Transportation Asset Management Webinar Series

Webinar 55

TAM Tools Webinar Miniseries

Webinar 2: Management Systems

Sponsored by FHWA and AASHTO

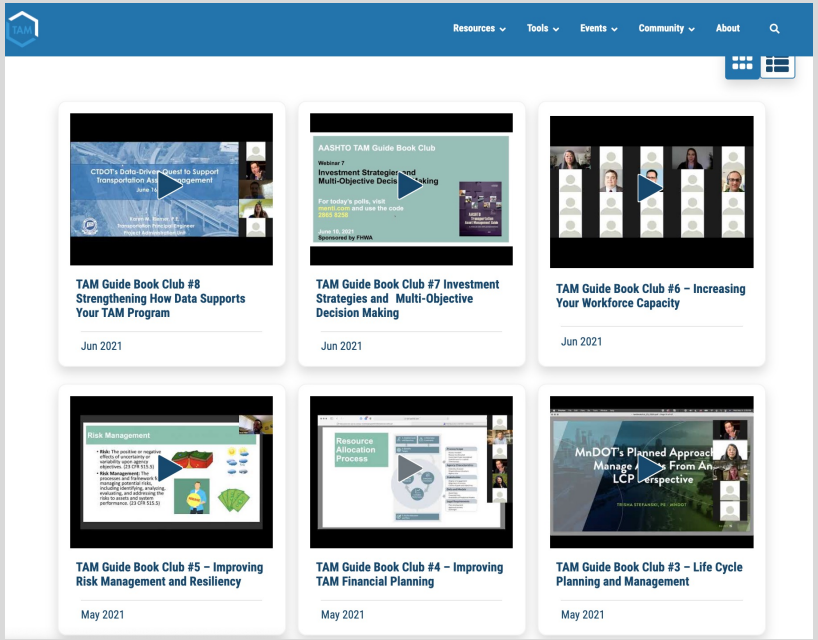
U.S. Department of Transportation
Federal Highway Administration

AASHTO
The Voice of Transportation

April 27, 2022

FHWA/AASHTO Asset Management Webinar Series

- The TAM Webinar Series has been running since 2012
- **Special miniseries on TAM Tools**
  - Thursday May 5: Other TAM Tools
  - Thursday May 12: Techniques
- We welcome ideas for future webinar topics and presentations
- Submit your questions via the webinar'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

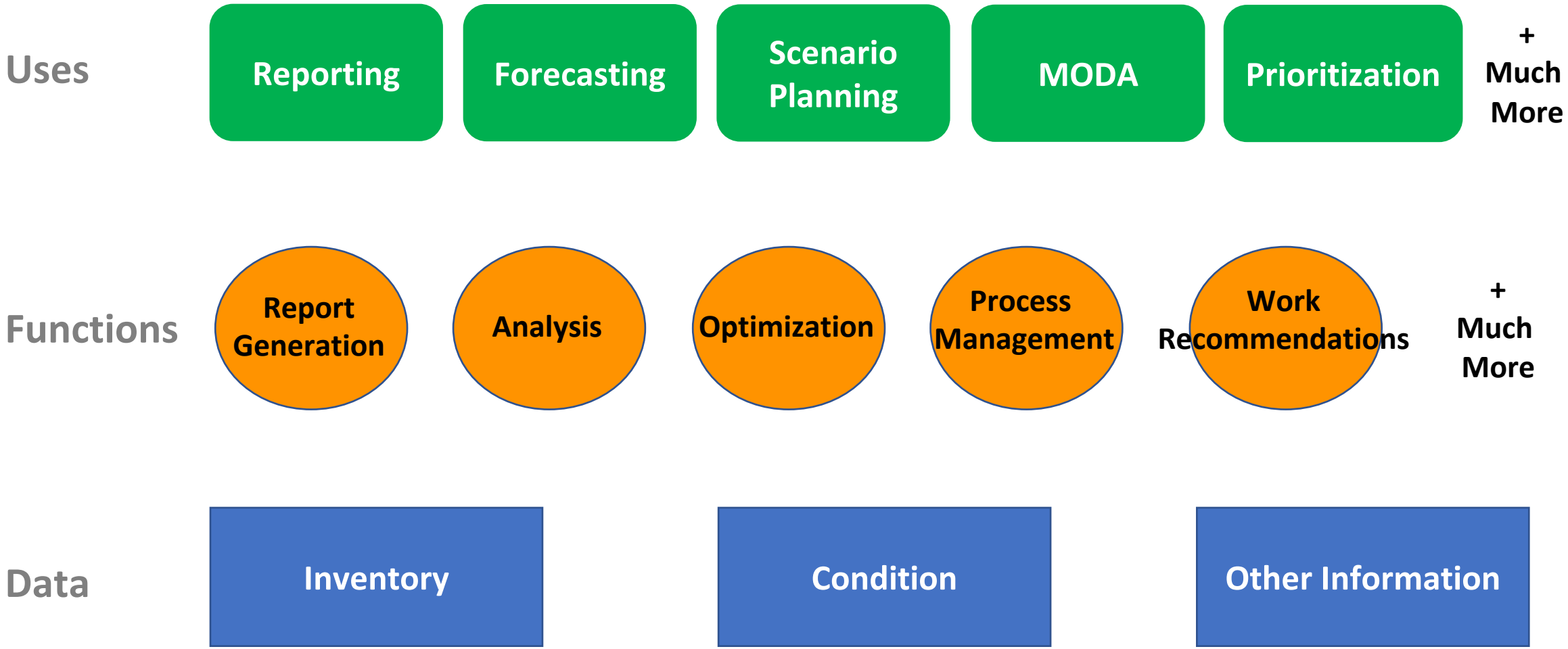
Webinar Objectives

- Raise awareness of the role of management systems in supporting strong asset management practice
- Understand some of the management systems currently in use at transportation agencies
- To hear from the TAM community

Webinar Agenda

2:00	**Welcome and Introduction** Tashia Clemons, FHWA and Hyun-A Park, Spy Pond Partners
2:10	**Overview and Opening Polls** Hyun-A Park
2:30	**Utah DOT ATOM** Kendall Draney, Utah DOT
2:35	**AgileAssets at New Mexico DOT** Phillip Montoya, New Mexico DOT
2:40	**Pennsylvania DOT BridgeCare and Project Builder** Justin Bruner, Pennsylvania DOT
2:45	**Colorado DOT Presentation** Britton Stocks and Toby Manthey, Colorado DOT
2:50	**Q&A and Dialogue** Hyun-A Park
3:30	**Wrap-Up**

