Transportation Asset Management Webinar Series

Webinar 73

Expanded Asset Classes in TAMPs

Sponsored by FHWA and AASHTO

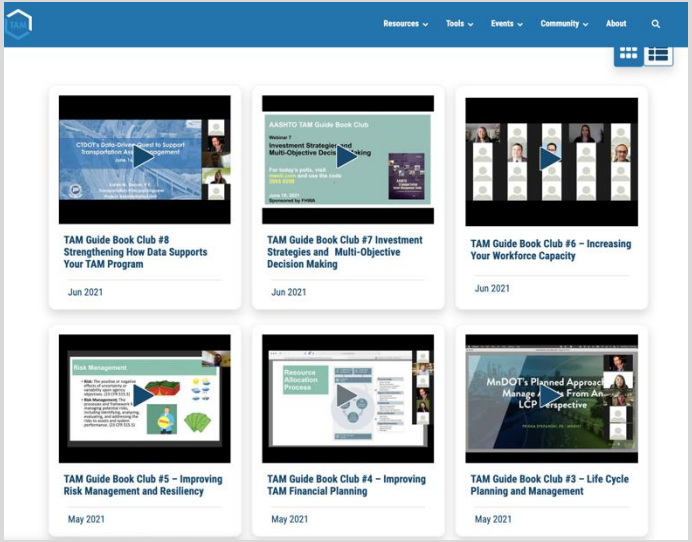
U.S. Department of Transportation Federal Highway Administration

AASHTO The Voice of Transportation

February 19, 2025

FHWA/AASHTO Asset Management Webinar Series

- This is the 73rd in a webinar series that has been running since 2012
- Webinars are held every two months, on topics such as off-system assets, asset management plans, asset management and risk management, and more
  - Usually, the 3rd Wednesday of the month, 2PM Eastern
- We welcome ideas for future webinar topics and presentations
- Submit your questions using Zoom's chat feature



Welcome

FHWA and the AASHTO Sub-Committee on Asset Management are pleased to sponsor this webinar series

- Sharing knowledge is a critical component of advancing asset management practice
- FHWA Asset Management Hub: https://www.fhwa.dot.gov/asset/pubs.cfm

Webinar Objectives

- Learn about how DOTs are making decisions to add asset classes other than pavements and bridges to their TAMPs.
- Highlight the work involved to include various asset classes to TAMPs and the lessons learned.
- Feature DOT plans for incorporating additional assets in 2026 TAMPs.

Webinar Agenda

2:00 **Welcome, Overview, and Agenda**
Michael Johnson, California DOT
Anna McLaughlin, AASHTO
Hyun-A Park, Spy Pond Partners

2:25 **INDOT TAMP Next Assets**
Louis Feagans, Indiana DOT

2:40 **Expanding TAMP Assets**
Chris Whipple, Utah DOT

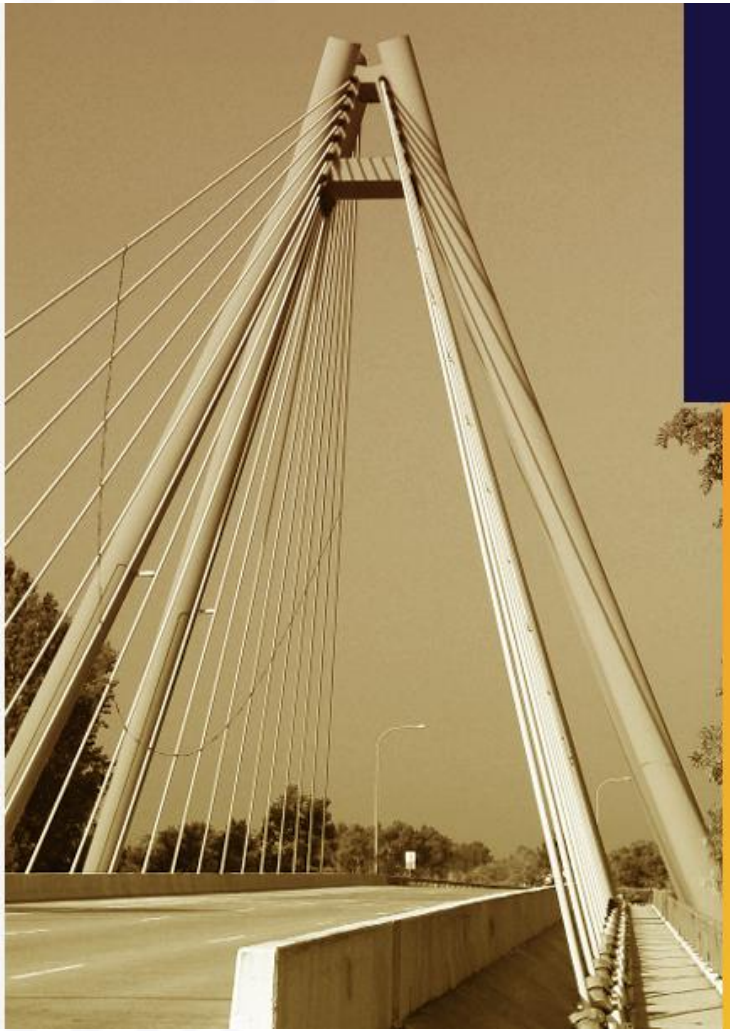
2:55 **Expanded Asset Classes in TAMPs**
Wolde Makonnen, Washington, DC DOT

3:10 **Q&A, Discussion and Next Steps**
Hyun-A Park, Spy Pond Partners
Anna McLaughlin, AASHTO

INDOT TAMP Next Assets

Louis Feagans

Managing Director of System Performance and Transportation Policy



Indiana Department of Transportation

BIL COMPLIANT

TRANSPORTATION ASSET MANAGEMENT PLAN

June 2022

NextLevel INDIANA

Asset Management Policy

The asset management policy provides the framework for INDOT staff to plan, design, finance, construct, acquire, operate, maintain, renew and dispose of INDOT's assets in a way that ensures sound stewardship of public resources while delivering quality public services:

Our Four Imperatives

Safety First

We will always ensure safe and sustainable asset utilization, protecting our customers and staff

21st Century Workforce

We will develop our workforce and align our employees around INDOT's Mission

Great Service

We will deliver great service, balancing the needs of our customers with available funding

Our Investment Strategy

We will align our asset-related decision making to ensure effective delivery of our 20 year Road and Bridge Plan

INDOT's Asset Management Principles

Forward-Looking and Sustainable

We will incorporate social, legislative, environmental and financial considerations into decisions, taking into account present and future service commitments and giving due attention to the long-term stewardship of assets.

Continually Improving

We will make continual improvement a key part of our asset management approach, with a focus on driving innovation through the development of tools, techniques and solutions.

Making Robust, Repeatable & Transparent Decisions

We will utilize a formal but scalable, consistent, and repeatable approach to manage infrastructure assets - enabling services to be provided in the most efficient and cost effective manner. We will collect, collate, control and circulate the right asset information, at the right time, informing the right asset management decisions.

Life-Cycle Cost Perspective

We will take an integrated "big picture" approach to asset management that considers the combined impact of all aspects of the asset life-cycle within the control of INDOT - acquiring, operating, maintaining, renewing and retiring assets. New assets will not be constructed/ acquired without considering future operating and maintenance costs.

Risk-Based and Optimal

We will direct resources & expenditures to achieve agreed service outcomes & benefits, balancing the needs of stakeholders and customers with available funding - at an acceptable level of risk. We will manage our assets in terms of their role and value within their full system context, promoting reliability of the transportation system, as opposed to managing individual assets and business processes in isolation.

People-Focused (Customers & Staff)

We will adopt a customer-focused approach to managing our assets, only accommodating additional demand for services when considering the impacts to our current Levels of Service. We will recruit, train and retain the right staff and work with our university and trade school partners to ensure we develop the best workforce.

Goals for Improving the TAMP

1.

   Introduce ***consistency***, ***transparency***, and ***defensibility*** into all aspects of the Asset Planning Process

2.

   Provide Departments with the ***tools needed*** to ***identify priorities*** and make smart recommendations

3.

   Provide Senior Management with the confidence that the ***"best" program*** is being put forward.

