

Using Risk and Conditions to Develop an Asset Management System



TRANSFORMING THE WAY THE WORLD WORKS





TRANSFORMING THE WAY THE WORLD WORKS



Trimble Unity
Maintain™

Powered by e-Builder



Trimble Unity
Construct™

Powered by Cityworks, AgileAssets
Unity Work Management



Trimble Unity
Permit™

Trimble Unity®



esri

Partner Network
Platinum



Managing Infrastructure is Complicated



What is Asset Management?

Coordinated activities of an organization to realize value from its assets in the achievement of its organizational objectives.



ISO 55000

Why Asset Management?

- Aging Infrastructure
- Loss of Institutional Knowledge
- More Sophisticated Facilities / Assets
- Customer Expectations
- Demand to Do More with Less
- Transition from Reactive to Proactive Work Environment

Asset Management Principles

All infrastructure *deteriorates with age* and requires proactive management to operate, maintain, repair, and eventually replace.



What is a SAMP? (Strategic Asset Management Plan)

- Asset Management Policy
- Asset Management Objectives
- Asset Portfolio Management
- Risk Management
- Performance and Continuous Improvement
- Life Cycle Management
- Resourcing
- Compliance and Legal Requirements

A well-developed **SAMP** serves as a blueprint for how an organization will manage its assets effectively to achieve business objectives and provide value while managing risk and complying with relevant standards and regulations. It is usually aligned with the **ISO 55001** standard, which specifies the requirements for an asset management system.

What is in an Asset Management System?