Asset Management System Overview

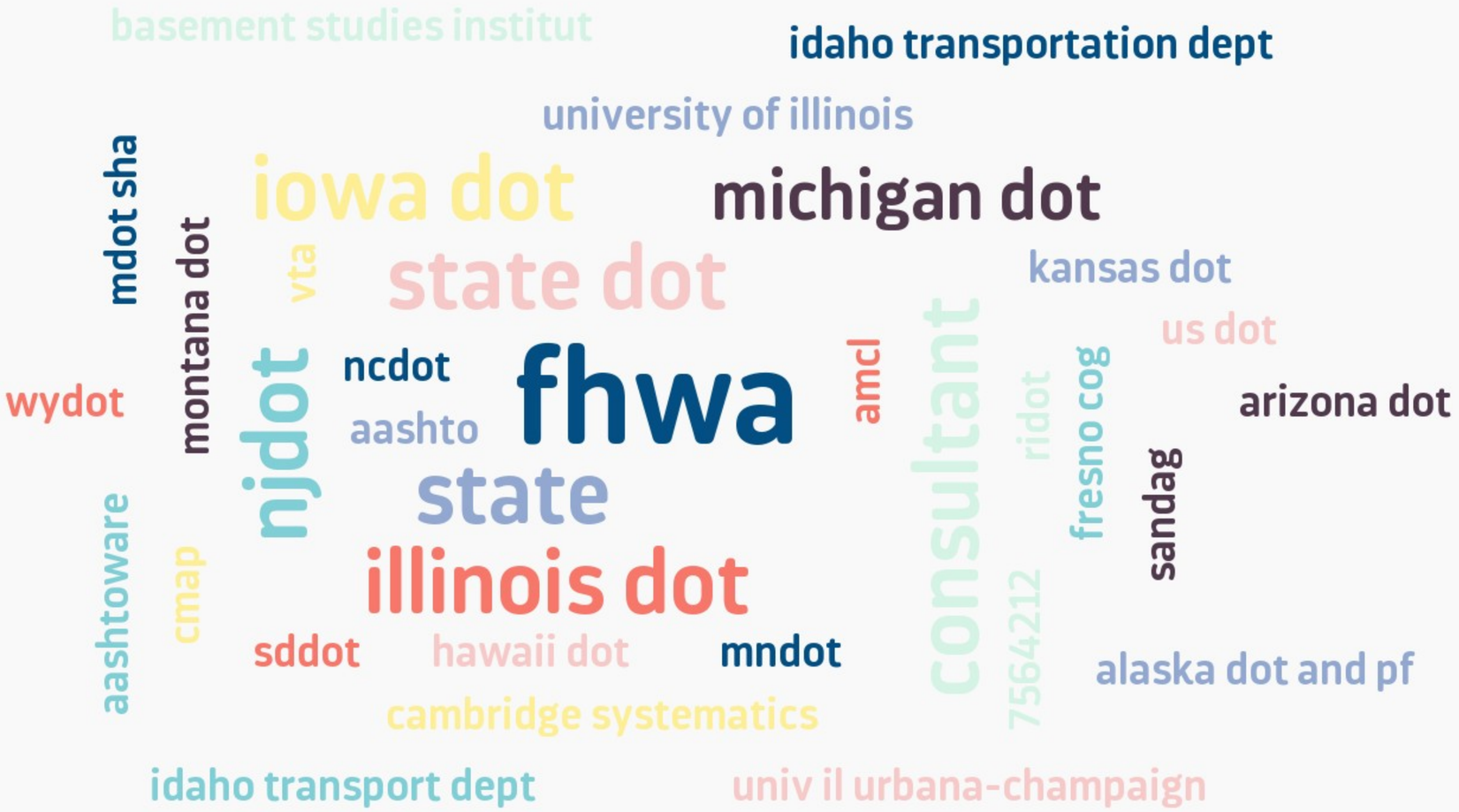


Menti Poll

Visit Menti.com and enter the code:

7526 4212

Your agency?


basement studies institut
idaho transportation dept
university of illinois
mdot sha
iowa dot
michigan dot
montana dot
vta
state dot
kansas dot
us dot
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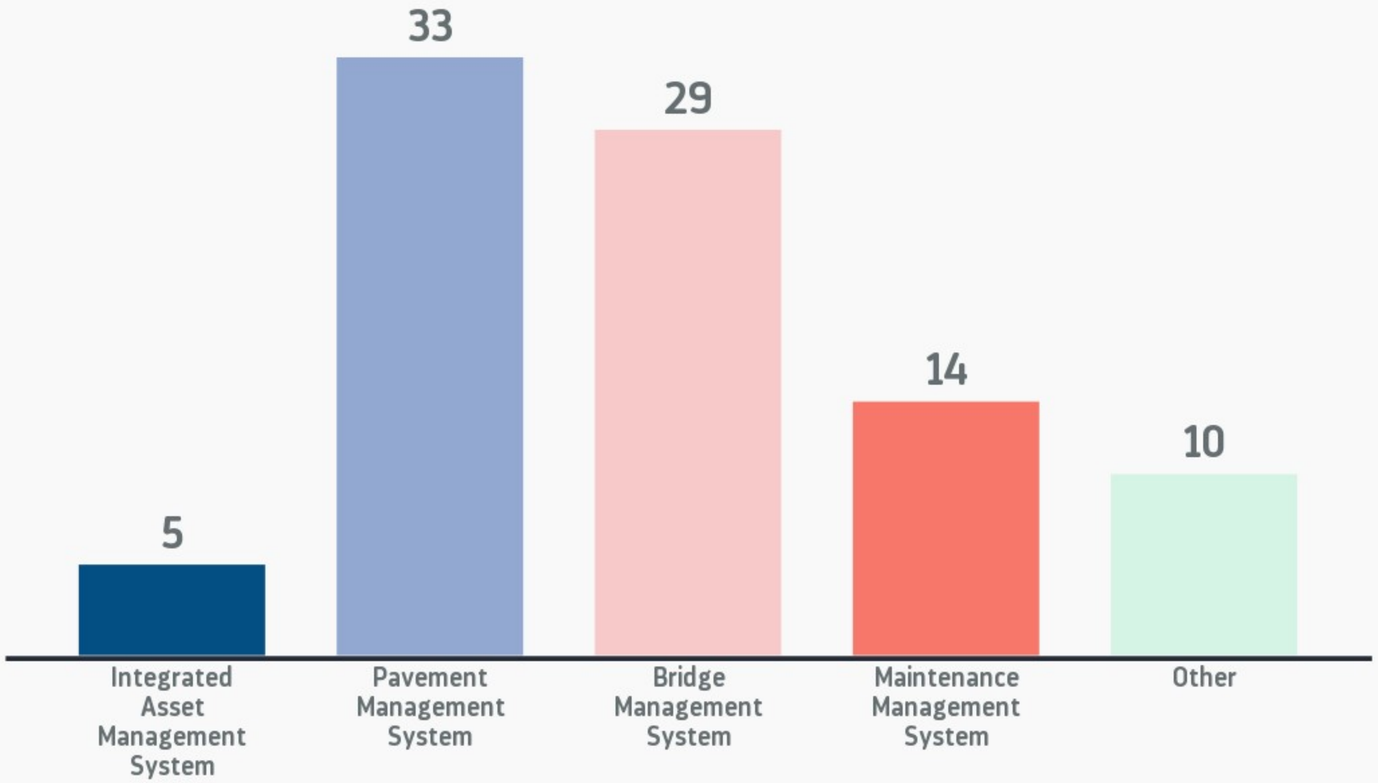
ncdot
fhwa
amcl
consultant
ridot
fresno cog
arizona dot
njdot
aashto
sandag
state
aashtoware
cmap
illinois dot
sddot
hawaii dot
mndot
7564212
alaska dot and pf
cambridge systematics
idaho transport dept
univ il urbana-champaign

Which management systems does your agency use?