NextLevel INDIANA

Why Add Other Assets To The TAMP

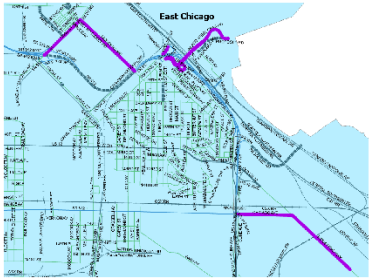
1. There is more than Pavement and Bridges in Transportation

2. Improve scopes and project estimates

3. Aid in determining funding needs for the future

Indiana NHS Routes

Indiana Local NHS Routes



Indiana NHS Routes Mileage

State System	Centerline Miles	Lane Miles
Interstate	1,367	5,863
US Highways	1,771	5,338
State Roads	622	1,911
Total	3,760	13,112

Local System	Centerline Miles	Lane Miles
County Road	10	36
City Street	31	114
Total	41	150

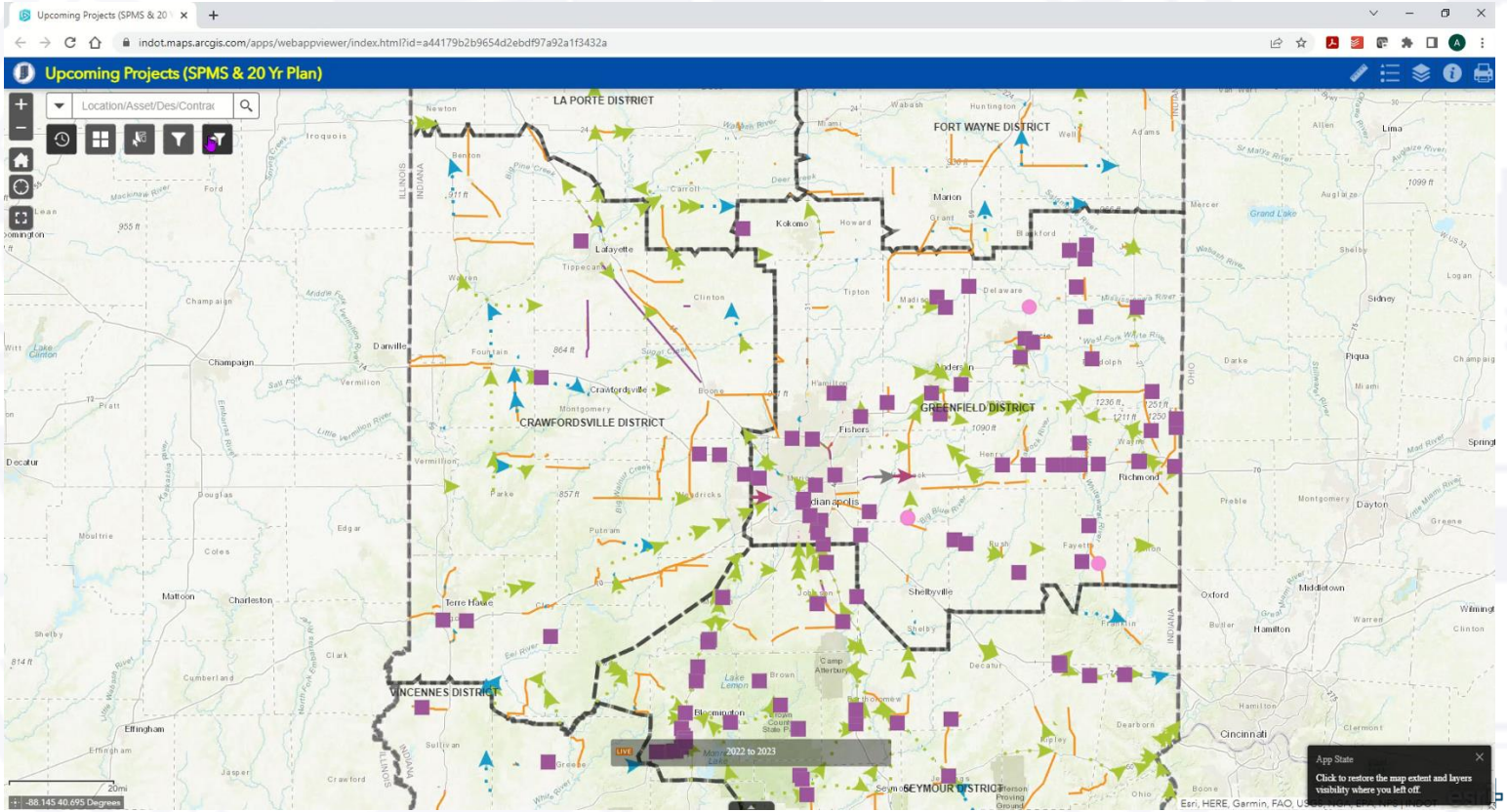
2022 INDOT Add INDOT's Large Culvert

- A large culvert is defined as any culvert with a span of 48 inches or more.
- Includes large culverts in all of its analysis (life cycle cost planning, risk management, and financial planning).
- INDOT owns and maintains 8,696 large culverts
  - 3,347 are on the NHS

Next Level of Assets Selection

- Culverts
- Small Culverts/Pipes
- MSE Walls
- Over Head Signs
- Noise Walls
- Lighting
- ADA
- ITS items
  - Signals
  - Signs
  - Traffic Mobility

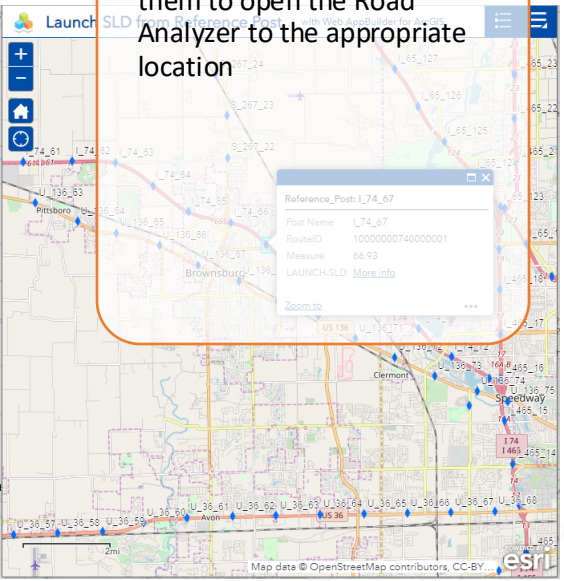
20 Year Plan Video



Proposed Workflow for Updating 20-yr Plan: Any Asset

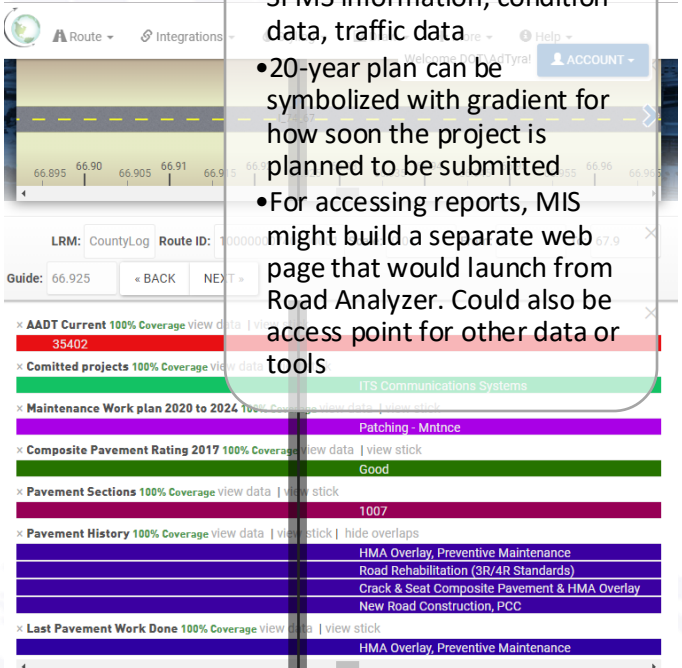
Identify: Asset Engineer accesses the relevant custom web app (map) on ArcGIS Online to find their relevant asset.

- They can search for them either using the search bar or by finding it on the map
- Selecting an asset will allow them to open the Road Analyzer to the appropriate location



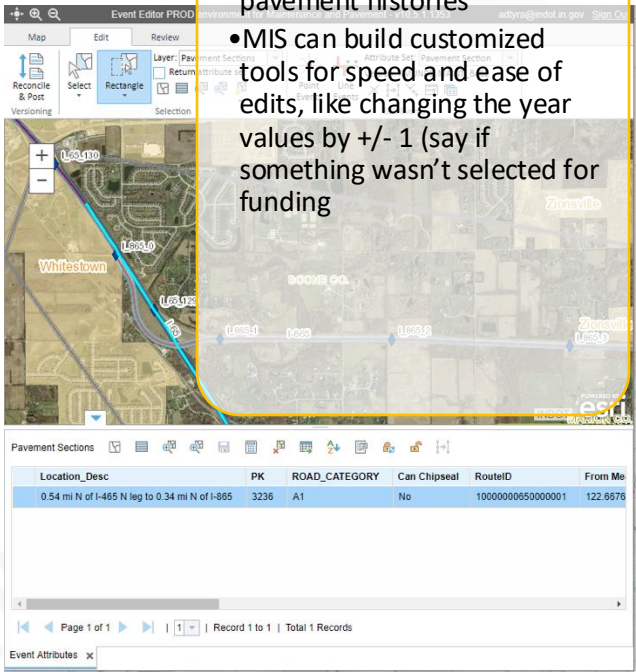
Analyze: Road Analyzer allows the user to view information related to their asset as well as other relevant information

- Can include 20-year plan for their asset and other assets, SPMS information, condition data, traffic data
- 20-year plan can be symbolized with gradient for how soon the project is planned to be submitted
- For accessing reports, MIS might build a separate web page that would launch from Road Analyzer. Could also be access point for other data or tools

