Pre-Backfill Digital Twin Documentation



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All views and ideas being presented today do NOT reflect the views or opinions of NOWRA.

Questions are welcome throughout the presentation.

SKYWALKER DRONE IMAGERY

The Septic Construction Lifecycle

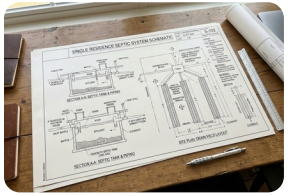
A step-by-step overview of the installation, verification, and completion process.



STEP 01

Site Conditions

Evaluate grades, drainage patterns, utilities, and existing vegetation.



STEP 02

Design & Eng.

Create precise plans for layout, pipe routing, and component locations.



STEP 03

Dig & Build

Excaavate the site and physically construct the physical system components.



STEP 04

Inspect & Approve

Conduct assessments and capture high-fidelity spatial documentation.



STEP 05

Backfill

Cover the system, finalizing the project and closing the visible window.

The Documentation Window

Before backfill...

- **Every component is visible.**
- **Every relationship can be observed.**
- **Every measurement can still be verified.**

ONCE BACKFILL BEGINS, THIS OPPORTUNITY NEVER RETURNS.





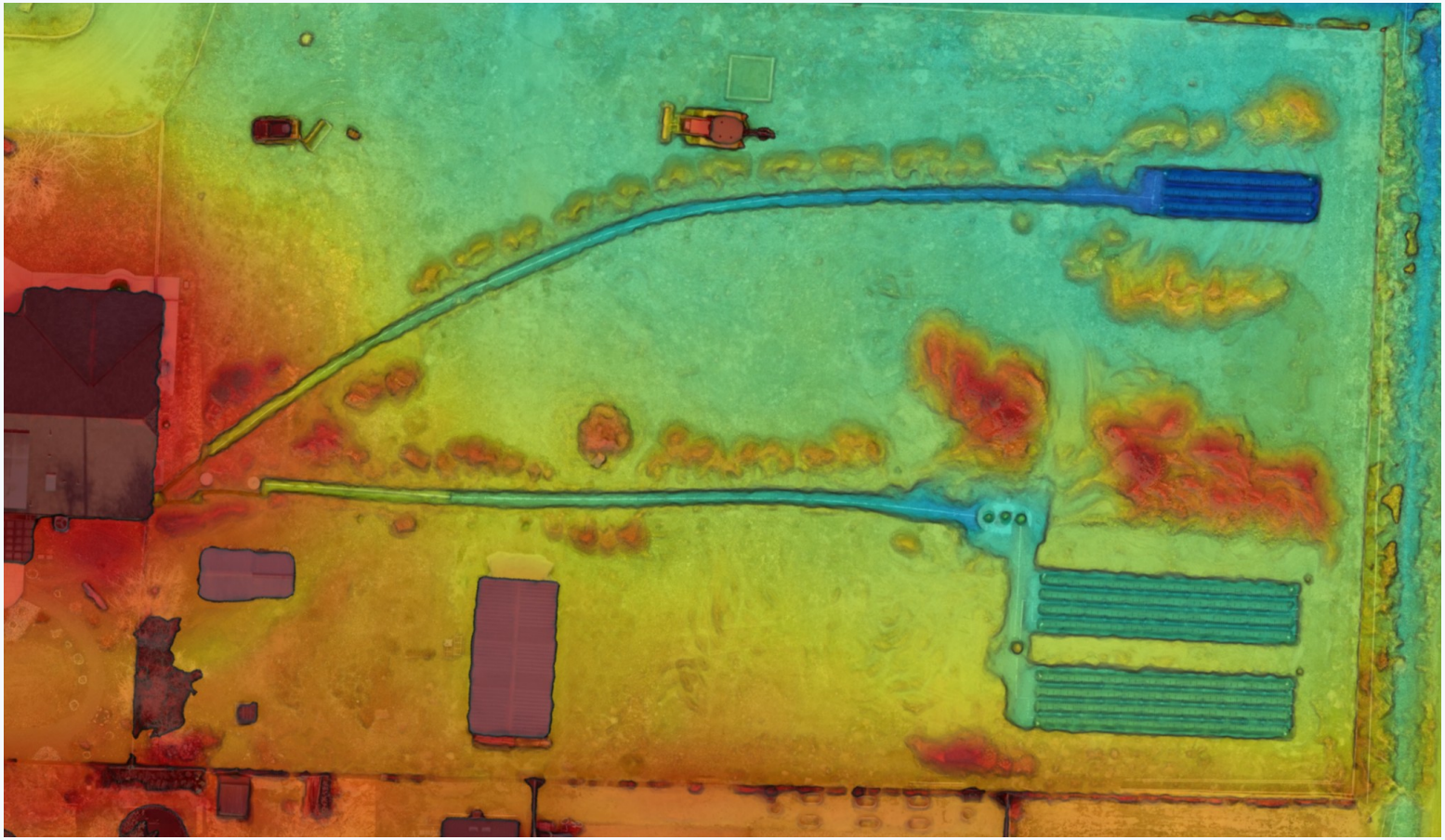




Based of this Aerial Photo alone, what do you know about this install??