If you answered "Other" for the last question, please write in the alternative management system used at your agency

AASHTOWare Bridge Management and Pavement Management

Facility Management System

TransAM

We are a transit agency with highway assets as well. Our primary assessment tool is FTA's TERM Lite

Buildings

TransAM

In the process of implementing an asset management system

None

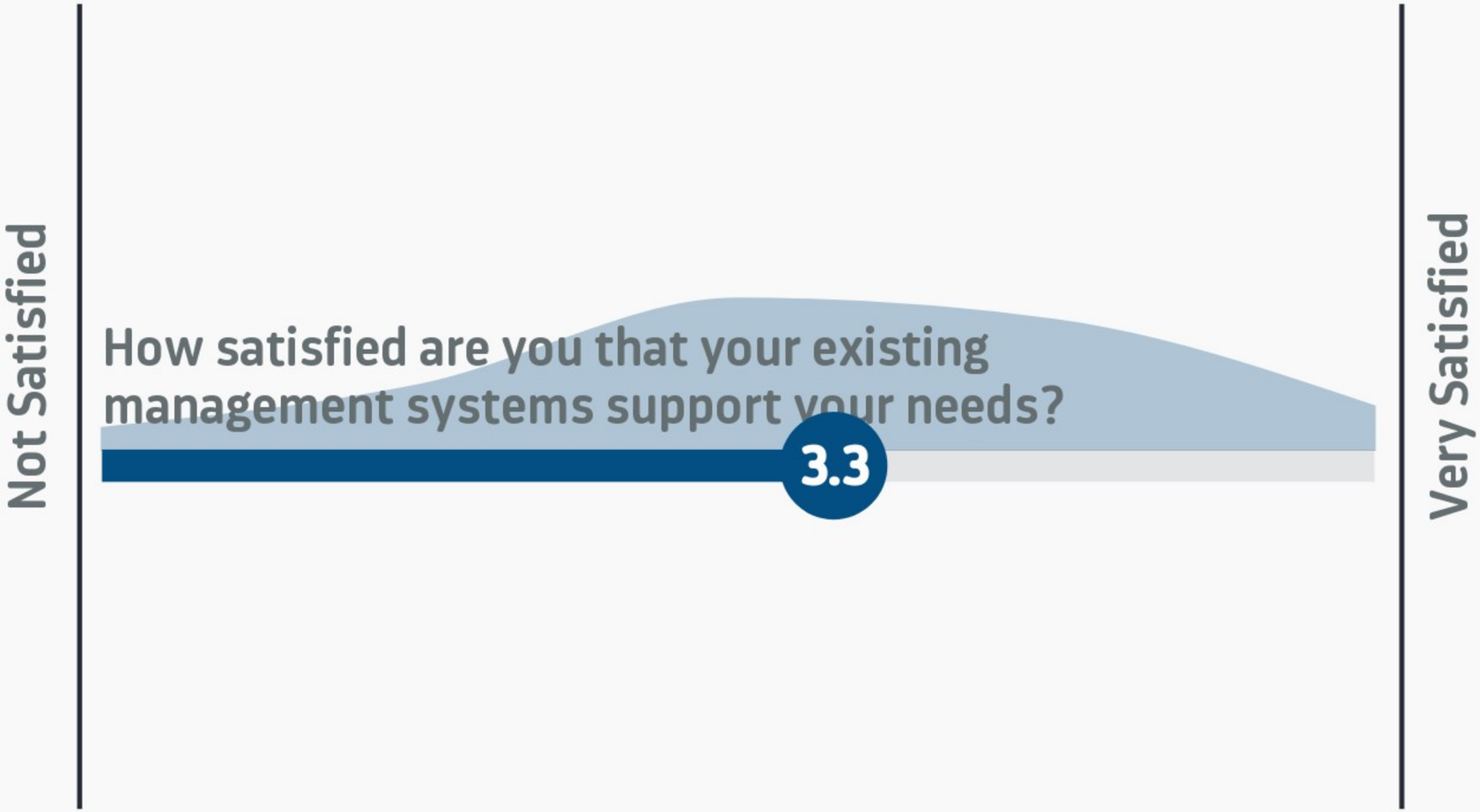
xxxx

12

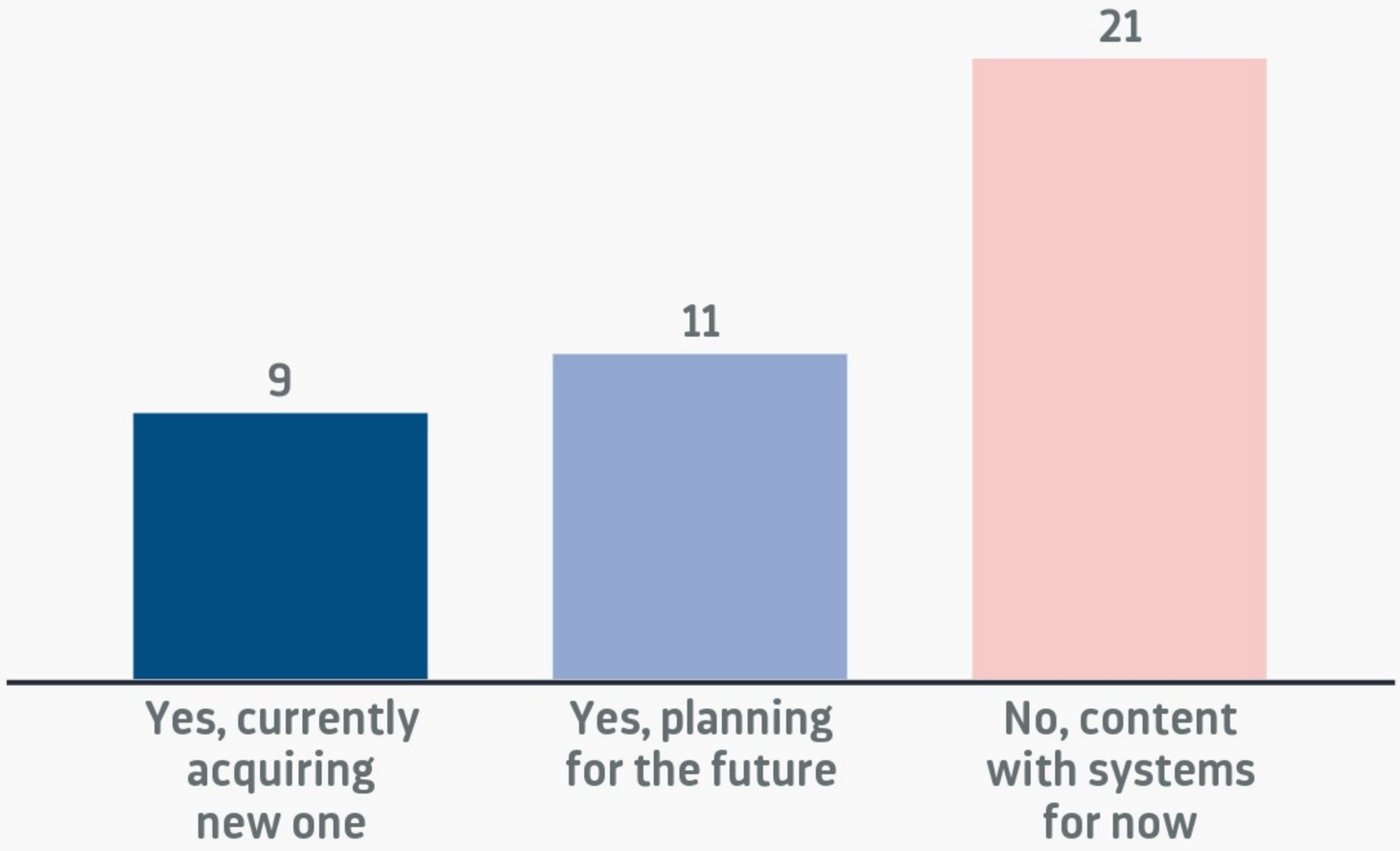
If you answered "Other" for the last question, please write in the alternative management system used at your agency

Na	.	all types

Please rate on a scale from 1-5



Are you in the midst of acquiring a new management system or considering it in the future?