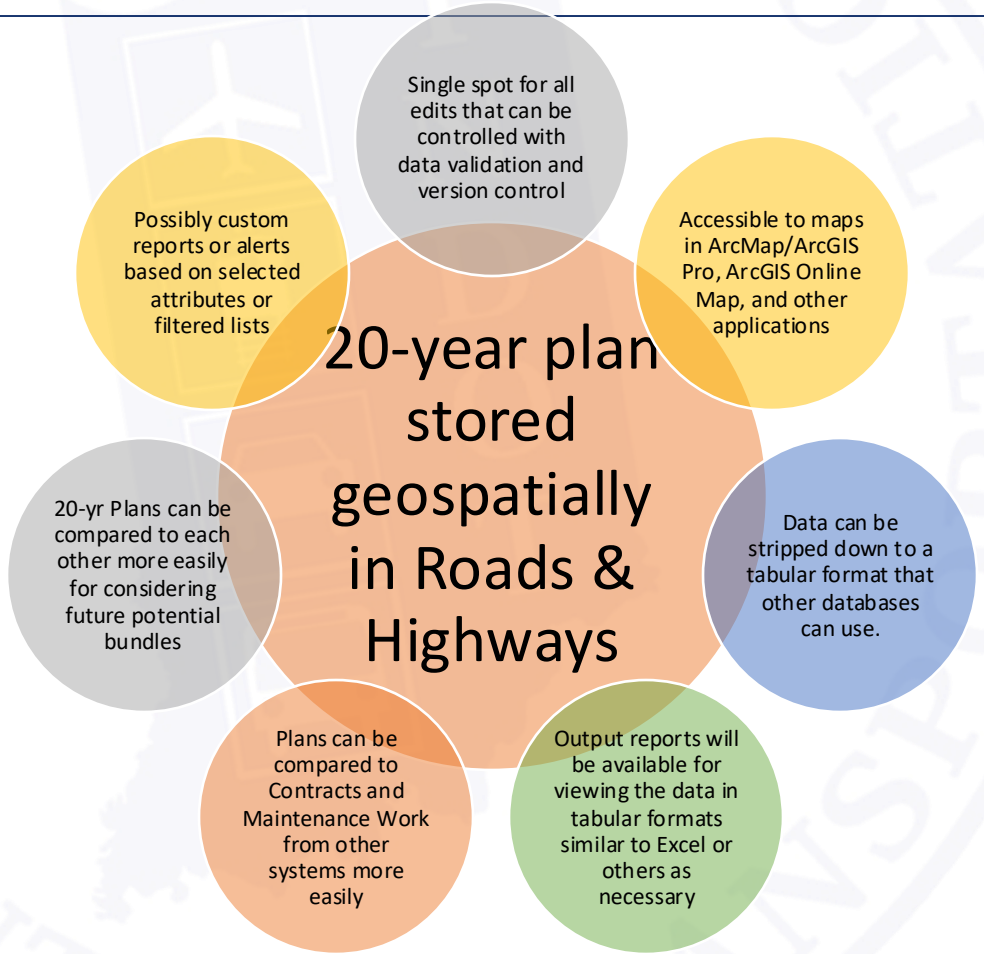


Edit: RCE can be launched from Road Analyzer for edits (single edit or multiple concurrent)

- Edits would be made the same way as other data like pavement histories
- MIS can build customized tools for speed and ease of edits, like changing the year values by +/- 1 (say if something wasn't selected for funding

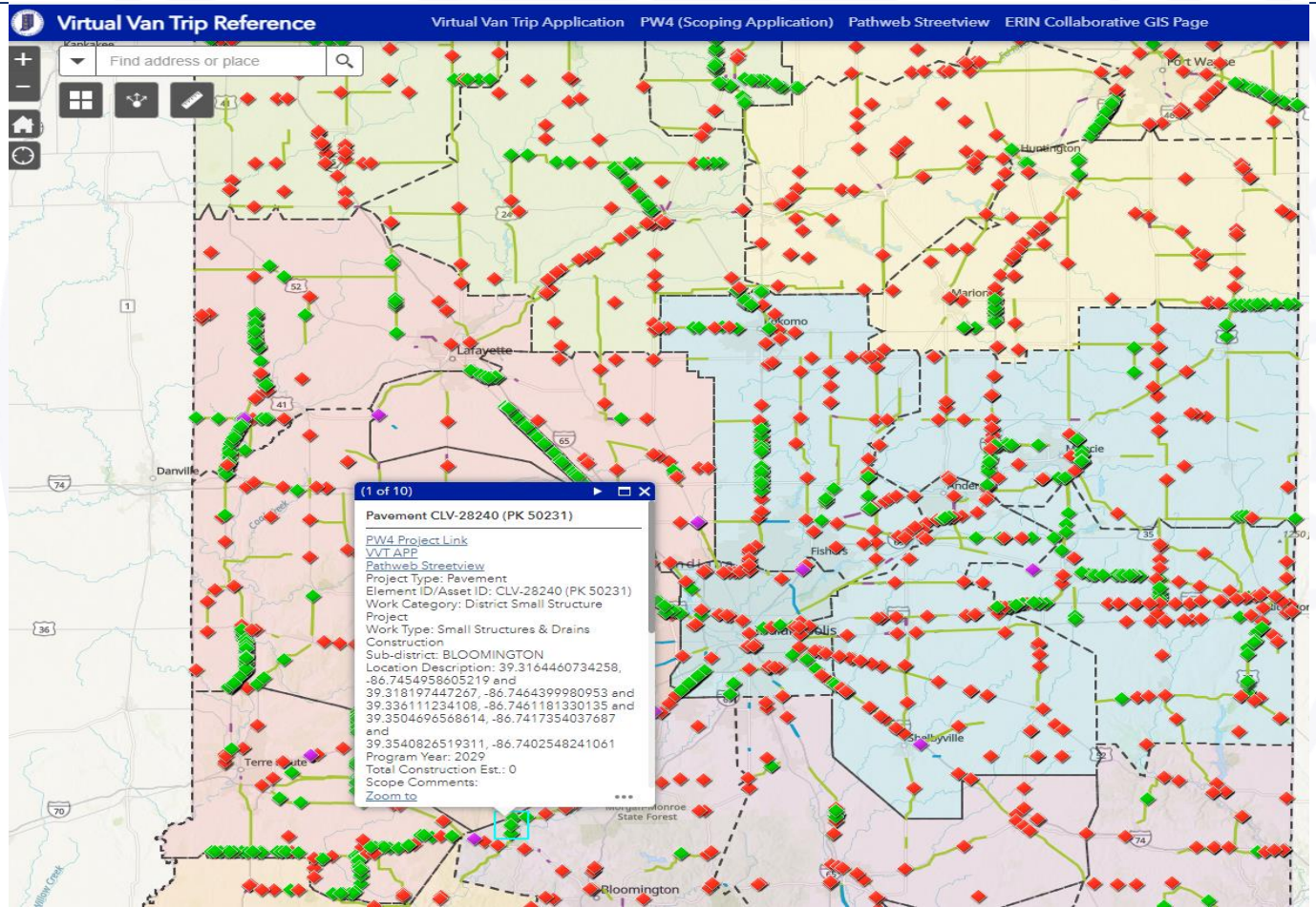


Advantages for Centralized 20-year plans



NextLevel INDIANA

Virtual Van Trip

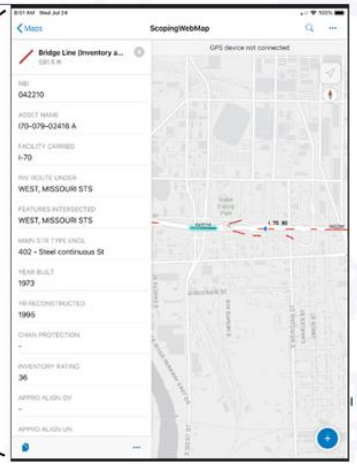


Project Scoping Application Overview

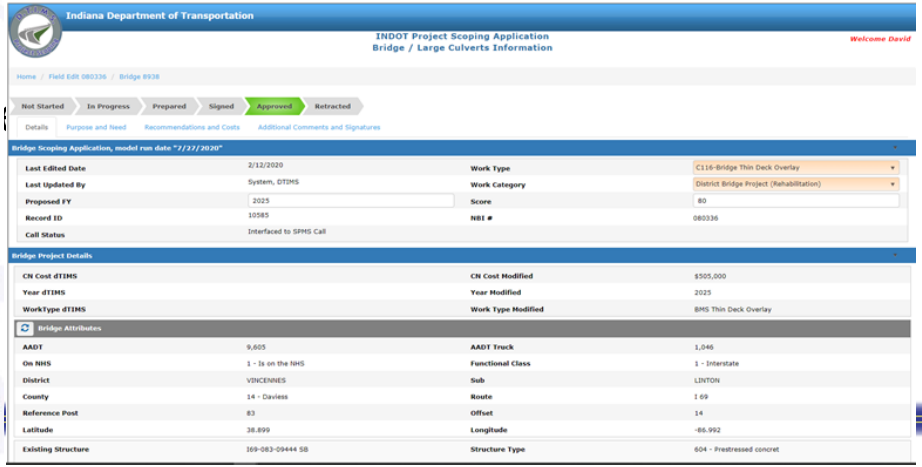
- INDOT has developed a project scoping application to develop scopes for bridge and pavement projects
  - Reduce data entry time
  - Improve the accuracy of data going into SPMS

