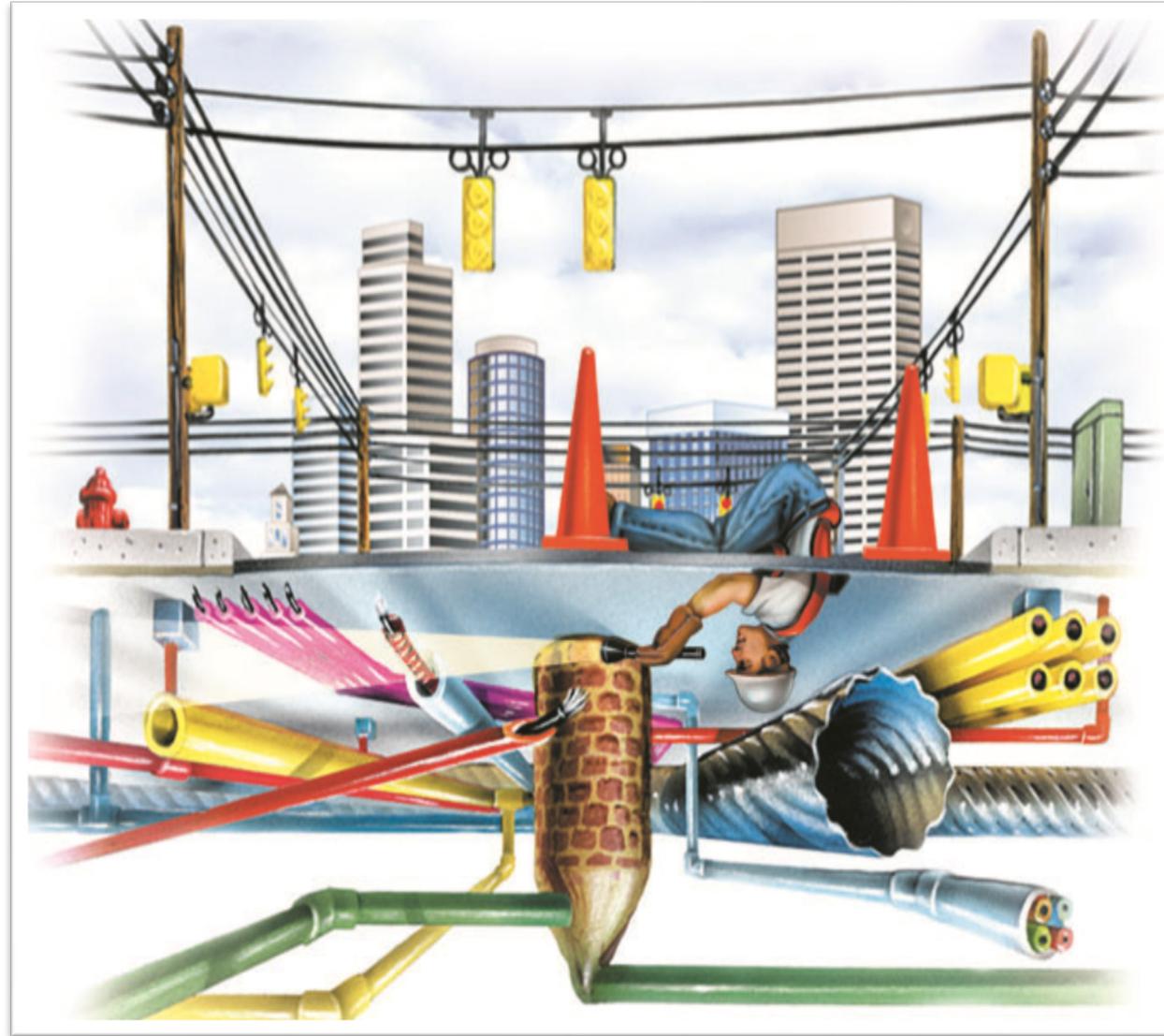
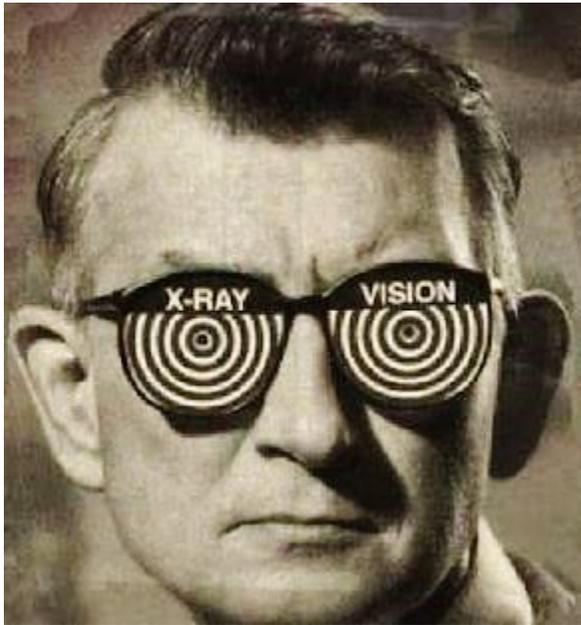