People

- Customers
- Staff
- Management

Data

- Asset Inventory
- Asset Condition
- Maintenance Records

Workflows

- Level of Service
- Operations & Maintenance
- Funding Strategy



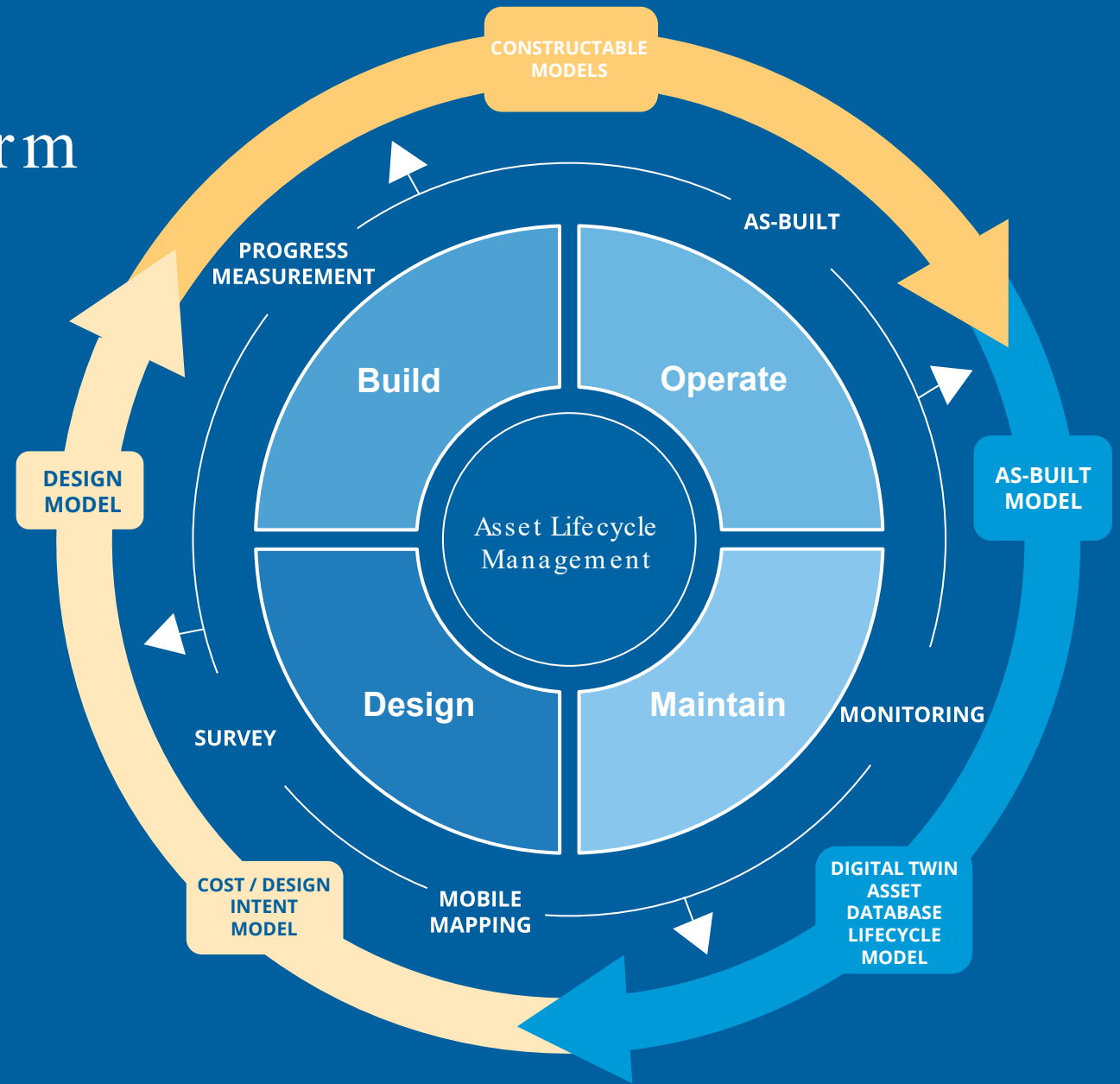
Trimble Unity®

Trimble Unity[®]

What is Asset Lifecycle Management?
Connecting the dots from Asset Creation
and construction to Asset Management
and eventual Asset Replacement

Trimble's Asset Platform

- Connects **systems of record** from design through operations by being **open and interoperable**
- From the start, every asset gets a **digital id**
- **Digital delivery** process is used throughout each phase
- This builds & maintains **digital twin**
- Physical world reality is captured and informs a **common data environment**



LEGEND

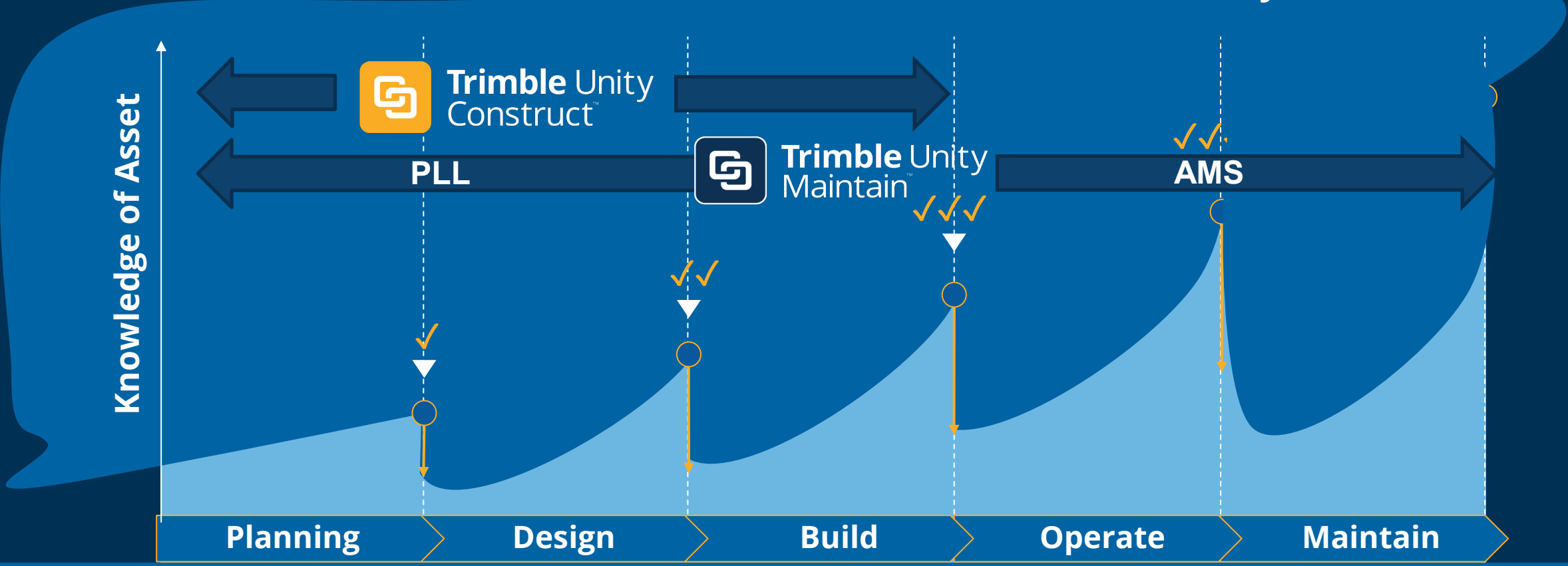
- Common Data Environment
- Reality Capture
- Workflows