Project Scoping Application

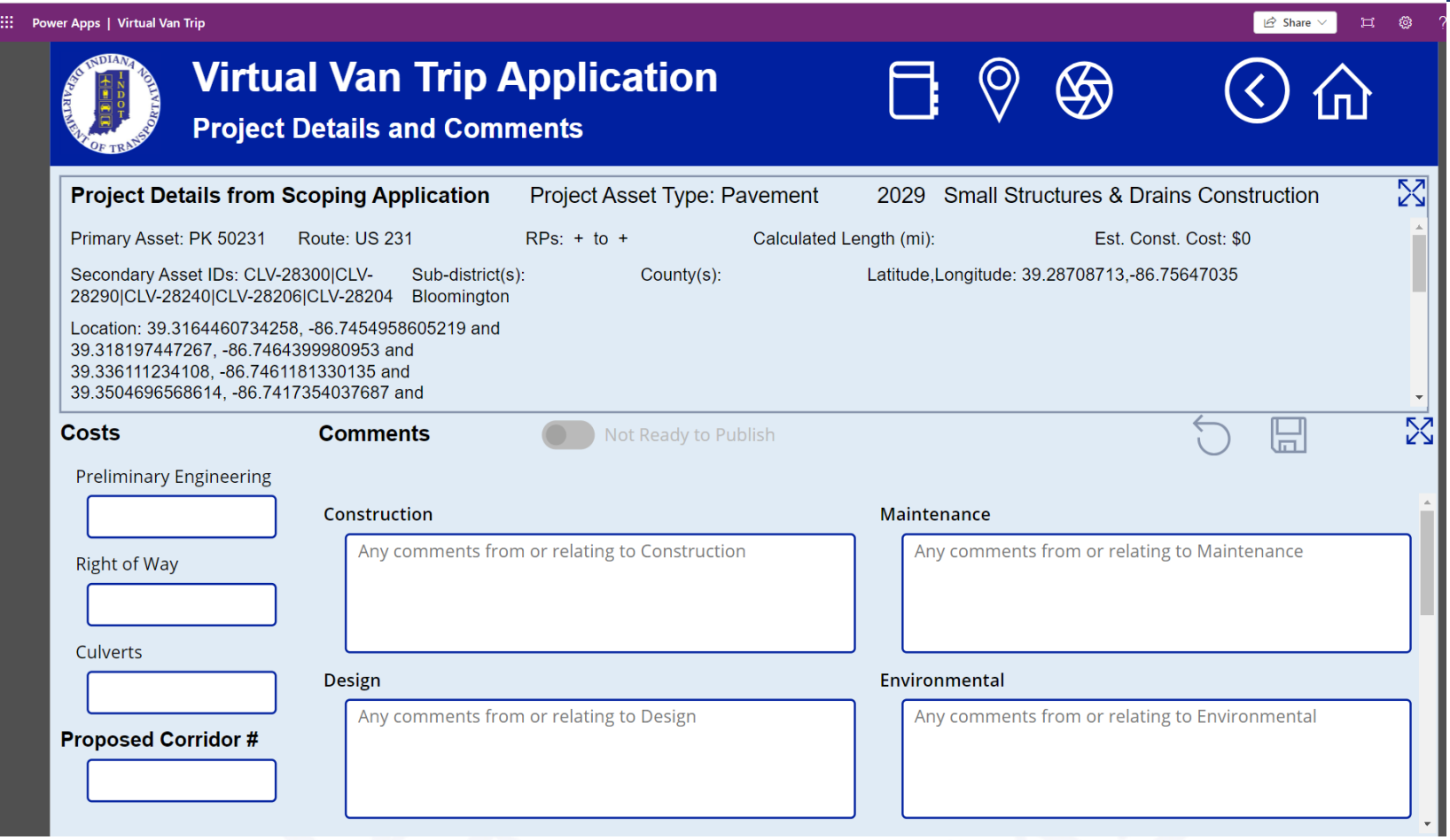
- Collector Application on iPad
  - Field notes, pictures, geo-located
  - Programmed projects visible