LOOKING THROUGH PAVEMENT: Benefits of Subsurface Utility Engineering

Presented by:
Chris Ernst, PE



Chris Ernst, PE

- 15 Years Experience
- Secretary of ASCE
Texas UESI Chapter
- Love Coaching Sports



OVERVIEW

- **Subsurface Utility Engineering (SUE)**
- **Project Examples**
- **New and Future Technologies**



RED
Electric



YELLOW
Gas, Oil, Steam
or Petroleum



ORANGE
Communications
Systems



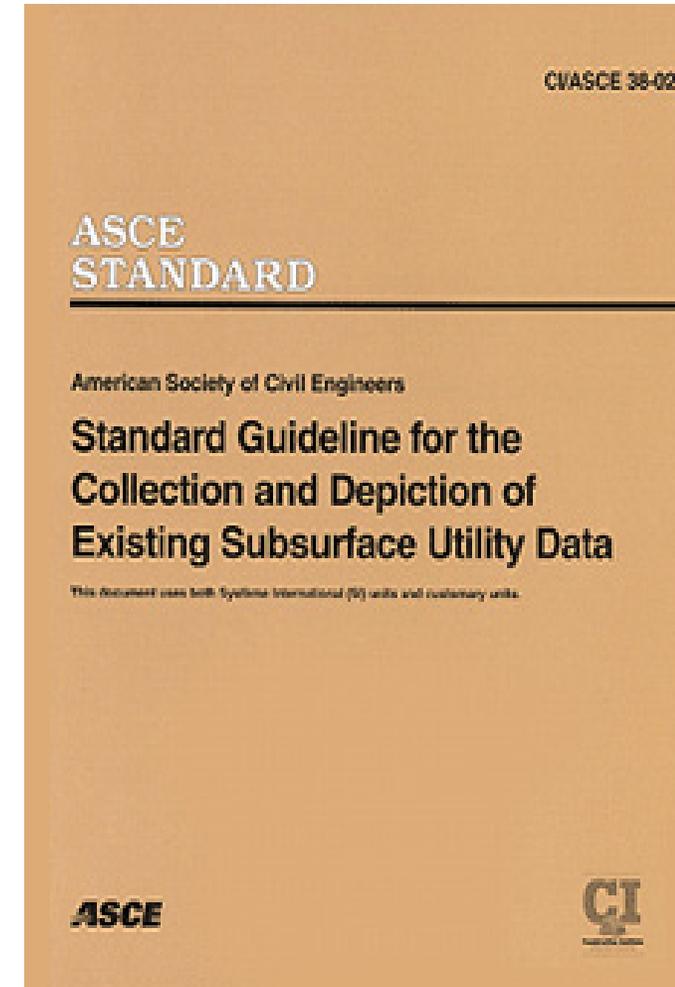
BLUE
Potable
Water





WHAT IS SUE?

- **Branch of engineering practice that involves:**
 - **Utility mapping at appropriate quality levels**
 - **Utility relocation design**
 - **Utility condition assessment**
 - **Communication of utility data**
 - **Utility relocation cost estimates**
 - **Implementation of accommodation policies**
 - **Utility design**



» WHO USES SUE?