Same install with elevation Heat Map. What else can you determine about the system now?



What Is a Pre-Backfill Digital Twin?

A comprehensive **visual and geospatial representation** of the installed system before backfill.

High-fidelity spatial data captured via drone or terrestrial scanning.

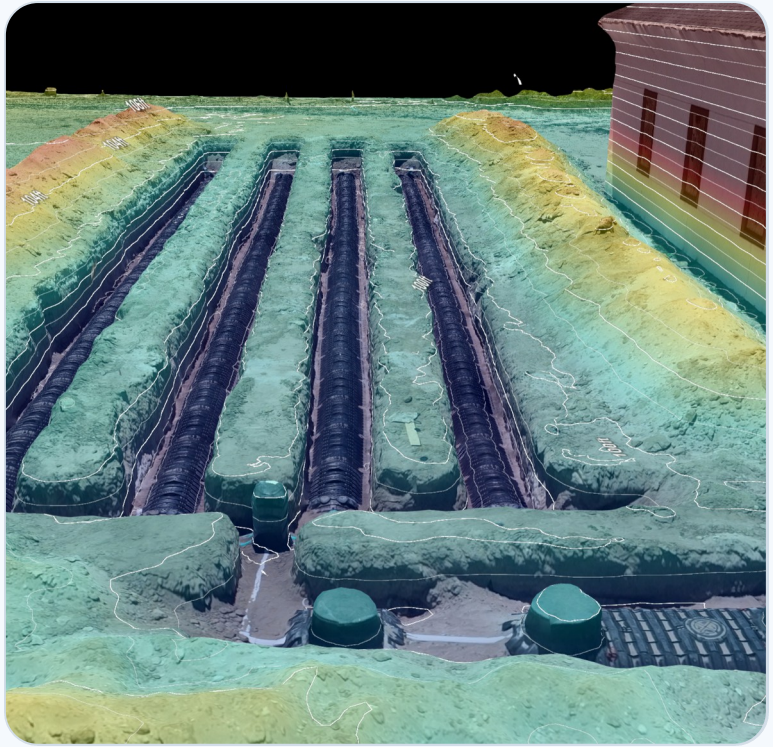


Interactive Demonstration

Scan the QR Code

https://tinyurl.com/SepticDigitalTwin

More Than Images



straight_elevation_engineering_overlays_spatial_relationships_full

Measurements
Precise length and width data.

Engineering Overlays
Compare design vs. actual.

Spatial Relationships
Component proximity.

terrain_placeview_in_ar

Elevation Profiles
Vertical height accuracy.

GPS Coordinates
Geospatial anchoring.

3D Visualization
Immersive site review.

Creating a Digital Twin

A complete, interactive digital twin captures every component in high fidelity before it is permanently buried.



01 Capture

Pilot is coordinated with to fly the site before backfill.



02 Process

All data is processed using specialized photogrammetry.



03 Deliverables

The digital twin is created for measurements, analysis, and as-built plans.



04 Submittal

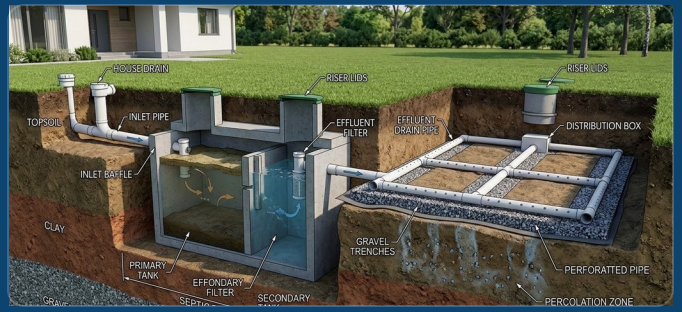
Submit official Record Drawings to county, builder, engineer, and owner.