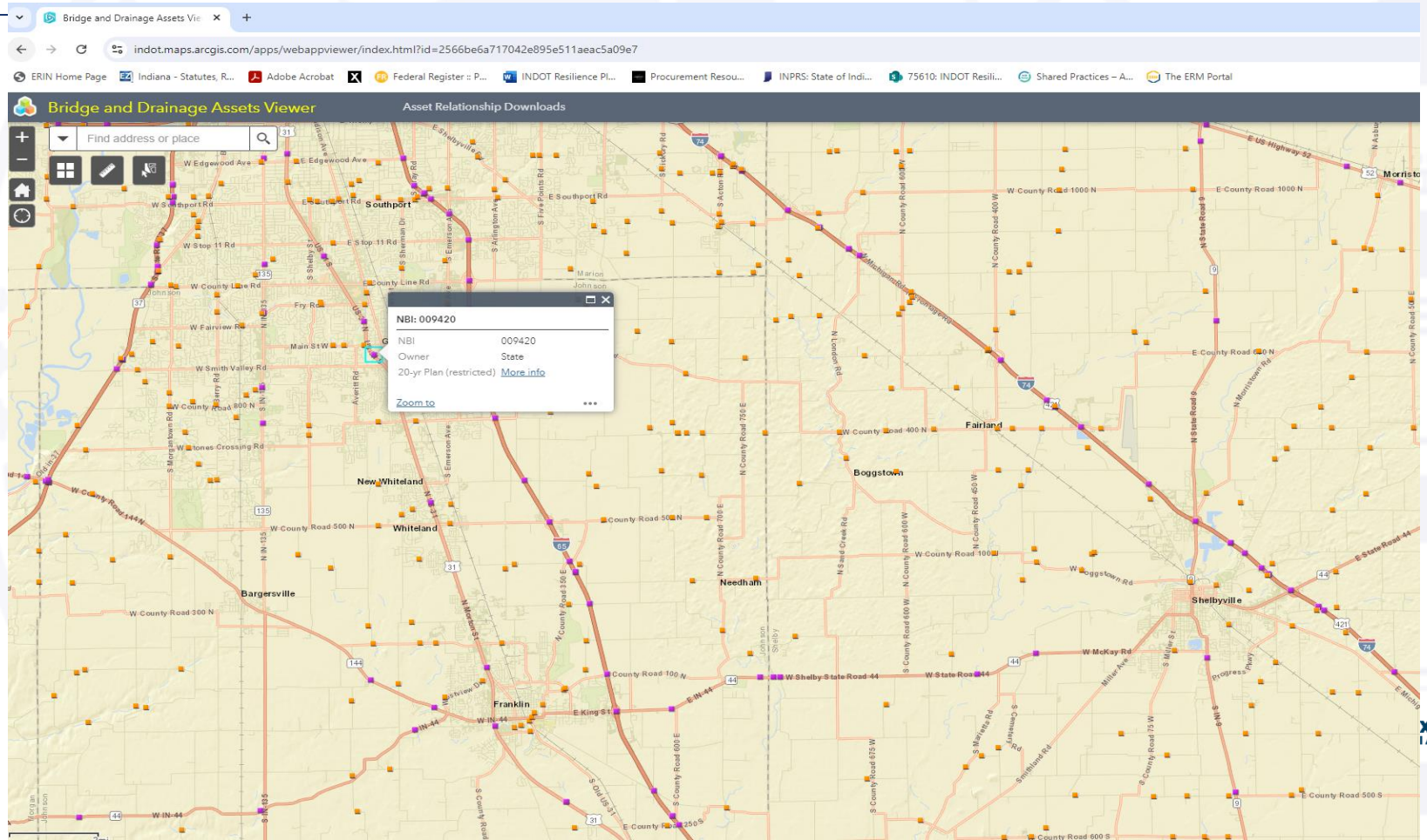
collect field notes



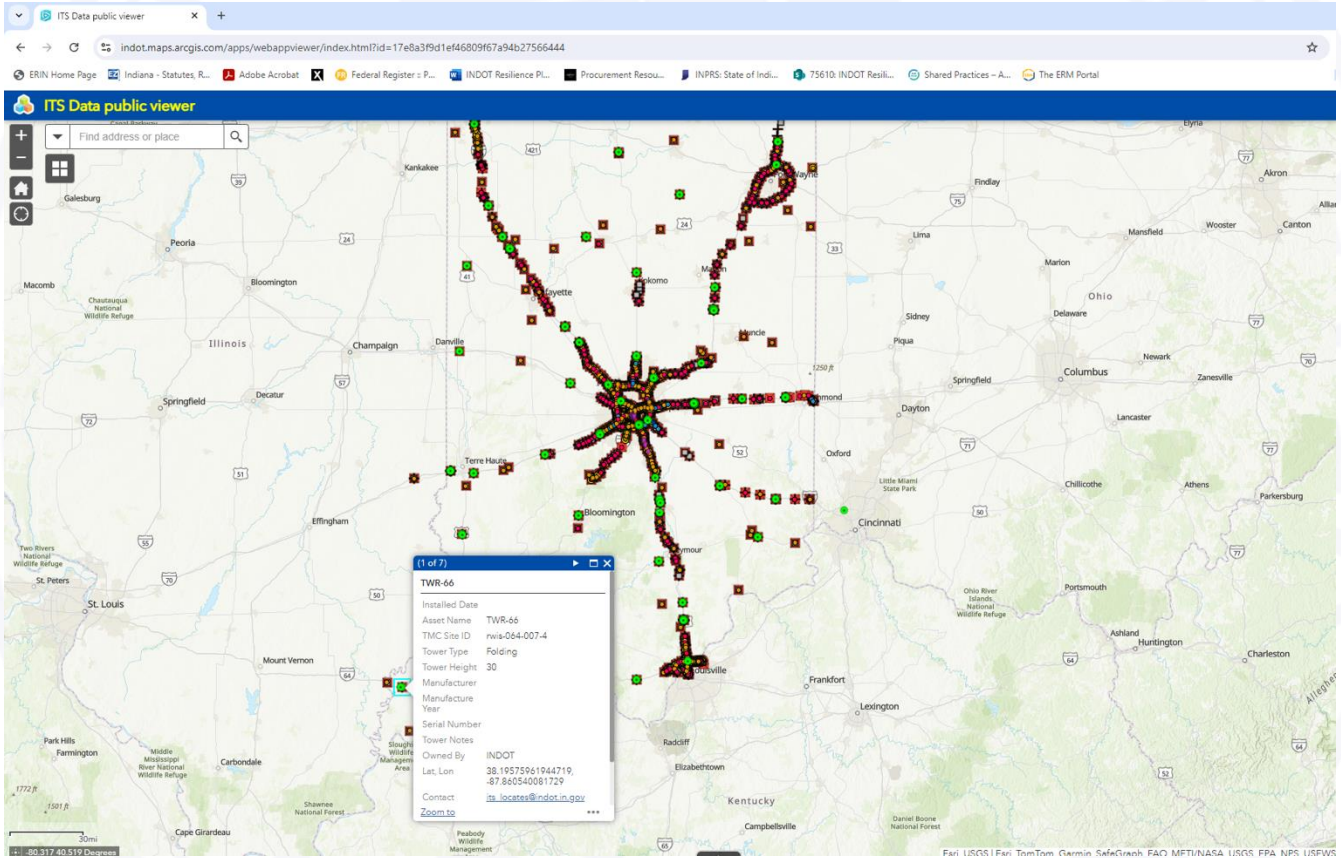
Virtual Van Trip Application



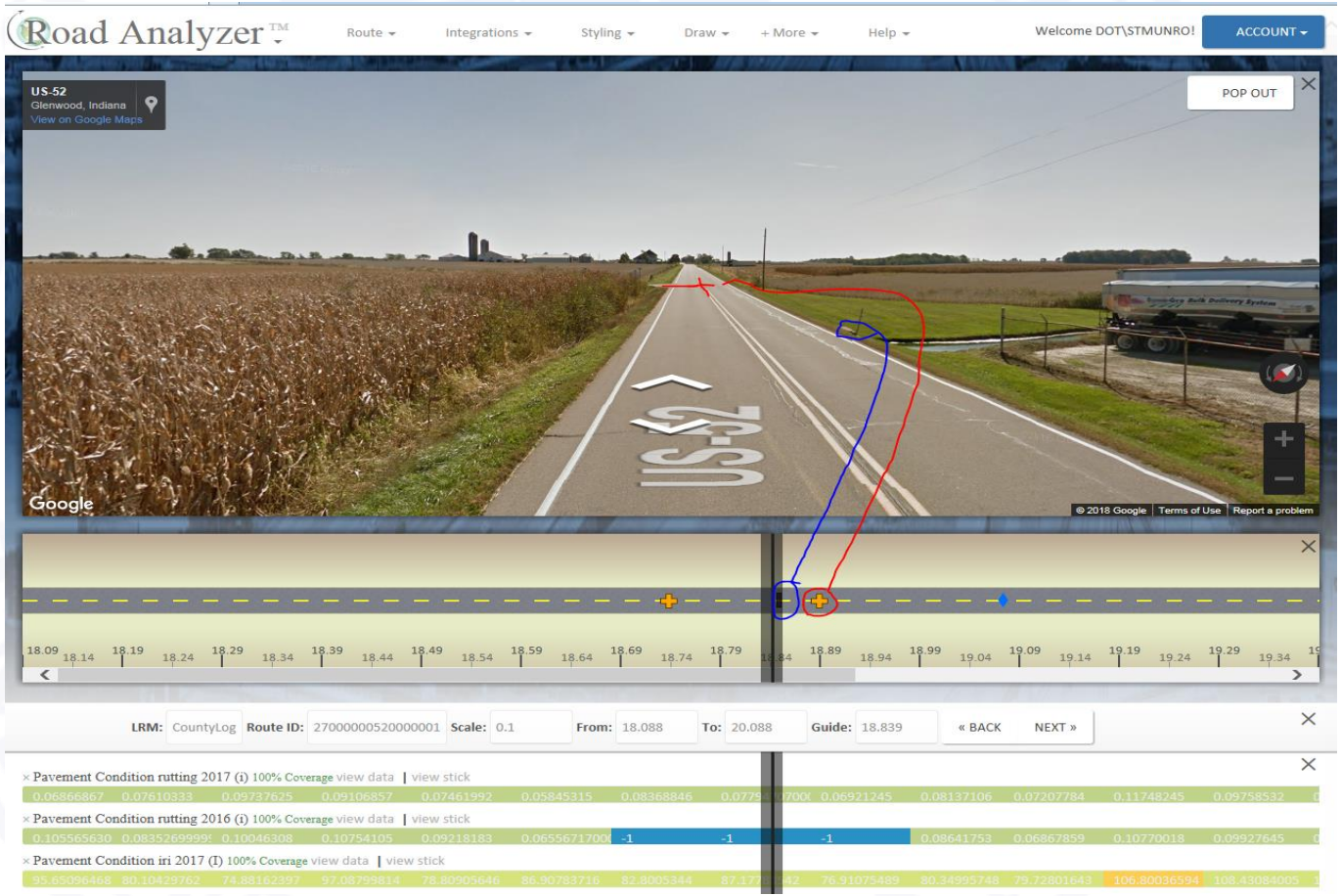
Bridge and Drainage Asset Viewer



ITS Data

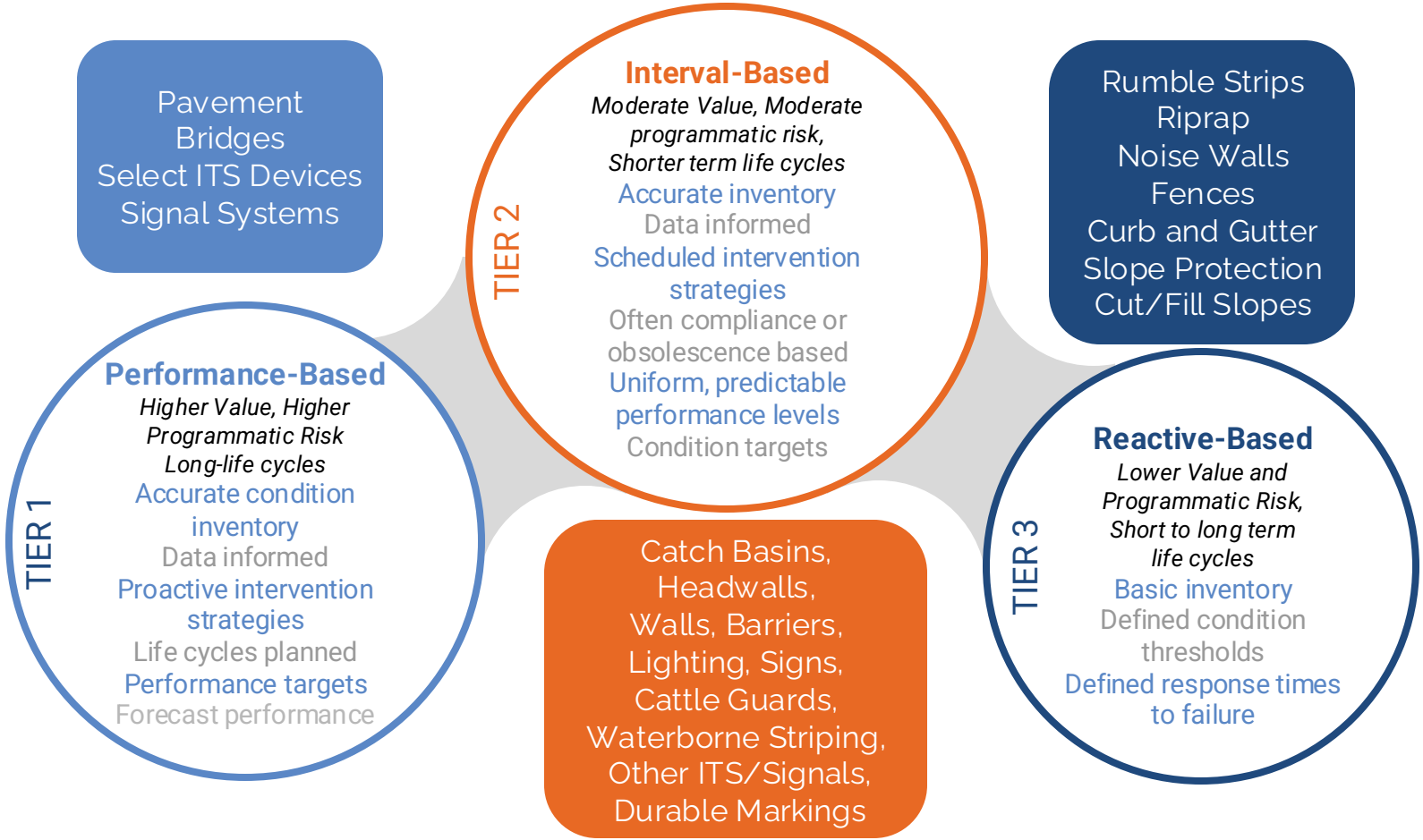

ITS Data public viewer
indot.maps.arcgis.com/apps/webappviewer/index.html?id=17e8a3f9d1ef46809f67a94b27566444
ITS Data public viewer
Find address or place
(1 of 7)
TWR-66
Installed Date
Asset Name TWR-66
TMC Site ID rwis-064-007-4
Tower Type Folding
Tower Height 30
Manufacturer
Manufacture Year
Serial Number
Tower Notes
Owned By INDOT
Lat, Lon 38.19575961944719, -87.860540081729
Contact its_locates@indot.in.gov
Zoom to
Indianapolis
Columbus
Cincinnati
Louisville
Lexington
Frankfort
Dayton
Springfield
Champaign
Bloomington
Terre Haute
Peoria
Kentucky
Illinois
Ohio