SUE QUALITY LEVELS



➤ QUALITY LEVEL “D” - RECORDS

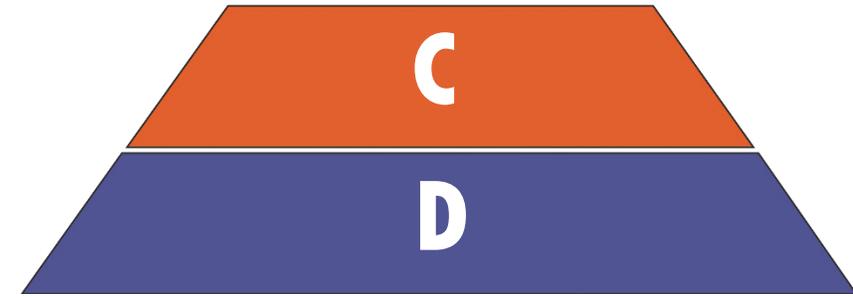
- Existing records
- Personal Interviews

D



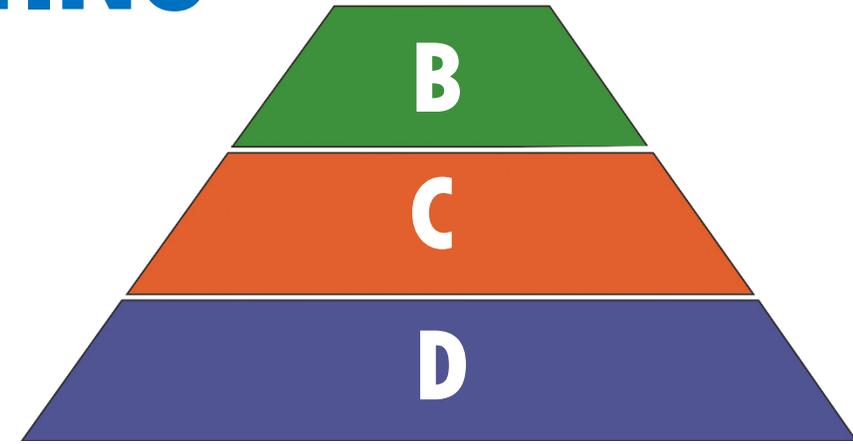
➤➤ QUALITY LEVEL “C” - SURVEYING

- **Survey Visual
Utility Appurtenances**



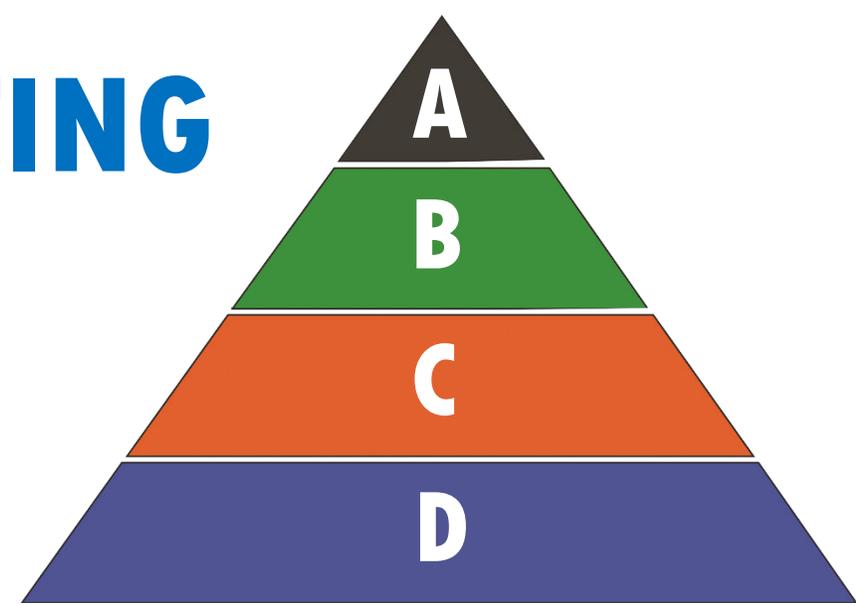
➤➤ QUALITY LEVEL “B” - DESIGNATING

- **Radio signal used to pinpoint horizontal position**



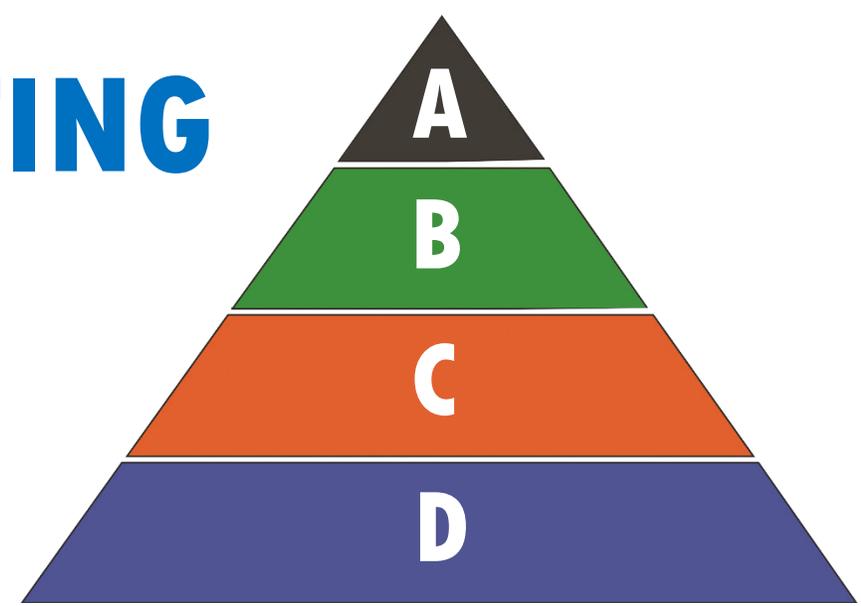
➤➤ QUALITY LEVEL “A” - LOCATING

- **Non-destructive excavation**
- **Most accurate vertical & horizontal position**



➤➤ QUALITY LEVEL “A” - LOCATING

- **OQ (Operator Qualification)
Certified**



➤ WHAT IS CONFLICT ANALYSIS?

- **Proactive approach in determining conflicts**
 - **Uses SUE data**
 - **Evaluates your design plans for your project**
 - **Perform Clash Detection/3D Modeling**

FM 1867 Big Wells

CSJ: # 1799-02-27

UTILITY CONFLICT LIST

UPDATED ON 6/1/2018

UTILITY OWNER: City of Big Wells

Utility Owner and/or Contact Name	Conflict ID	Drawing or Sheet No.	Utility Type	Size and/or Material	Utility Conflict Description	Start Station	Start Offset	End Station	End Offset	Utility Investigation Level Needed	Test Hole	Recommended Action or Resolution
City of Big Wells	1		Water		Water line longitudinal beneath proposed pavement. Level C/D SUE performed.	290+91	16.5' RT	326+93	21.0' RT	QLA	TH 1 TH 8 TH 10 TH 12 TH 20	Need verification of depth/location via QLA or any additional construction plans we could obtain.
City of Big Wells	2		Water		Abandoned asbestos water line longitudinal beneath proposed pavement. Level D from drawings.	290+91	6.3' RT	323+41	10.1' RT	QLA	TH 4	Need verification of depth/location via QLA or any additional construction plans we could obtain.



“I’VE GOT A LITTLE STORY FOR YOU...”