What is a Record Drawing? Why is it important?

The permanent source of truth for an onsite wastewater system after construction.

The Final Truth

An as-built (record drawing) documents how an onsite wastewater system was actually installed in the field. It serves as the permanent reference of the completed work, capturing critical changes that differ from the original design.



history_layers_safeguard_

Documents Actual Installation

Captures field adjustments and deviations from the original design as they were physically built underground.

Records Key Geometries

Maps exact component locations, vertical elevations, and approved changes for true-to-life precision.

Approved Variations

Officially records authorized design modifications made on-site to resolve real-world landscape anomalies.

Long-Term Maintenance & Repair

Provides critical blueprints for inspectors, maintenance providers, and system evaluations decades into the future.

One Record. Multiple Perspectives.

The Preserved Installation

A single, unchangeable digital twin serves as the permanent source of truth. The documentation remains the same—it is the questions that change.



Engineers & Regulators

Does the physical installation align with designs and comply with codes?

Installers & Inspectors

Were all components placed and connected correctly before backfill?

Maintenance Providers

Where exactly are the buried access ports and structural components located?

Homeowners

Where is my system buried, and how do I prevent accidental damage?

Traditional Documentation and Digital Twins

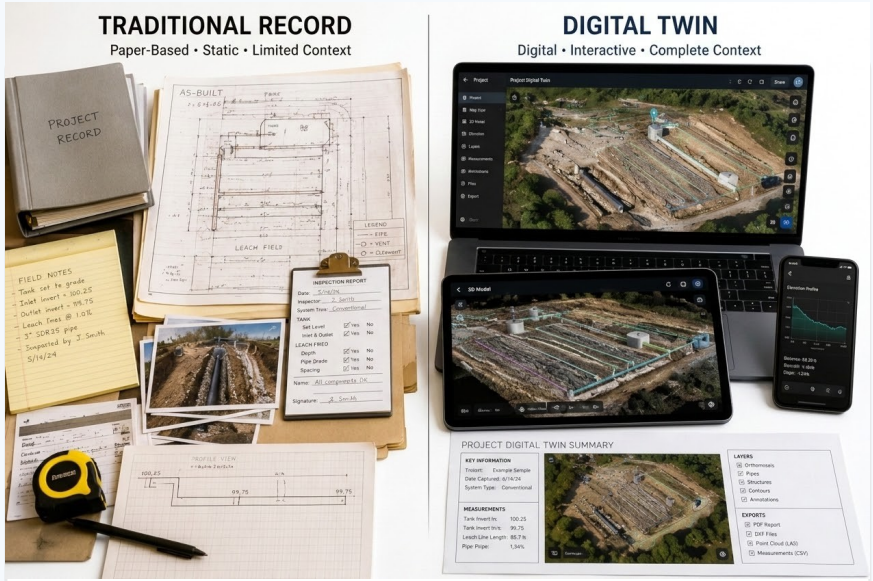
Traditional

edit_document Drawings

description Notes

assignment Inspection

photo_camera Photographs



Paper Records vs. Digital Twin

Digital Twin

architecture Imagery

biotech Spatial Context

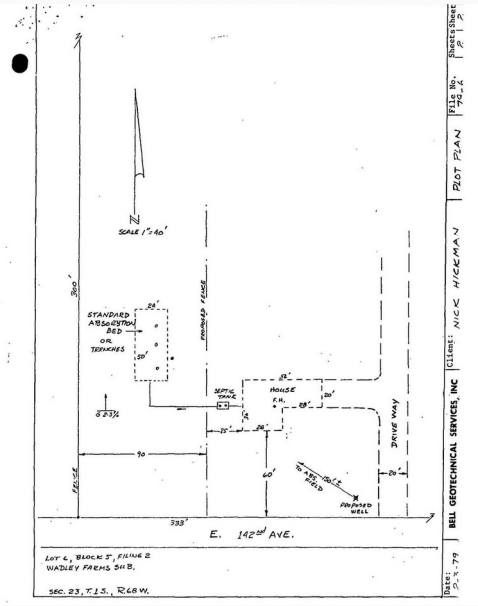
layers Elevation

view_in_ar Interactive Record

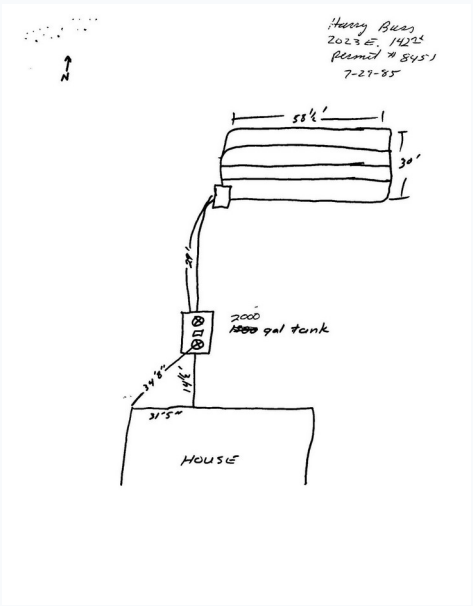
One Property. 40+ Years. What Happened? Design vs. As-Built

Comparing original 30+ year old engineering plans with hand-drawn installation field records.