What do you want to know most about other agency's management systems?

challenges; best practices

life-cycle planning

How MODA is incorporated

performance models

Optimization usage

How they are intergrating between systems and using data.

How does it impact your project development and prioritization.

A lot. Worked with 52 agencies on their asset management systems.

How they are collecting data for system decisions.

What do you want to know most about other agency's management systems?

If there are any stand alone systems that we can use for those assessments that are not part of our current or potential system.

How many people are assigned to manage the system?

Intergratability

Pros and cons

Usability

Cloud or Hosted?

pros and cons

how well they work, and if they could work for me

Configurable

What do you want to know most about other agency's management systems?

How trade-off analysis is accomplished between asset types.

Business processes the systems support.

How and where do they make use of it?

Relationship between management system and programming decisions.

How do you know if your investments are lowering total cost of ownership, improving safety outcomes, and otherwise delivering value?

Do you use the system only in the central office or is it deployed to the districts also?

Management section maintenance

Integration into other non AMS systems (for cross reporting)

Interconnectivity and ability to support risk management discussions

What do you want to know most about other agency's management systems?

Interface with other states

Grants

how to prioritize projects with unknown funding

Policies for prioritization

mobile or handheld

Integration into other DOT systems

can performance metrics be shown on a phone ?

dashboard

success expereinces

What do you want to know most about other agency's management systems?