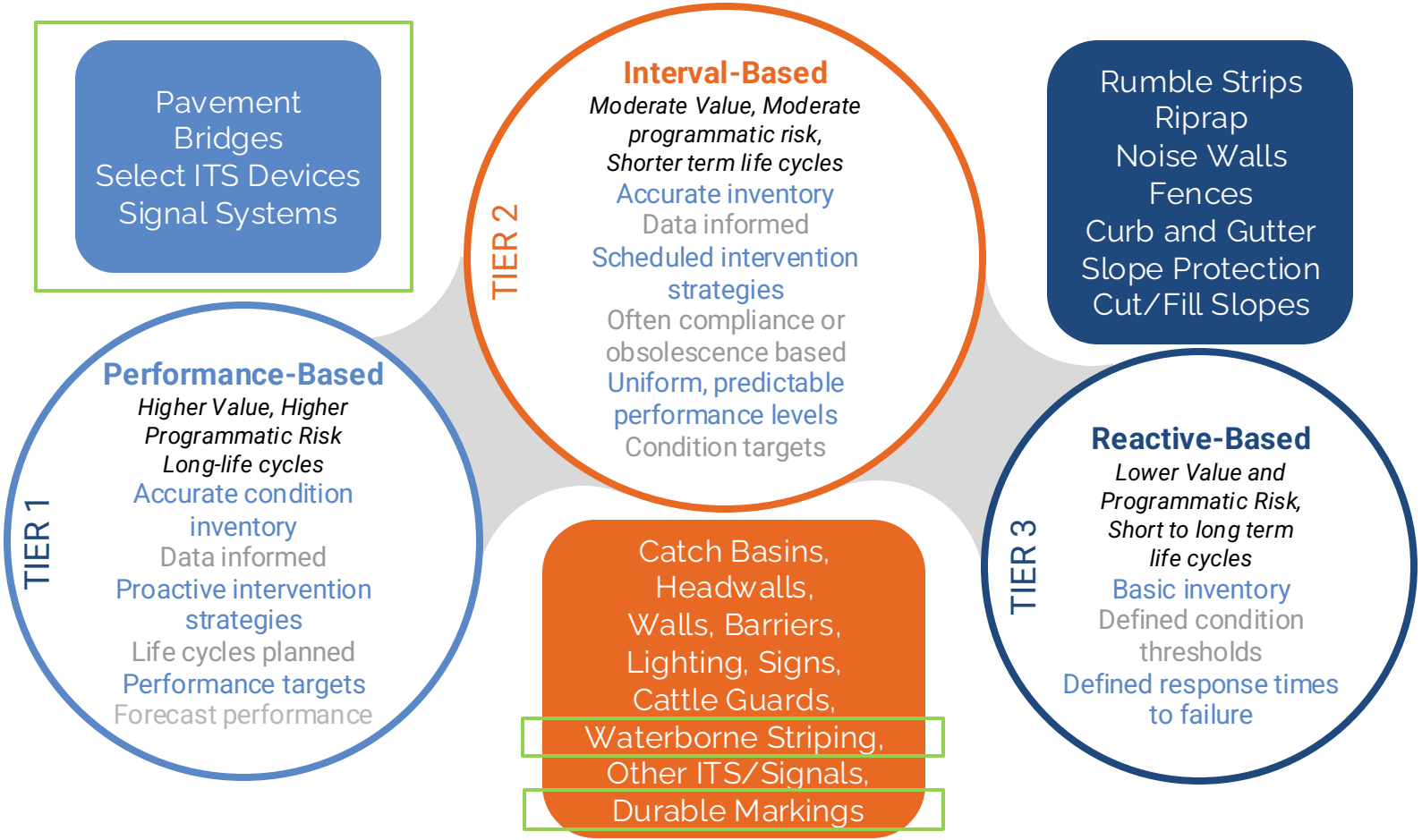
Road Analyzer



Expanding TAMP Assets

AASHTO/TRB TAM Webinar 2-11-25


Pavement
Bridges
Select ITS Devices
Signal Systems
TIER 1
Performance-Based
Higher Value, Higher Programmatic Risk
Long-life cycles
Accurate condition inventory
Data informed
Proactive intervention strategies
Life cycles planned
Performance targets
Forecast performance
TIER 2
Interval-Based
Moderate Value, Moderate programmatic risk,
Shorter term life cycles
Accurate inventory
Data informed
Scheduled intervention strategies
Often compliance or obsolescence based
Uniform, predictable performance levels
Condition targets
Catch Basins,
Headwalls,
Walls, Barriers,
Lighting, Signs,
Cattle Guards,
Waterborne Striping,
Other ITS/Signals,
Durable Markings
Rumble Strips
Riprap
Noise Walls
Fences
Curb and Gutter
Slope Protection
Cut/Fill Slopes
TIER 3
Reactive-Based
Lower Value and Programmatic Risk,
Short to long term life cycles
Basic inventory
Defined condition thresholds
Defined response times to failure


Pavement
Bridges
Select ITS Devices
Signal Systems
TIER 1
Performance-Based
Higher Value, Higher Programmatic Risk
Long-life cycles
Accurate condition inventory
Data informed
Proactive intervention strategies
Life cycles planned
Performance targets
Forecast performance
TIER 2
Interval-Based
Moderate Value, Moderate programmatic risk,
Shorter term life cycles
Accurate inventory
Data informed
Scheduled intervention strategies
Often compliance or obsolescence based
Uniform, predictable performance levels
Condition targets
Catch Basins,
Headwalls,
Walls, Barriers,
Lighting, Signs,
Cattle Guards,
Waterborne Striping,
Other ITS/Signals,
Durable Markings
Rumble Strips
Riprap
Noise Walls
Fences
Curb and Gutter
Slope Protection
Cut/Fill Slopes
TIER 3
Reactive-Based
Lower Value and Programmatic Risk,
Short to long term life cycles
Basic inventory
Defined condition thresholds
Defined response times to failure

Approach	Definition	Inventory	Maint. Cycle	Condition Data	Long-Term PM	Optimize Lifecycle
Performance Driven Plus	Asset condition is routinely monitored and modeled. Actions are taken proactively and reactively to optimize the asset lifecycle through minimum lifecycle cost, maximum benefit, maximum lifecycle length, or some similar approach.	o	o	o	o	o
Performance Driven	Asset condition is routinely monitored and actions are taken to manage the long-term performance of the asset based on system performance.	o	o	o	o	
Interval Driven Plus	Activities are scheduled at specific time intervals based on analysis and deterioration, where the inspection and maintenance activities are performed simultaneously to collect condition data for analysis.	o	o	o		
Interval Driven	Activities are scheduled at specific time intervals based on analysis and deterioration. Condition data may be collected on these assets to meet other business needs, but inspection cycle is managed separately from the maintenance cycle.	o	o			
Reactive	An inventory is maintained, but there is no regular condition data collection and no maintenance performed to slow or address deterioration until an asset is reported as having an unacceptable defect. Annual work is planned at the aggregate level with concern for the specific locations of potential defects.	o				
Minimum Maintenance	No inventory or data collection is collected or maintained. Maintenance is performed when assets are identified as having an unacceptable defect.					

developing asset maturity

Determine the decisions and what data is needed.

Evaluate the need for and level of asset data required (condition, interval, or reactive).

Use your available resources (grants, research, other asset groups) to prioritize inspection.

Determine initial deterioration rates and inspection frequency, based on risk and resources.

Define the data to be collected and where to store it.

Gather most of the data in design/construction.

Automate and optimize collection and analysis.

Document the benefit and need.

improved communication

TAMP Structure

ES. Executive Summary

1. **Introduction**
   a. Overview
   b. AM Vision and Objectives
   c. TAMP Scope and Organization
2. **AM Planning and Programming Framework**
   a. RM-PM-AM Relationship/PBPP?
   b. TAMP in the Planning Process
   c. Maintenance Work Planning
   d. Enterprise AM Systems (?)
3. **Risk Management**
   a. Value Framework
   b. Risk at UDOT
   c. Resilience to Extreme Weather and Natural Hazards
   d. Risk Response Prioritization
   e. Emergency Response Events (Twice Damaged)
4. **Asset Inventory, Condition, and Valuation**
   a. Management approaches (Tiers)
   b. Pavement, Bridge
   c. Tier 1 and 2 Assets (Performance and Interval based management) - reference SOGR

Website Equivalents

ES. Link to SOGR, risks, and TAMP

1. **Introduction**
   Home Page - Overview with links (see below)

1. **AM Planning and Programming Framework**
   Links on home page to SD site, data hub, some of the key figures from the TAMP

1. **Risk Management**
   Landing page with succinct overview of principles and link to RIP, Multiple Damaged Assets, Risk Register
   - Key points from risk register
   - Processes and approach

1. **Asset Inventory, Condition, and Valuation**
   Brief description of management, snapshots (and links) to SOGR
   Asset Valuation for each (link to Statistical SM)

improved communication

TAMP Structure (continued)

5. **AM Performance Measures, Targets, and Gaps**
   a. Target Terminology (State, Fed definition)
   b. Pavement, Bridge
   c. Tier 1 and 2 Assets
6. **LifeCycle Planning**
   a. Life Cycle Planning Approach
   b. Pavement Life Cycle Planning
   c. Bridge Life Cycle Planning
   d. Tier 1 (and 2?) Life Cycle Planning
7. **Financial Planning**
   a. Connecting Revenue to AM Outcomes
   b. Revenue Sources
   c. Revenue and Inflation
   d. Revenue Allocation/Investment Priorities and Direction
   e. Investment Strategies (TIer 1 and 2)
8. **TAMP Implementation**
   a. Continuous Improvement
   b. Future Implementation

Appendix A - Glossary of Terms
Appendix B - Risk Register
Appendix C - Life Cycle Planning

Website Equivalents (continued)

5. **AM Performance Measures, Targets, and Gaps**
   Breakdown of performance targets by asset (dashboard?)