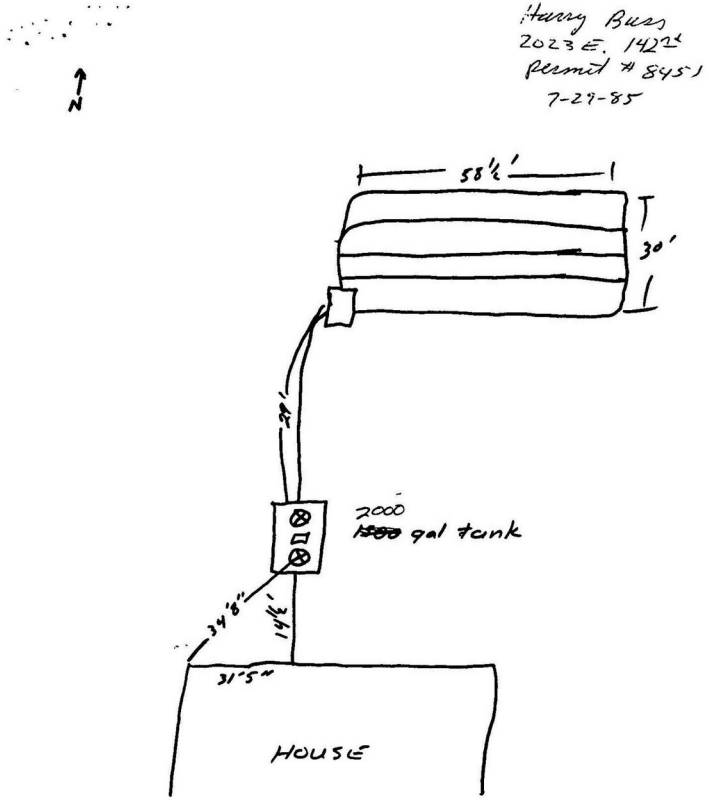
1. Original Engineering Design

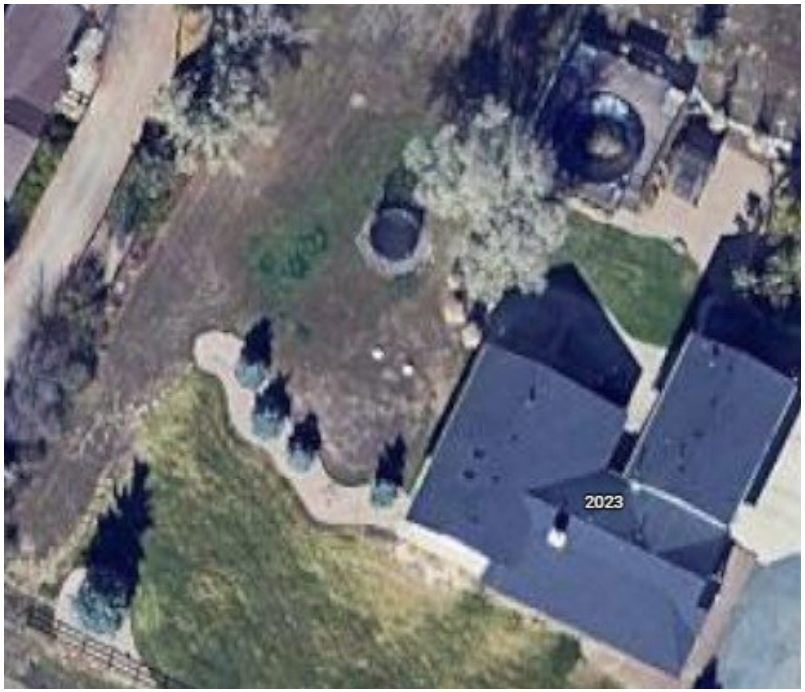


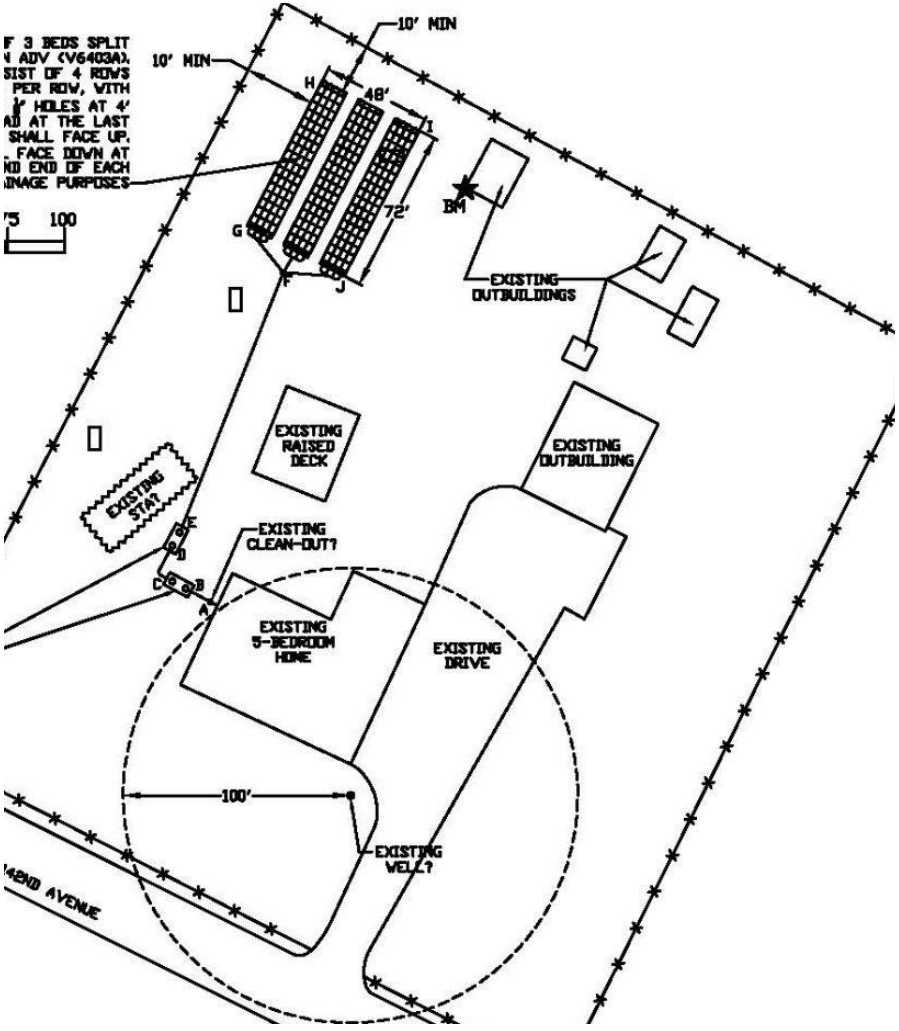
2. Field As-Built Record



30 years later with Google Maps we can assess the accuracy of the as built to some degree of certainty.






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EXISTING 5-BEDROOM HOME