success experiences

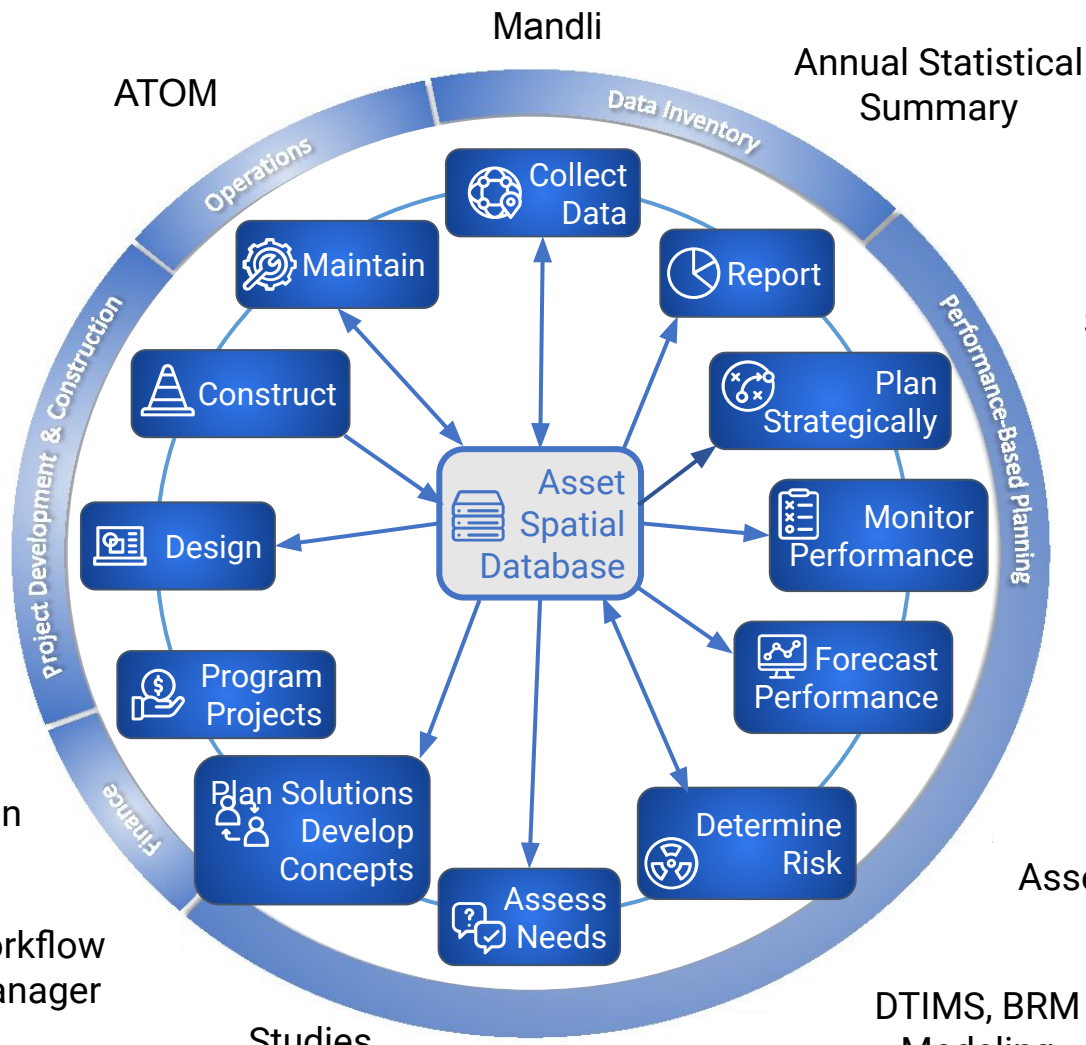
success experience

TAM Tools Webinar
UDOT - ATOM

April 27, 2022

Future of UDOT Asset Management

data flow



Mandli

ATOM

Annual Statistical Summary

Strategic Direction

Digital Delivery

ePM

Dashboards

Prioritization

Risk Assessment

Workflow Manager

Studies

DTIMS, BRM Modeling

UDOT Keeping Utah Moving

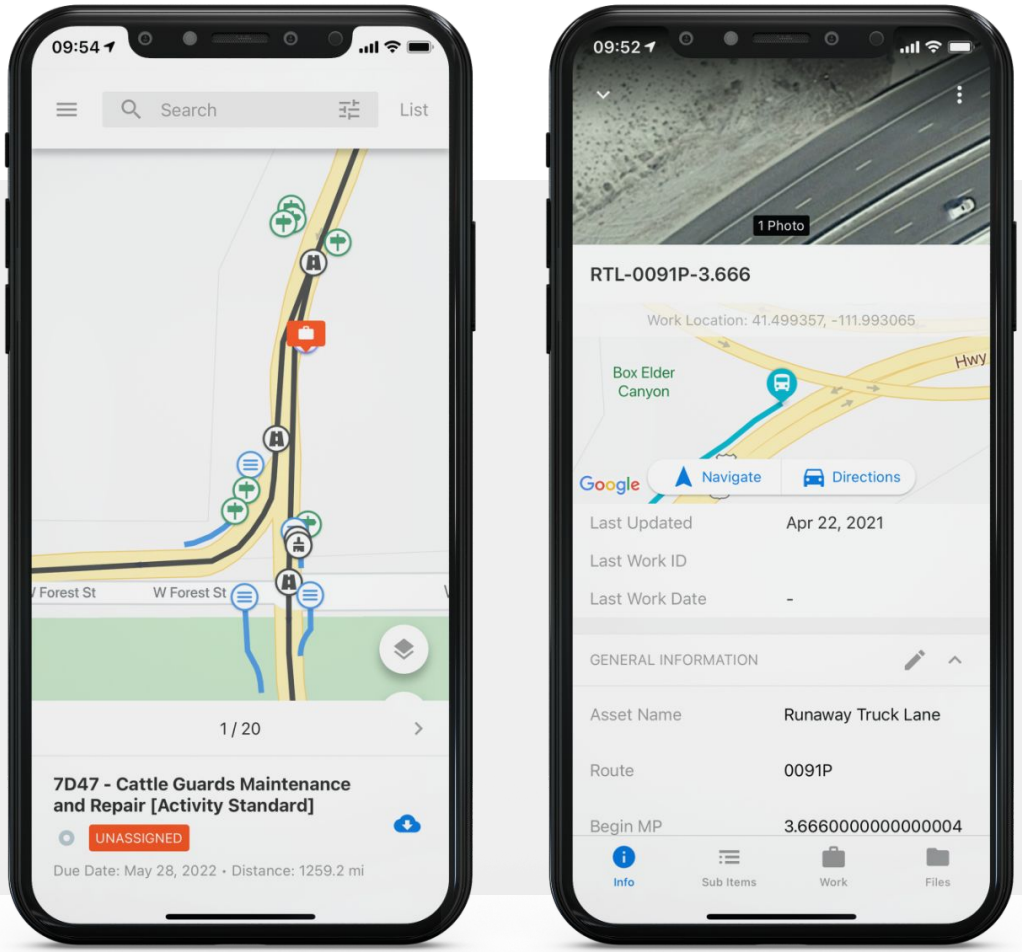
Inventory | Maintenance Assets

- Barrier
- Catch Basin
- Cattle Guard
- Culvert / Drainage Pipe
- Curb and Gutter
- Cut Ditch
- Detention / Retention Pond
- Fence
- Fixed Anti Icing System
- Headwall
- Oil Water Separator
- Overhead Sign Structure
- Paved Waterway
- Pavement Message
- Pavement Striping
- Pump Station
- Raised Median / Traffic Island
- Runaway Truck Lane
- Signal Mast Arm
- Sign Assembly
- Structure
- Tunnel
- Wall

UDOT Keeping Utah Moving

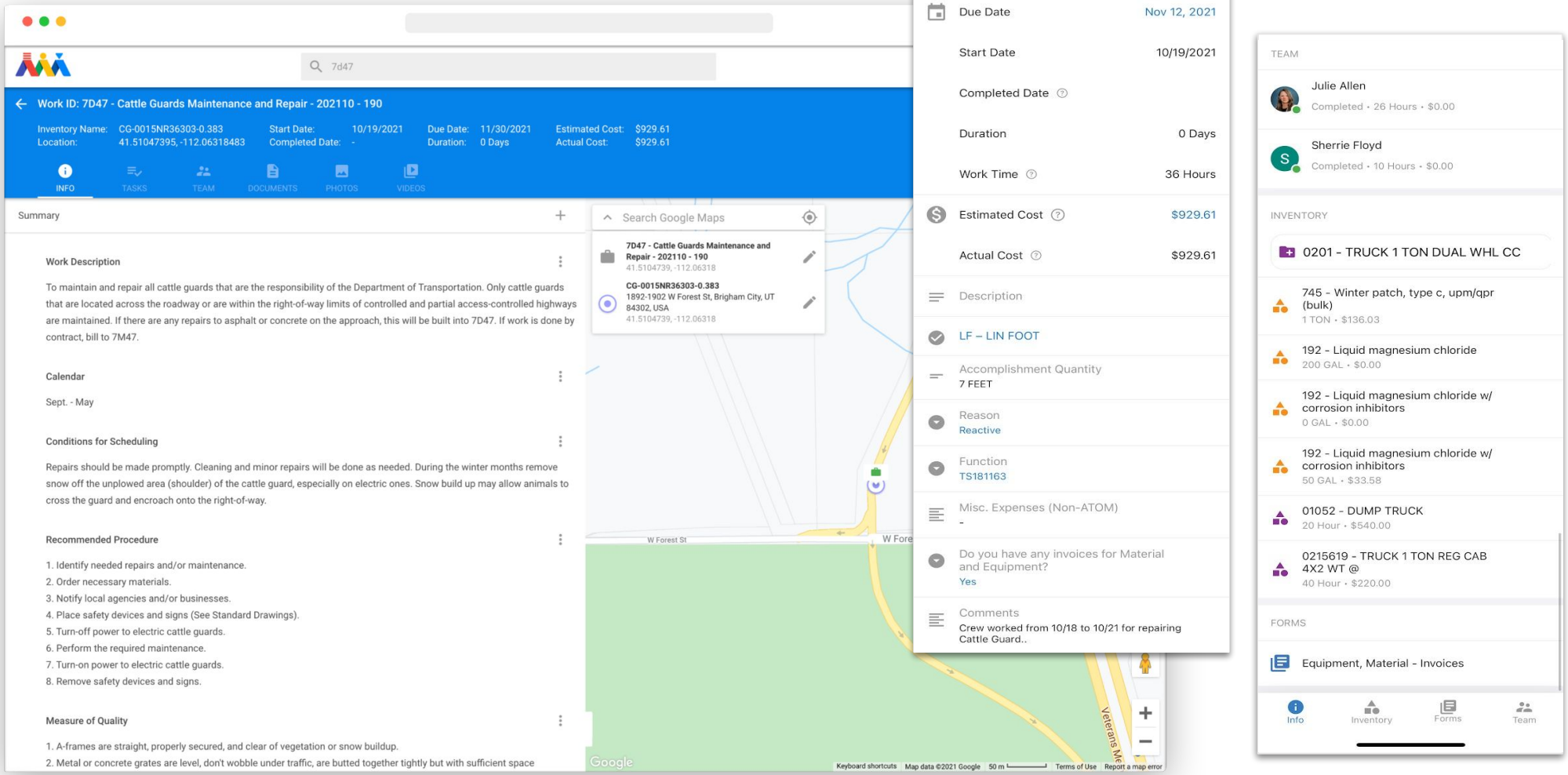
Inventory | Mobile Data Collection

- Collecting condition data
- Offline functionality
- Built for tablets and phones
- Easy to use for a mobile workforce