5. **Life Cycle Planning**
   Combine with Sections 5, 6, and 7 for each asset

5. **Financial Planning**
   See above

5. **TAMP Implementation**
   Timeline and implementation plan page

Appendix A - Glossary of Terms
Appendix B - Risk Register
Appendix C - Life Cycle Planning

UDOT
Keeping Utah Moving

TAM Webinar 73:

Expanded Asset Classes in TAMPs

February 19, 2025

District Department of Transportation

OUTLINE

- d. TAMP

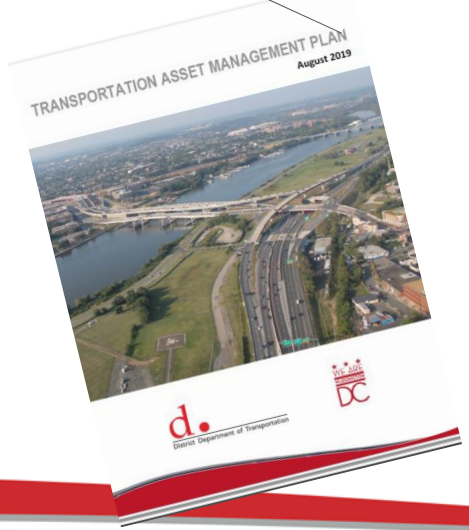
- Ancillary assets
  - d. TAMP 2022
    - Initial efforts

  - Expanded assets in 2026 and beyond

d. TAMPs

- The first complete d. TAMP was initially developed and certified in 2019
  - TAMP minimum requirements
    - NHS pavement and bridges
    - Inventory, Condition
    - LCP, Investment Strategies
    - Financial Plan, Risk management

- 2022
  - TAMP minimum requirements
  - BIL and Extreme Weather requirements
  - Refined processes
  - Other Assets



Expanded Asset Classes - d. TAMP

OTHER ASSETS

- Other than pavement and bridges, major assets managed by d. include:
  - Sidewalks and curb & gutter – approximately 1,496 miles
  - Alleys – approximately 365 miles
  - Tunnels – 15
  - Culverts (some categorized as bridge)
  - Retaining walls
  - Overhead sign structures
  - Guardrails & attenuators
  - Green infrastructure
  - Trees
  - Streetlights & traffic signals

  Others:
  - Street Signs
  - Traffic bollards/flexiposts, pavement marking, parking meters, bike lanes, bus stop islands…

Expanded Asset Classes - d. TAMP

ASSET MANAGEMENT & TAMP NEEDS

The Basic:

- Inventory & Condition -
  - Data, how much data
  - How detailed, how old, how often data is collected
  - Database, data/asset management systems
- Maintenance Program -
  - Work and maintenance information
    - Past work completed/data
  - Work plan (& prioritization processes)
- Financial Information -
  - How much money spent and how much accomplished with $$

More for AM:

- Data and performance analysis -
  - Asset performance, target setting, decision trees
  - Life-cycle planning and risk management
  - Budget/Investment scenarios
    - Planned budget (is there dedicated funding?)

Expanded Asset Classes - d. TAMP

d. APPROACH

- Agencywide Outreach
  - Asset owners within various departments, agencywide
- Asset readiness Assessment
  - Gather information
  - Information and gap analysis → asset maturity evaluation

Example of a preliminary sample asset register

	A	B	C	D	E	F	G
1	**Asset Type**	**Existing Inventory**	**GIS Layer**	**Is Updated and Used**	**Can Cyclomedia collect?**	**Polygon, Point, Line**	**Link to Layer**
2	ADA Curb Ramps	Yes	Yes	No		Pl	https://maps2.dcgis.dc.g
3	Alley	Yes	Yes			L	https://maps2.dcgis.dc.g
4	Automated Traffic Enforcement Cameras	Yes	Yes	Yes		Pt	https://maps2.dcgis.dc.g
5	Bike Lane	Yes	Yes	Yes		L	https://maps2.dcgis.dc.g
6	Bile Trails	Yes	Yes	Yes		L	https://maps2.dcgis.dc.g
7	Bike Racks	Yes		Yes			https://maps2.dcgis.dc.g
8	Bridges	Yes	Yes	Yes		Pl	https://maps2.dcgis.dc.g
9	Bus Lanes	Yes	Yes	Yes		L	https://maps2.dcgis.dc.g
10	Bus Stops	Yes	Yes	No		Pt	https://maps2.dcgis.dc.g
11	Capital Bikeshare Stations	Yes	Yes			Pt	https://maps2.dcgis.dc.g
12	Culverts	Yes					https://maps2.dcgis.dc.g
13	Curb Extensions	Yes	Yes	Yes		Pl	https://maps2.dcgis.dc.g
14	Flexipost/Pylons	Yes		No			https://maps2.dcgis.dc.g
15	Green Infrastructure	Yes	Yes			Pl	https://maps2.dcgis.dc.g
16	Guardrails	Yes	Yes	Yes		Pt	https://maps2.dcgis.dc.g
17	HAWK Signals	Yes	Yes	Yes		Pt	https://maps2.dcgis.dc.g
18	Parking Meters	Yes	Yes	Yes		Pt	https://maps2.dcgis.dc.g
19							
20							

d. CORE INFRASTRUCTURE

- Before the recent restructuring, the AM division managed the inventory, condition and maintenance of Core Assets, *i.e. pavement, bridges, sidewalks, alleys, tunnels, (plus guiderails and attenuators), and the TAMP.*
    - Good Inventory data for sidewalks, alleys, tunnels and guardrails
    - Condition data – survey not performed as frequently
        - Condition database is updated when work is completed at a location;
        - Data is still used to prioritize and plan work locations
    - Worst first approach focused on sidewalks and alleys rated 'Poor'
    - Also includes Reactive maintenance program to respond to safety issues and Service Requests (trip hazards, loose bricks or cracked sidewalks)

***** Significant Investment on sidewalks and alleys by Mayor Bowser past 6-7 years *****

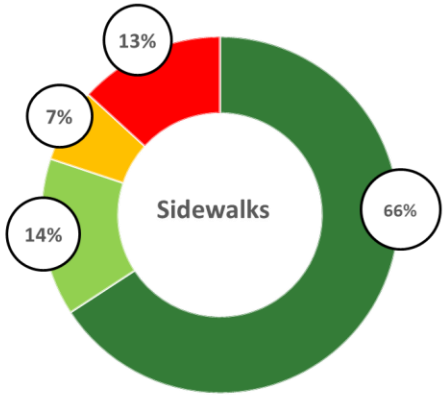
Maintenance Strategies

Maintenance Strategy	Description
Condition-based maintenance	Used for assets that require routine condition monitoring, predictable failure modes using condition forecasting models
Interval-based maintenance	Routine/regularly scheduled type maintenance
Reactive-based maintenance	Used for Service requests, or noncritical assets/components, inconsequential, or redundant items.

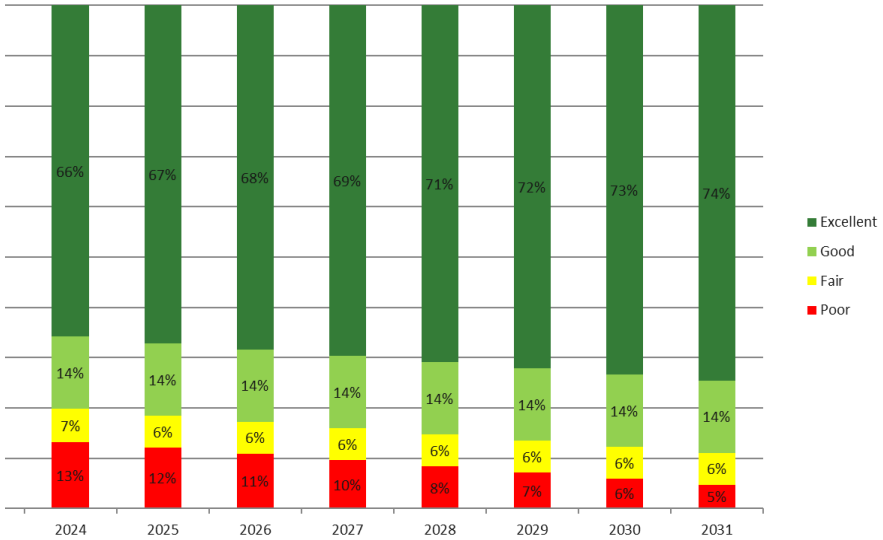
- *Note that some assets may combine various maintenance strategies*