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100'

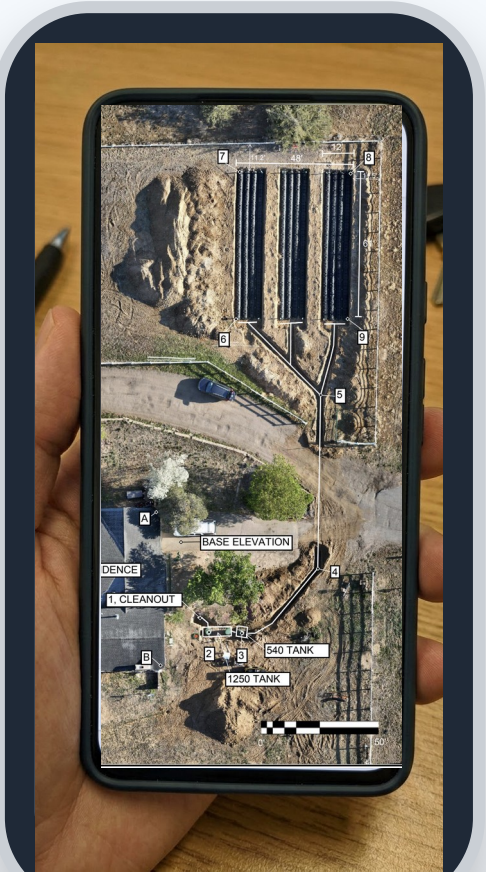
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EXISTING STA?
EXISTING CLEAN-OUT?
EXISTING 5-BEDROOM HOME
EXISTING DRIVE
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B
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E