UDOT Keeping Utah Moving

Work | Detail Page



UDOT Keeping Utah Moving

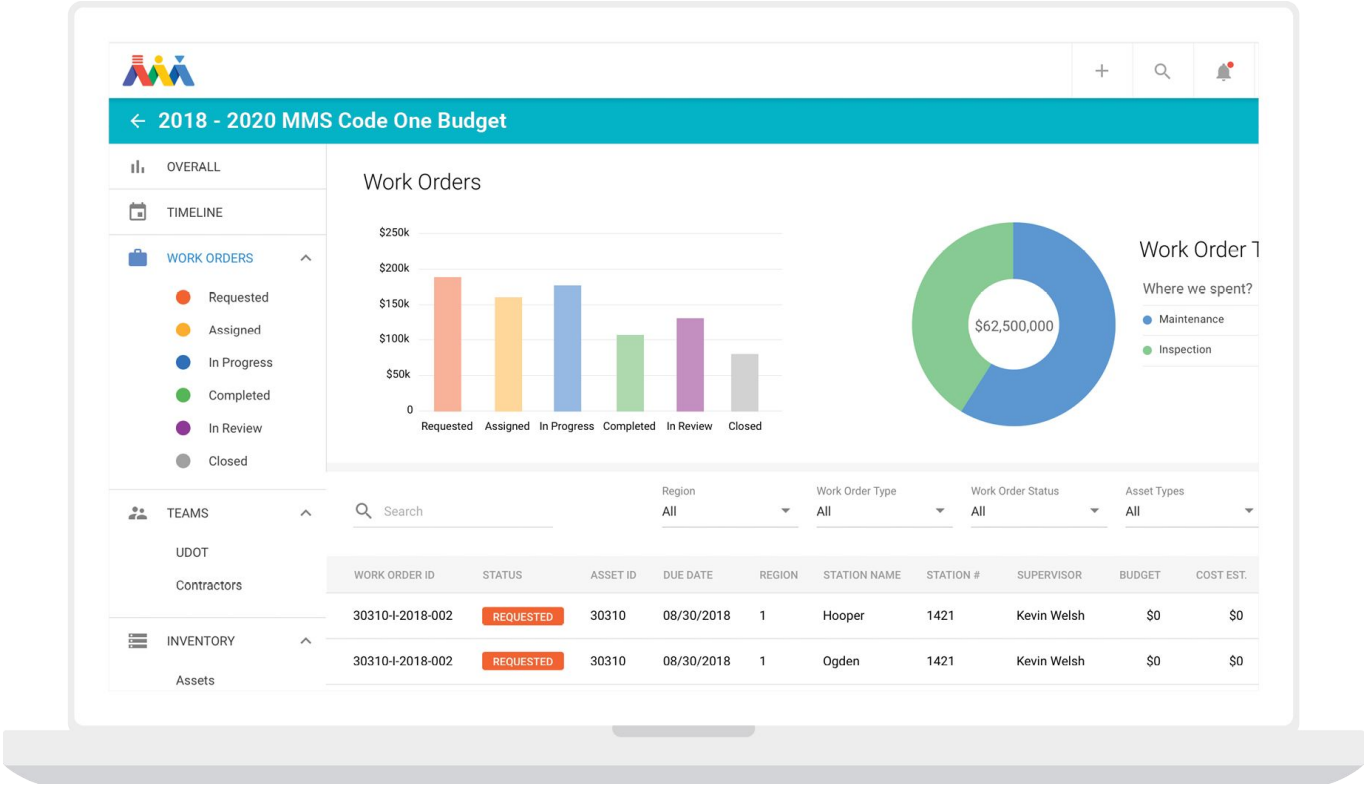
Using Data | Budgeting / Forecasting

OLD

Budget Distribution
by historical data

NEW

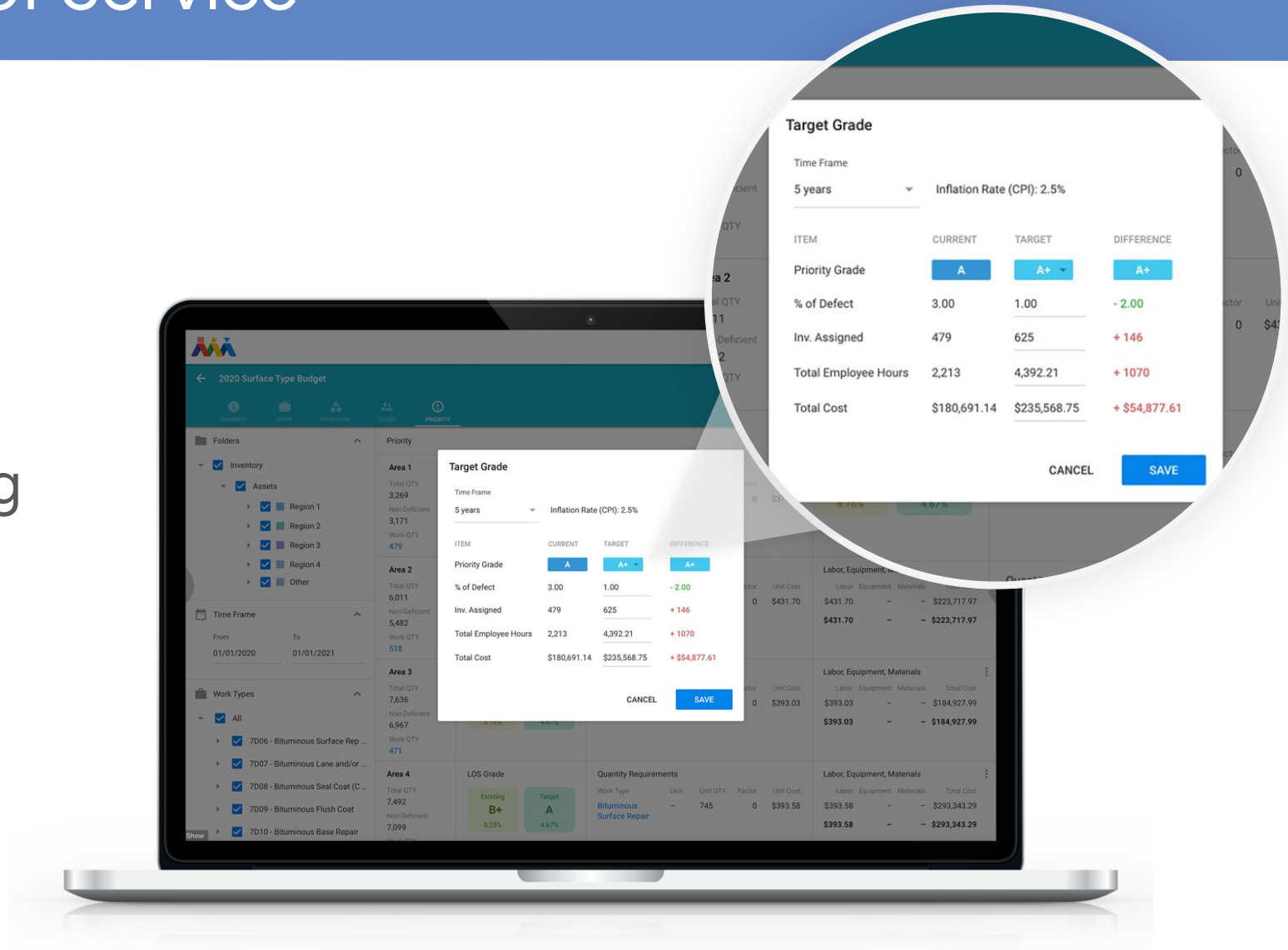
Budget Distribution
by condition



UDOT Keeping Utah Moving

Using Data | Level of Service

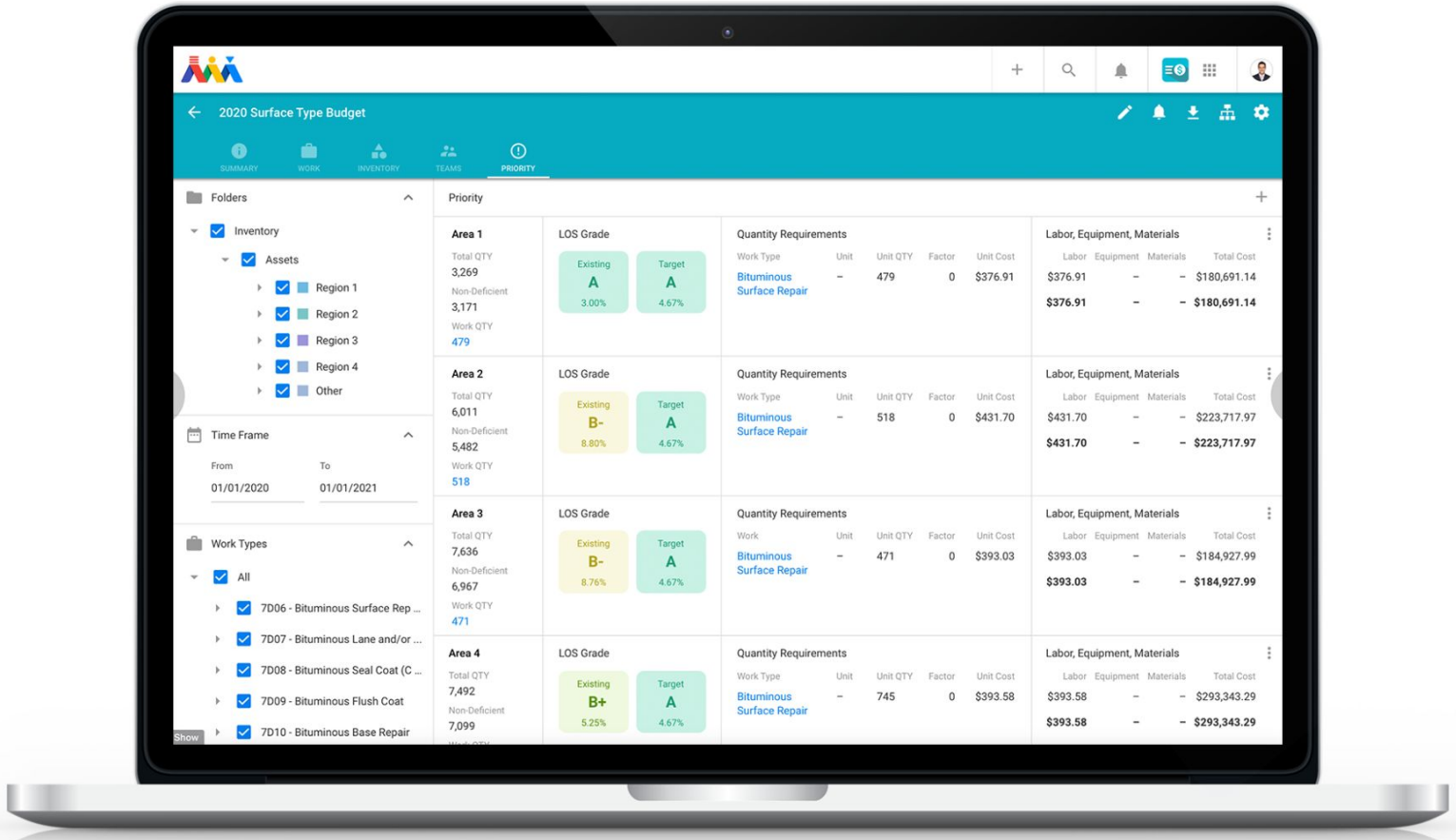