Sidewalks - d. TAMP

Sidewalk condition in 2024 (year of last survey after 2018)



Sidewalk Network Forecast (average $25Mil/year)



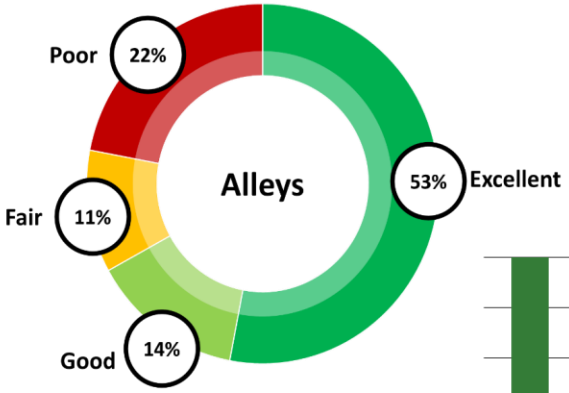
Expanded Asset Classes - d. TAMP

Sidewalks - AM Assessment

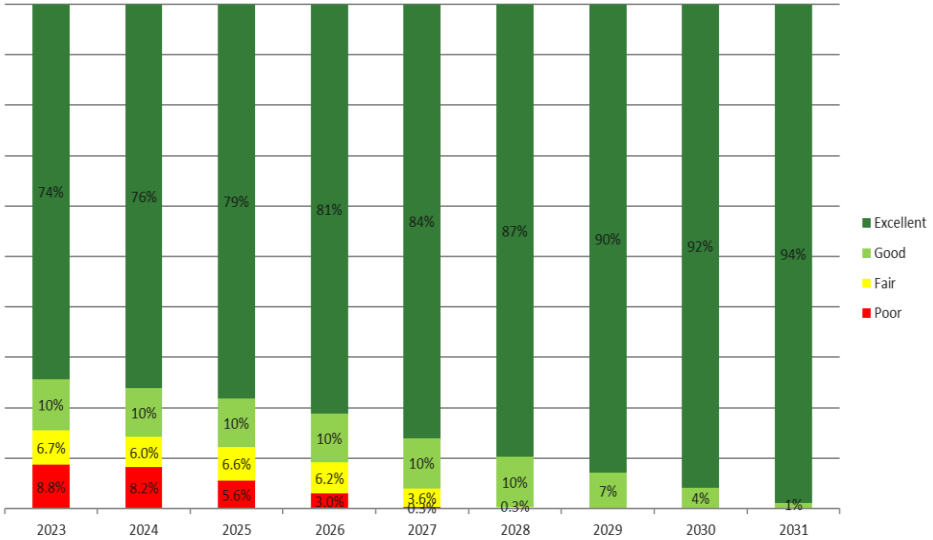
Maintenance Strategy	Process/Task	Supporting Data	Level of Need (Essential/ Desirable)	Data Availability (Completeness)
Condition & Reactive-based	Inventory assessment	Asset/component inventory	Essential	Excellent – data is available and complete
	Condition assessment	Historical condition	Desirable	Adequate - data is somewhat available but not complete
	Performance assessment	Performance data (measures, goals, and targets)	Essential	Adequate – data is somewhat available but not complete
	Analysis & forecasting	Treatment strategies and benefits	Essential	Good – data is available
		Deterioration rates	Desirable	Poor – Data is not available
		Work type cost	Essential	Good – data is available
		Decision trees	Desirable	Good – data is available
		Analysis tools or processes	Desirable	Poor – Data is not available

Alleys - d. TAMP

Alleys condition in 2018 (year of last survey)



Alleys Network Forecast (average $15Mil/year)



Expanded Asset Classes - d. TAMP

Alleys - AM Assessment

Maintenance Strategy	Process/Task	Supporting Data	Level of Need (Essential/ Desirable)	Data Availability (Completeness)
Condition-based	Inventory assessment	Asset/component inventory	Essential	Excellent – data is available and complete
	Condition assessment	Historical condition	Essential	Adequate - data is somewhat available but not complete
	Performance assessment	Performance data (measures, goals, and targets)	Essential	Adequate – data is somewhat available but not complete
	Analysis & forecasting	Treatment strategies and benefits	Essential	Good – Data is available
		Deterioration rates	Desirable	Poor – Data is not available
		Work type cost	Essential	Good – Data is available
		Decision trees	Desirable	Good – Data is available
		Analysis tools or processes	Essential	Poor – Data is not available

TUNNELS

- Good inventory and condition data overall
- Tunnels consist of various components
  - A combination of Condition/Interval/Reactive based approaches exist
  - Some components, follow manufacturer's maintenance guidelines
- Need more analysis on each component to perform:
  - LCP, deterioration rates
  - Each component may require its own AM and maintenance strategy
- Translate that for the whole tunnel structure

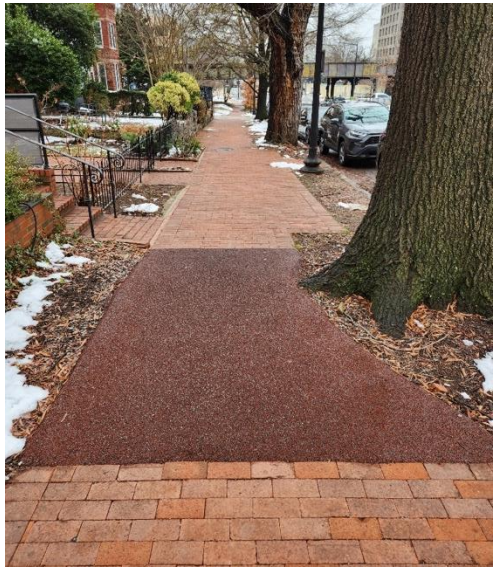
Tunnels: Equipment and Recommended Maintenance Approach

Equipment/System	Condition Based	Interval Based	Reactive Based
Structural components	Preferred	Feasible	Not recommended
Lighting	Feasible	Feasible	Preferred
Ventilation equipment	Preferred	Feasible	Not recommended
Filtering and pumping stations	Preferred	Feasible	Not recommended
Tunnel environment sensors	Preferred	Feasible	Not recommended
Fire detection and extinguishing system	Feasible	Preferred	Not recommended
CCTV system	Feasible	Preferred	Feasible
Emergency exists	Preferred	Feasible	Feasible
Traffic management equipment	Feasible	Preferred	Feasible
Automatic accident detection	Preferred	Feasible	Feasible
Communication systems (SOS, loudspeaker, telephone)	Preferred	Feasible	Feasible

Next steps - d. TAMP

- Further data analysis needed for LCP and to develop deterioration rates
  - Performance/Lifecycle Plan/Maintenance needs
  - Concrete vs. brick vs. other materials
    - Tree roots damage (short life) and flexipave performance

Brick Sidewalk – damage by tree roots

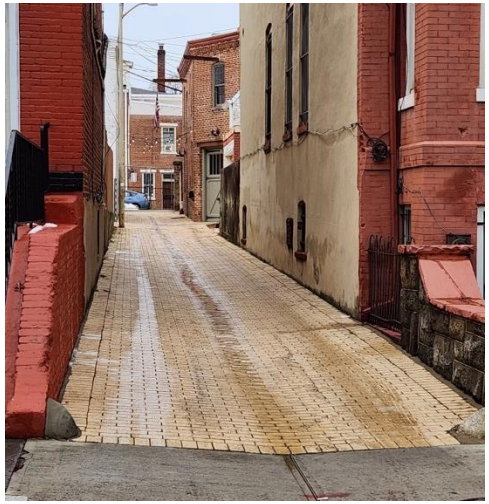


Flexipave

Next steps - d. TAMP

- Further data analysis needed for LCP and to develop deterioration rates
  - Performance/Lifecycle Plan/Maintenance needs
  - Concrete vs. brick vs. other materials

Concrete Sidewalks: horizontal cutting



Alleys and sidewalks – special materials

Next steps - d. TAMP

TAMP Implementation

- General TAMP communication and education, AM practice
    - Outreach to asset owners
- Assets TAM maturity evaluation
    - Data availability (the basic and more)
    - Further data analysis (inventory, condition, completeness, quality, financial)
    - Maintenance program and work plan strategies
- Update assets register to include more than the basic (inspection cycle, performance and targets need, Life-cycle plan and maintenance/replacement strategy…)
- Technology and leveraging on available systems for better AM
    - GIS
    - Asset Management systems

Next steps - d. TAMP

- Executive Management
  - Information for data driven decision making, prioritization

DC Mayor Bowser at Budget Oversight Hearing on streets, sidewalks and alleys – d. analysis and charts were instrumental in securing investment on core infrastructure by the Mayor.

  - Resource needs

Thank you
Questions?

Wolde Makonnen
wolde.makonnen@dc.gov
202-391-8199

Q&A and Discussion

Submit your questions using the Webinar's chat feature

All webinars available online:

https://www.tam-portal.com/event-directory/tam-webinars/

Save the Dates!

A bimonthly webinar series, Wednesdays at 2:00 PM EST

Next Webinar

Wednesday, April 16, 2025 – 2:00 PM EST
Topic: Life Cycle Planning

More to follow!

U.S. Department of Transportation Federal Highway Administration

AASHTO THE VOICE OF TRANSPORTATION

For more information or to register:

https://www.tam-portal.com