Handoffs Cause Data Loss

Actual State: Information Loss Across The Lifecycle



Data is Rarely the Issue



Is Data Organized to Capture Value?

Four Phases of Digital Transformation



PAPER / ANALOG

[It's paper after all.]



SPREADSHEETS

[Paper 2.0]



GIS

*[A powerful beginning,
often in silos]*



INTELLIGENCE

*[A connected platform to
Design, Build, Operate &
Maintain every asset]*



Trimble Unity[®]



- Permitting
- Licensing
- Surveying



- Project Management
- Cost Controls
- Contract Administration

- Asset Management
- Asset Inspection
- Work Order Management
- Inventory Management

Risk



Risk – July 29, 2014 - LADWP @ UCLA



Risk

\$13 Million (UCLA)

\$2.5 Million (Cars)

\$50,000 (water loss)

DWP Repair Costs?



Why Asset Management?

May 3, 2022

- Salt Lake City
- 16" Water Main Break
- Pipe Installed in 1940s
- \$10,000s in insurance claims and repair costs:
 - 10 feet of water main
 - 60 feet of sewer main
 - Site restoration
- Damaged 6 homes
- And a car



<https://www.sltrib.com/news/2022/05/05/sinkhole-swallowed-car/>

[UCLA 30" Water Main Break - 2014](#)



RISK BASED APPROACH

Manage Assets

- **Asset Centric**
- **Short Term Planning**
- **Capital Costs**
- **Reactive**
- **Condition Based Analysis**

Asset Management

- **Service Centric**
- **Long Term Planning**
- **Whole Lifecycle Costs**
- **Strategic**
- **Risk Based Analysis**



Defining Risk

$$\text{PoF} \times \text{CoF} = \text{BRE}$$

PROBABILITY OF FAILURE

Ex: Likelihood of asset failing in a given period, % or decimal.

CONSEQUENCE OF FAILURE

Ex: Observable events impacted by asset failure i.e. Service, Environmental, etc.

BUSINESS RISK EXPOSURE

Ex: Level of exposure a city will likely confront through a potential failure of asset or asset class.