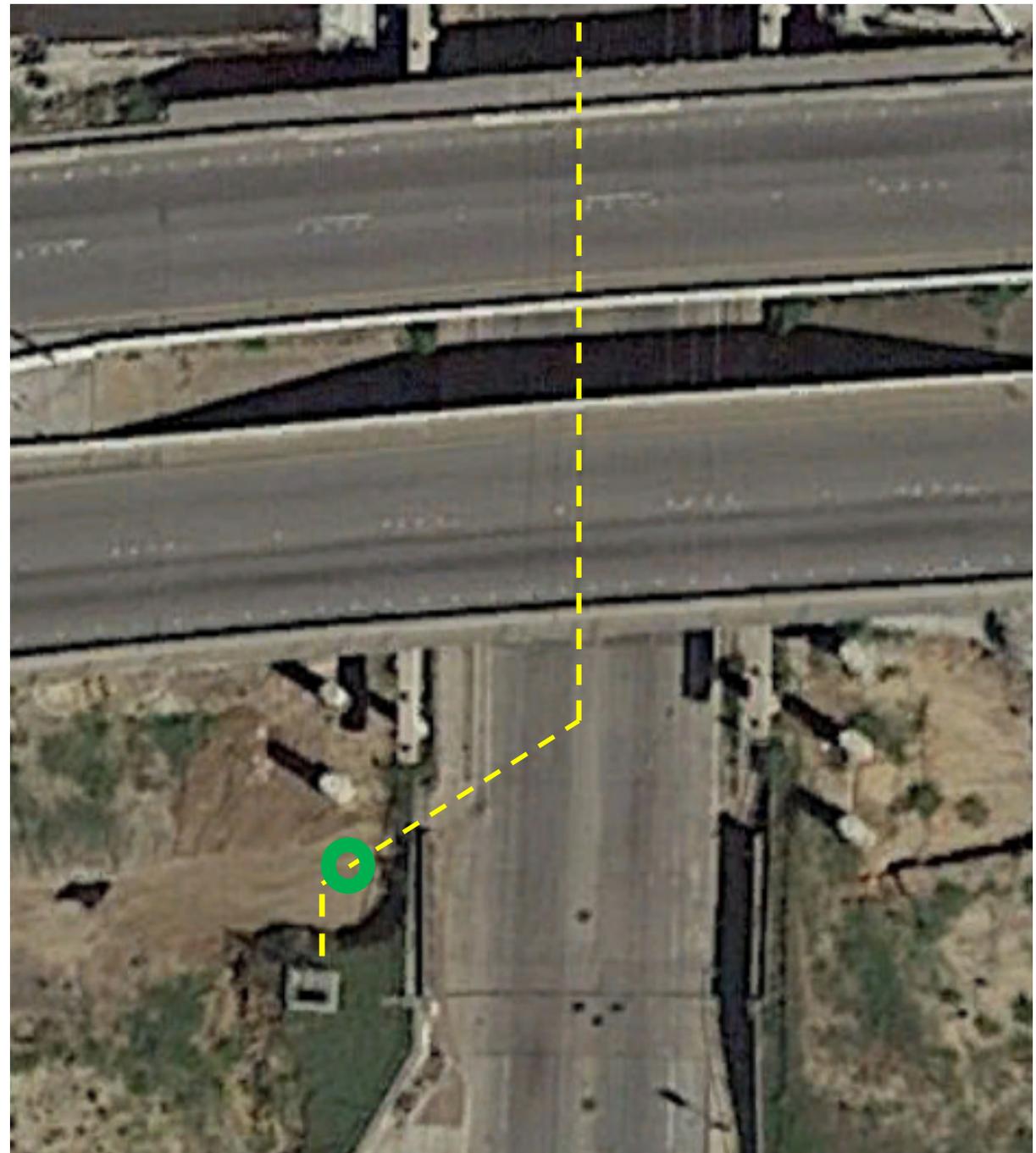


“YOU HIT WHAT?”





“YOU HIT WHAT?”





“YOU HIT WHAT?”