Final As-Built Documentation Package



Scan the QR Code

https://tinyurl.com/SepticAsbuilt

Explore the completed documentation package.

Looking Ahead

As documentation technologies continue to evolve...

"What opportunities might this create for the onsite wastewater industry?"



FROM DOCUMENTATION TO GIS INTEGRATION

Pre-backfill records can become a valuable layer in your county's existing GIS system.

CAPTURE
Pre-backfill GeoTIFF imagery

→

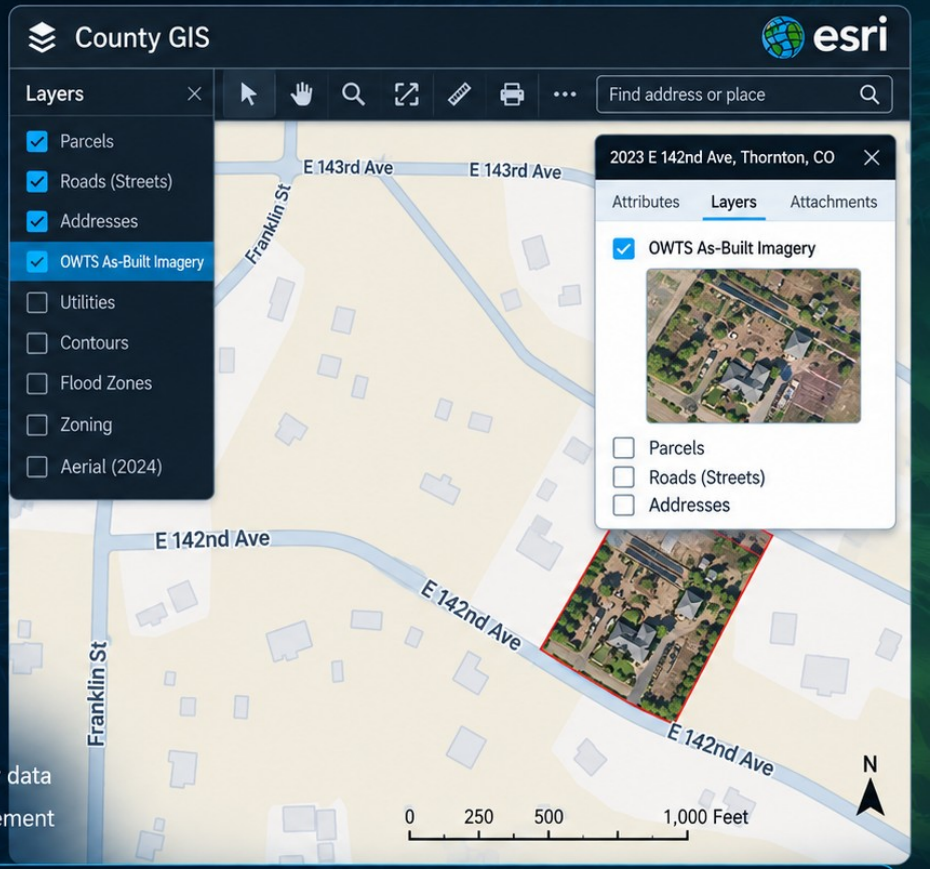
INGEST
Add to your GIS / Esri environment

→

PRESERVE
Permanent spatial record

KEY BENEFITS

- Georeferenced imagery of the completed installation
- Captured before it disappears underground
- Stored as a permanent spatial record
- **Accessible** alongside parcels, permits, addresses, utilities, and other county data
- Supports faster reviews, easier record retrieval, and long-term asset management



INSTEAD OF SEARCHING FOR A SEPTIC RECORD,
IMAGINE SEEING THE ACTUAL INSTALLATION WHERE IT EXISTS ON THE PROPERTY.

Questions

Thank you.

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QR CODE FOR ENTIRE PRESENTATION TODAY

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