Risk

Age

Material Type

Size

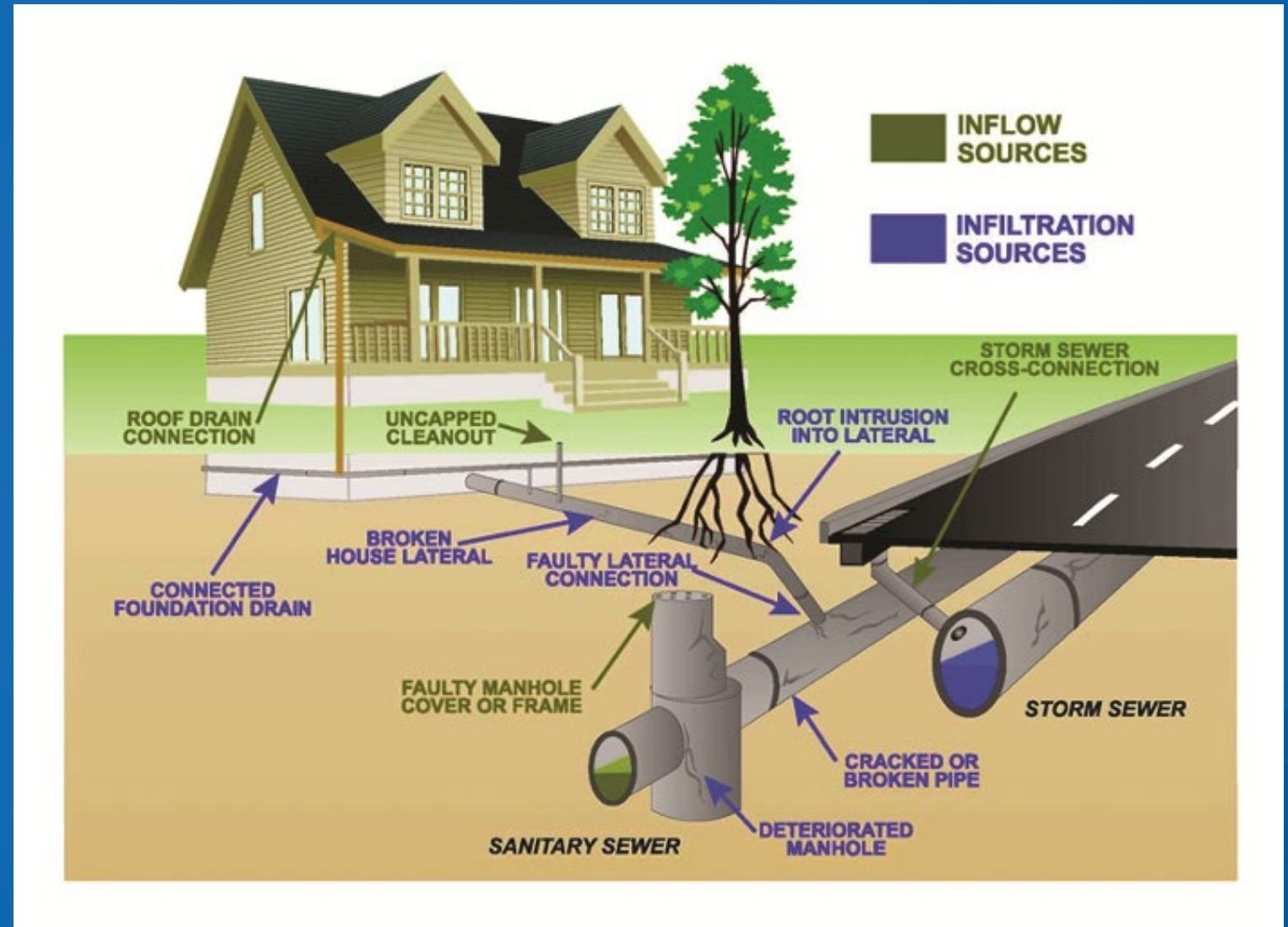
Location

Service area

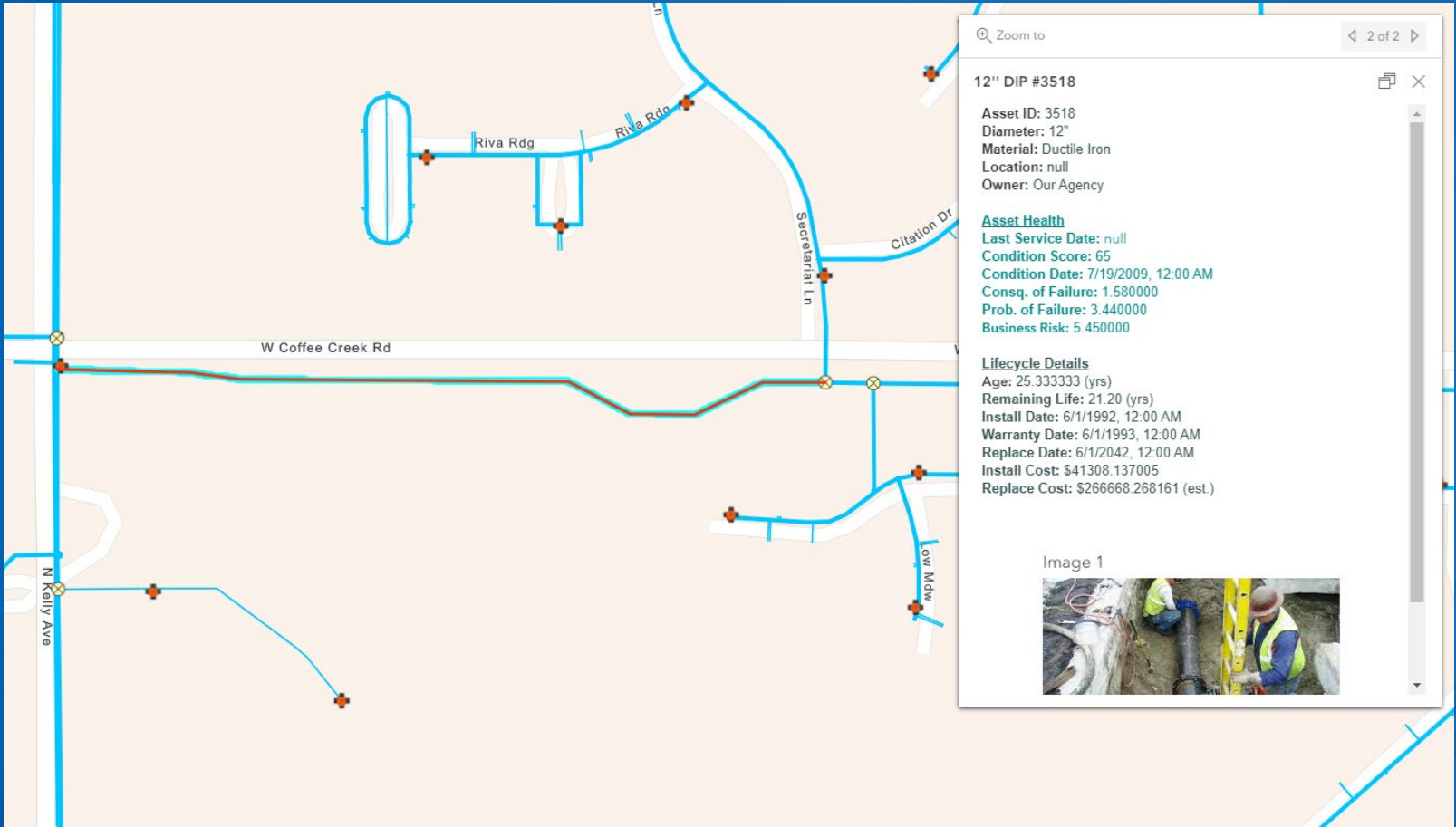
Proximity

Failure Mode

Replacement Cost



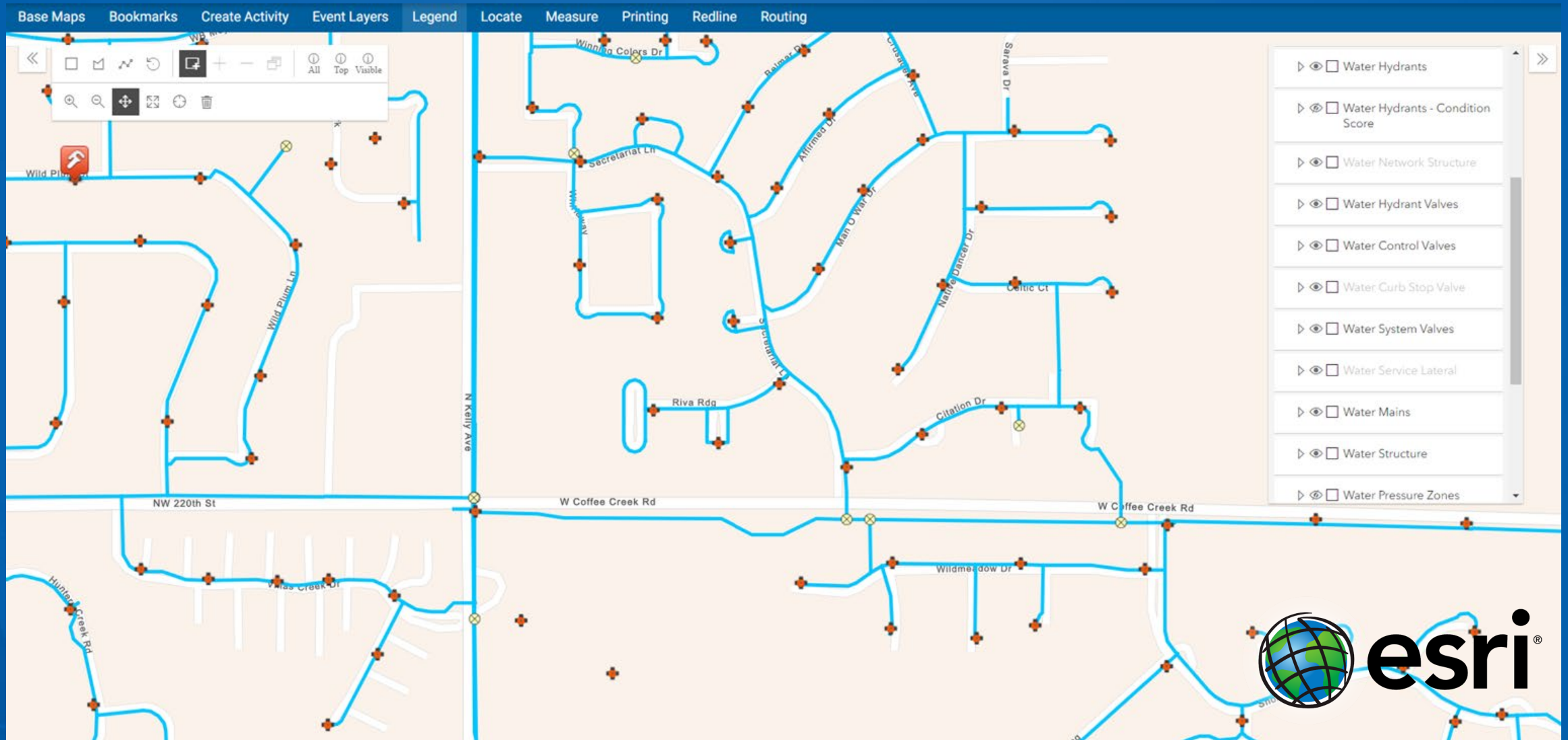
GIS Attributes – Risk Factors



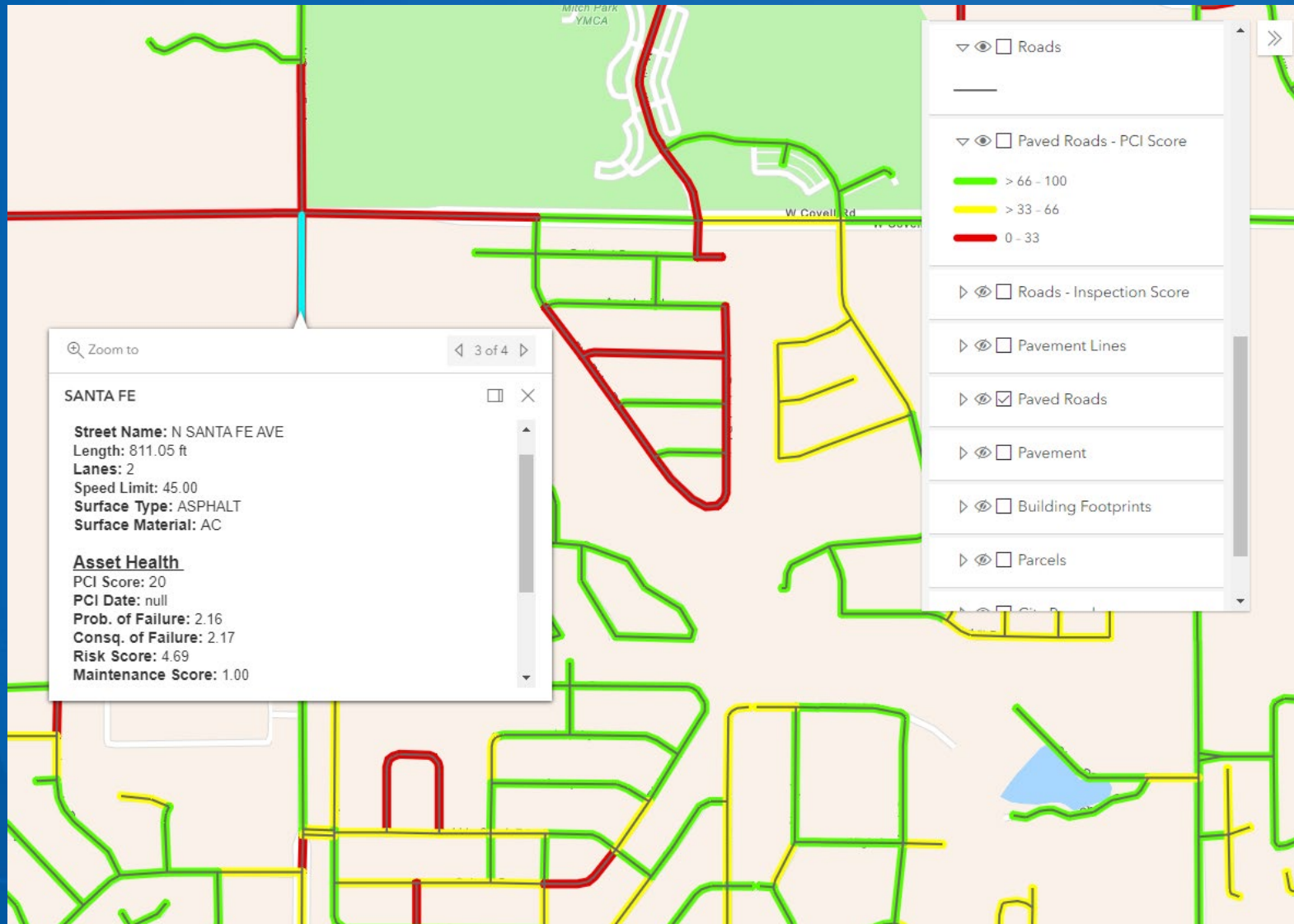
Age
Material
Size
Soil Type
Condition



Asset Inventory – System of Record



Work History and Asset Condition become GIS Attributes