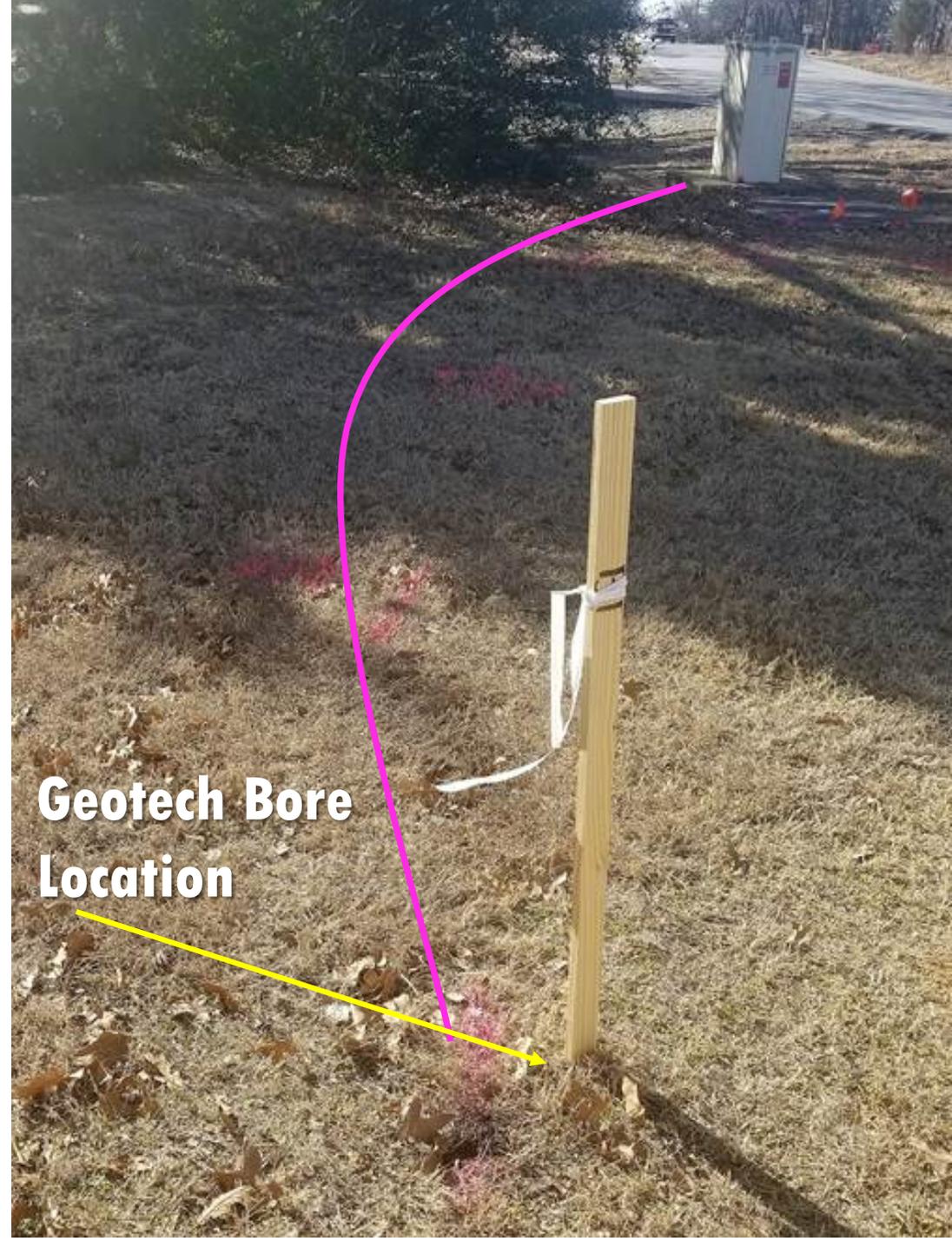


“THE FIBER GOES WHERE?”