- LOS standards & performance-based planning and budgeting
- Asset-driven decisions



Keeping Utah Moving

Using Data | Trade-Off Analysis

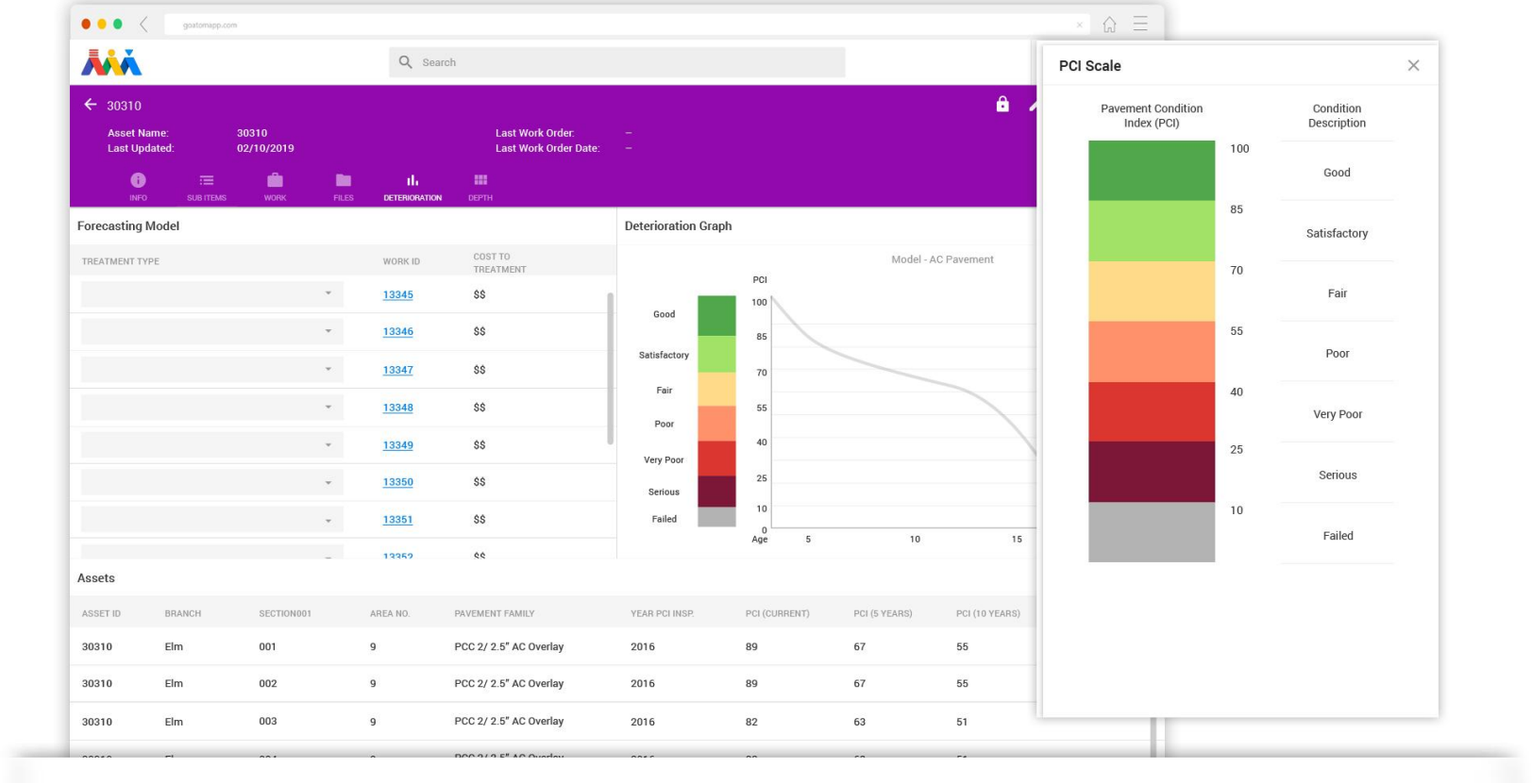
- Real cost data
- Cross-asset data



UDOT Keeping Utah Moving

Using Data | Deterioration Curves

- Can be adjusted by asset type
- Can be adjusted by location (region, etc.)