Asset Condition
Work History
Cost
Risk Metrics



Why use GIS in Asset and Risk Management?

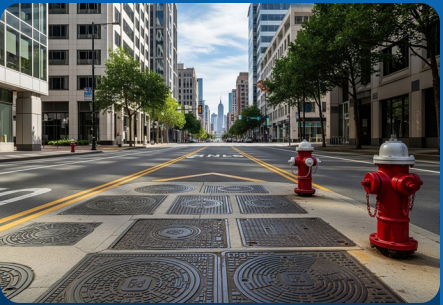
- GIS is most accurate record of assets
 - Contains location data and pertinent info
 - Maintain consistent data after losing institutional knowledge
- More Sophisticated Facilities and Assets
 - Represent assets more accurately i.e. digital twin (3D)
 - Network connectivity and topology (Utility Network)
- Customer expectations and demand to do more with less
 - Quicker response time to problems
 - More efficient use of labor and resources
 - Transition from reactive to proactive

Where to begin?

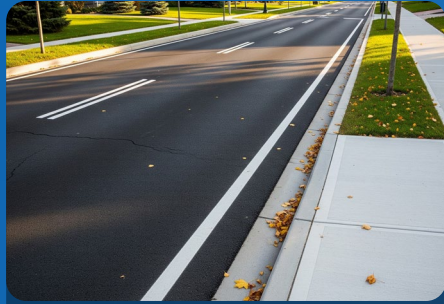
In terms of minimum data requirements, we need to know about Assets:

- what assets we have
- asset attributes
- where they are
- what condition they are in
- how they are performing
- what needs to be done to them
- what has been done in the past

Manage your Assets starting today!



Water & Sewer Systems



Roads & Sidewalks



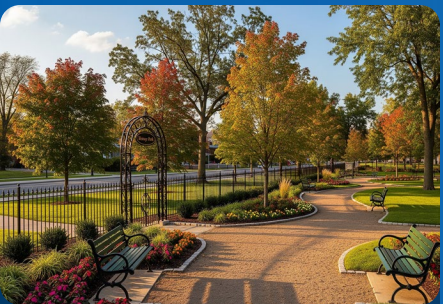
Signs & Signals



Bridges & Culverts



Stormwater & Drainage



Parks & Trees



Lighting & Parking



Facilities & Buildings



Fleet & Equipment



Flood Mitigation