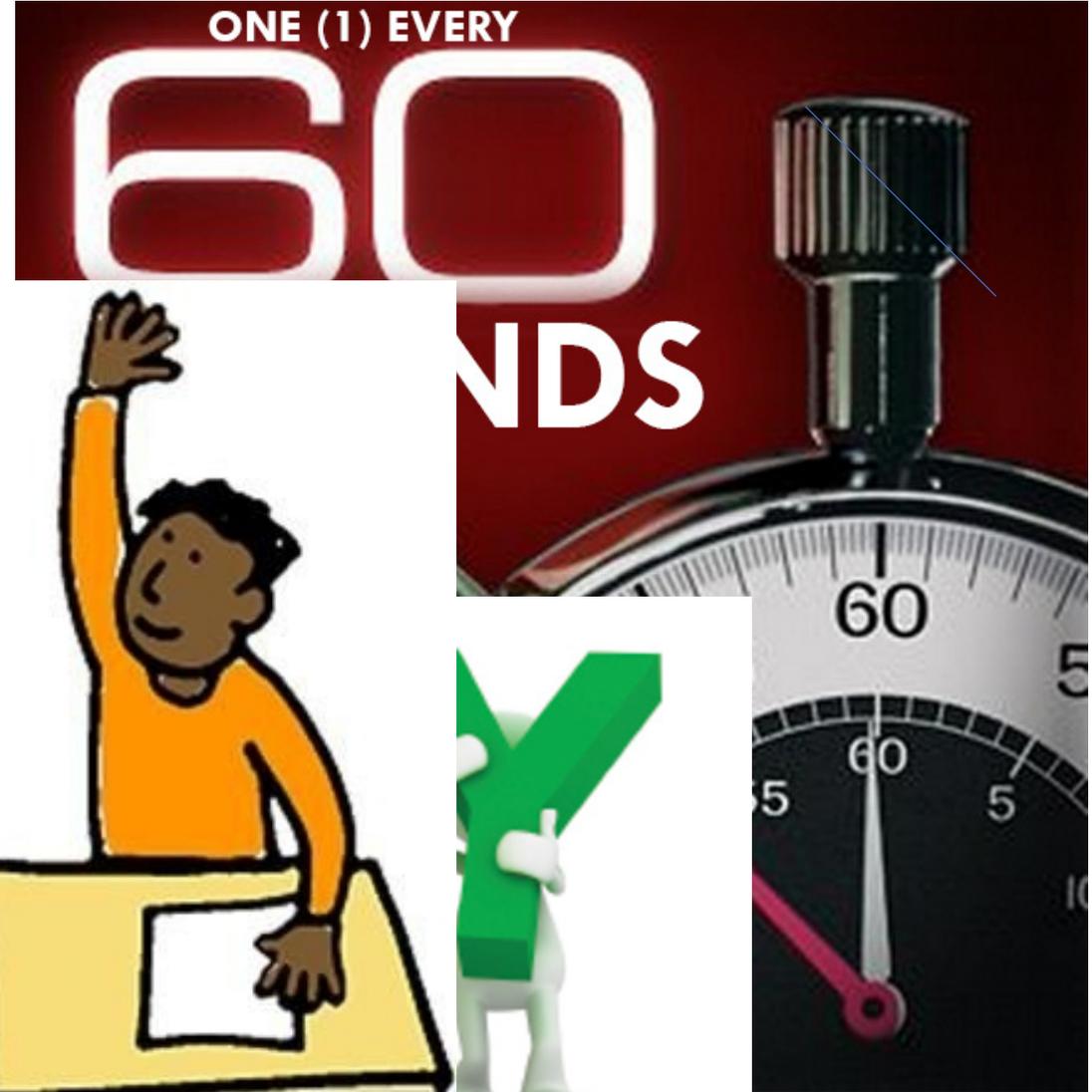
“THE FIBER GOES WHERE?”



**Geotech Bore
Location**

»» WHAT ARE THE RISKS?

- **Utility Strikes**
- **Sc**
- **Sc**



➤➤ WHAT ARE THE RISKS?



Gas Pipeline Explosion



Water Main Strike

»» WHAT ARE THE RISKS?

- **Delay of Projects**
- **Contractor Claims**
- **Environmental Issues**
- **Re-Design Fees**
- **Negative Publicity**
- **Change Orders**





KNOWING BEFORE YOU DIG

- **Knowing what is underground BEFORE you start saves Time, Money and Lives**
 - **Easier to interface design data with existing utilities**
 - **Reduces ROW acquisition cost**
 - **More accurate project bids**
 - **Minimizes utility strikes**
 - **Ensures a safer work environment**
 - **Reduces or eliminates redesign conflicts in construction**

2000 Study by Purdue University commissioned by the Federal Highway Administration



Every dollar spent on SUE,
TxDOT would see:

\$4.27 Saved





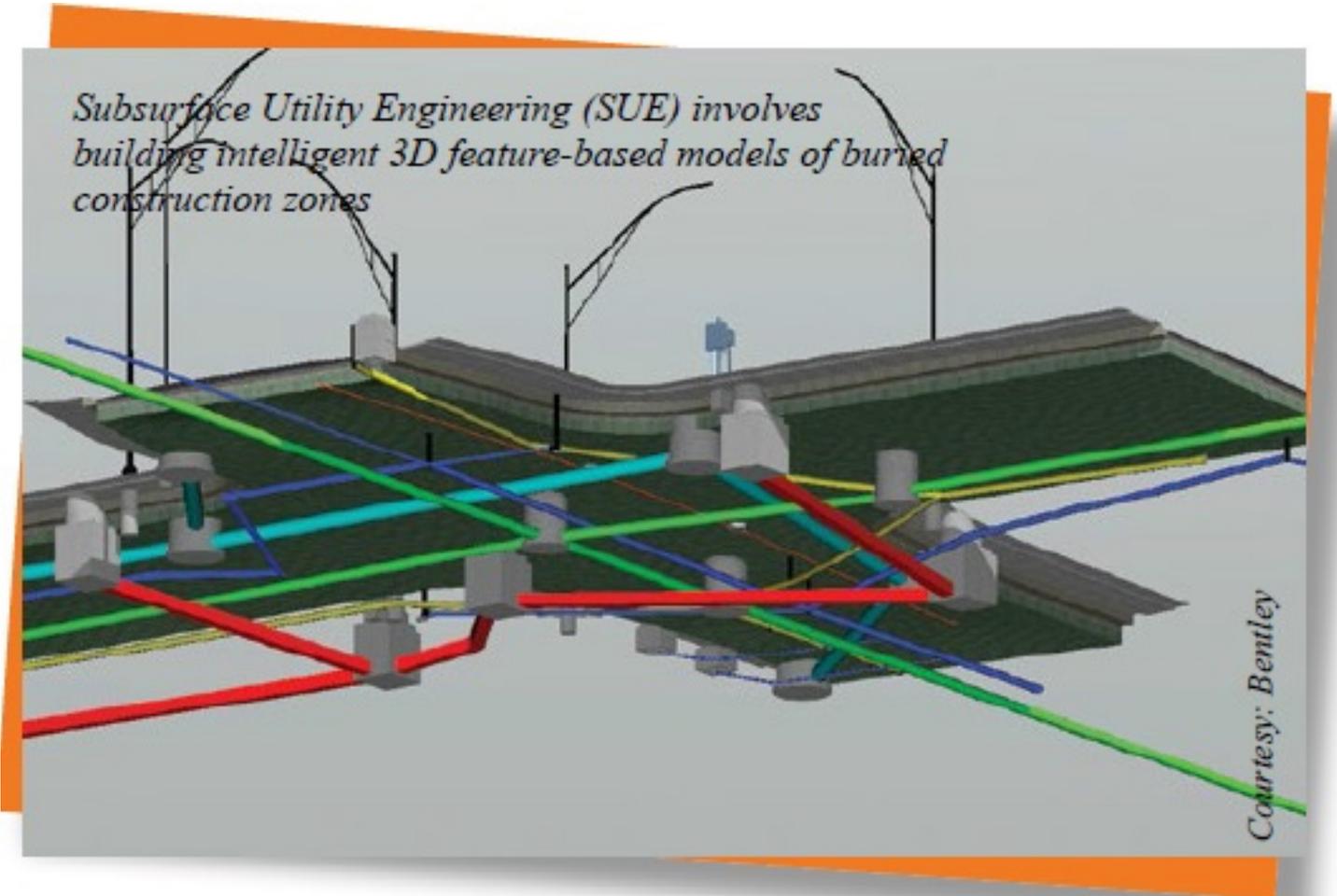
➤ TO INFINITY AND BEYOND....

- **Drone Surveying**
Interface with SUE
 - **Quality Level C**
 - **Quality Level B Marks**



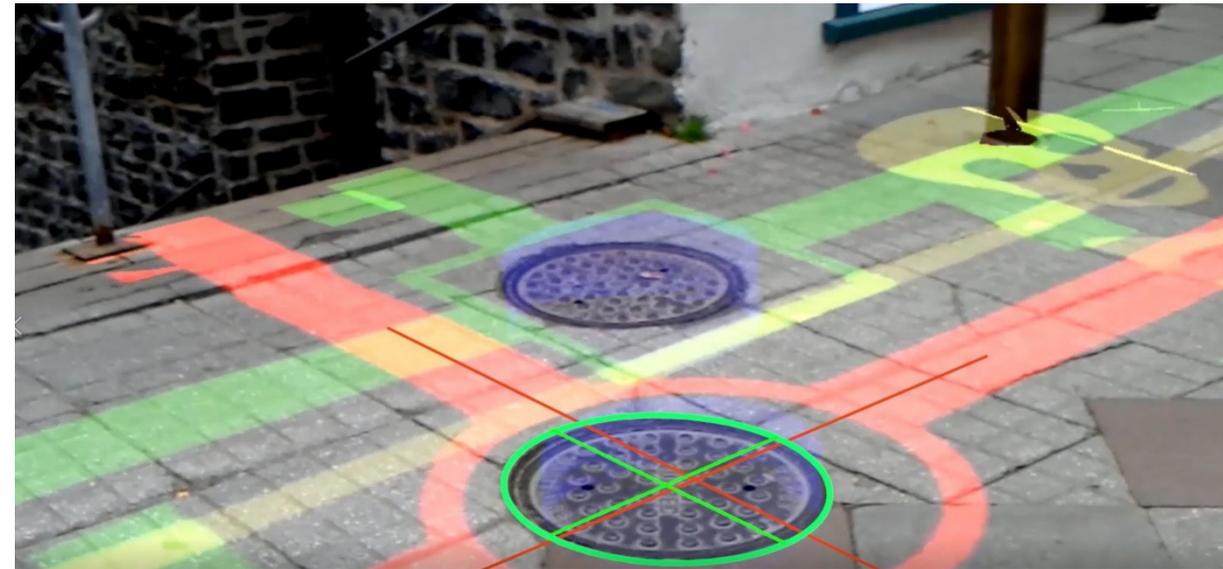
➤ TO INFINITY AND BEYOND....

- **3-D Modeling**



➤ TO INFINITY AND BEYOND....

- **Utilities and Mixed Reality (Virtual and Augmented)**
 - **2D/3d Pipes Projection for Excavation**



»» **IN SUMMARY....**

- **New Technologies – only as good as data you input**
- **Clients recognize a significant savings in:**
 - **Total project cost**
 - **Reduced time to complete projects**
 - **Fewer surprises requiring work stoppages for re-design and conflict resolution**

»» CONTACT INFORMATION

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