UDOT Keeping Utah Moving

Questions?

Contract Information

UDOT State Maintenance Asset Manager
Kendall Draney
kdraney@utah.gov
801-864-7876

UDOT Director of Maintenance and Facilities
Shawn Lambert
shawnlambert@utah.gov
801-910-2570

Thank you!

NMDOT

Webinar on Management Systems

NMDOT

How is Agile Assets used today?

- Pavement and Maintenance
- Federal Reporting
- Condition Analysis Report (CAR)
  - Pavement data placed into the EGIS system
- Pavement recommendations
- Decision trees
- Optimization and scenarios based on funding

NMDOT

Lessons learned during Implementation

Things that went well

- Stakeholders from all districts
- UAT- well organized and conducted
- Train-the-Trainer & End-User training sessions very well executed

Things that could have been done better

- Training documentation
- Complex reports required numerous adjustments- needed deeper requirements review earlier in the process

NMDOT

How effective is it at supporting NMDOT's TAMP objectives?

- Stores and reports historical and current condition data
- Allows multiple configurations that reflect NMDOT's business process (e.g., decision trees for treatments)
- Predicts future condition of the network for multiple funding scenarios
- Supplies Pavement Treatment recommendations (develops the best work plans given financial and technical constraints)

NMDOT

What do you find most valuable about NMDOT's Agile Assets implementation?

Assisted NMDOT with data reporting and consistency

Identified Gaps in data analysis

Helped with constraints and decision trees

Created consistency for reporting

SaaS subscription is helpful with ensuring any tickets get resolved faster

Resident Consultant helps to increase efficiency in the use of the application and helps to resolve any issues that may arise

NMDOT

Future Enhancements

- Resident Consultant
  - ❖ continue working on ensuring the best return on investment
- Planning Maintenance Activities via the Agile Assets system
- Bring the Pavement Management System to the next level
- LRS integration with Road and Highways
- Add additional assets to the Agile Assets System.

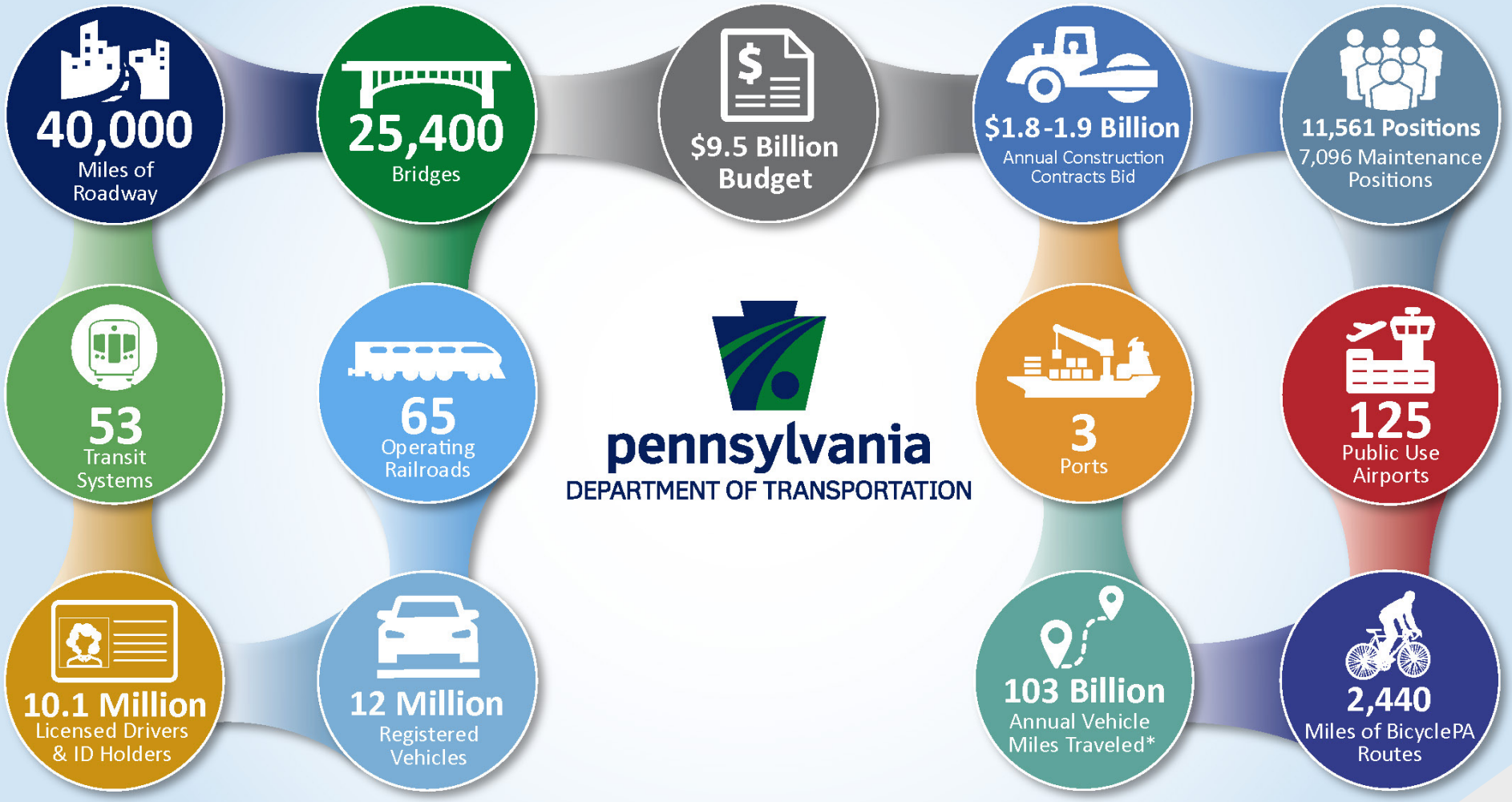
NMDOT

Questions?

Phillip Montoya
Phillip.Montoya@state.nm.us
505-469-4158

pennsylvania

DEPARTMENT OF TRANSPORTATION



*Total miles on all PA roadways

DOT AM HISTORY

Pennsylvania Department of Transportation

Transportation Asset Management Plan 2013

January 2014

Second Draft

of Transportation

agement Plan 2013

January 2014

Second Draft

Transportation Asset Management Case Studies

Presented by

U.S. Department of Transportation
Federal Highway Administration

DATA INTEGRATION

The Pennsylvania Experience

meet the challenges of implementing Ass
ment programs.

David R. Geiger

David R. Geiger
Director, Office of Asset Management
May 2004

AM HISTORY

From 2003:

What Did PENNDOT Have?

Over the past 20 years, PENNDOT has made significant investments in a suite of management systems designed to support its business operations, as follows:

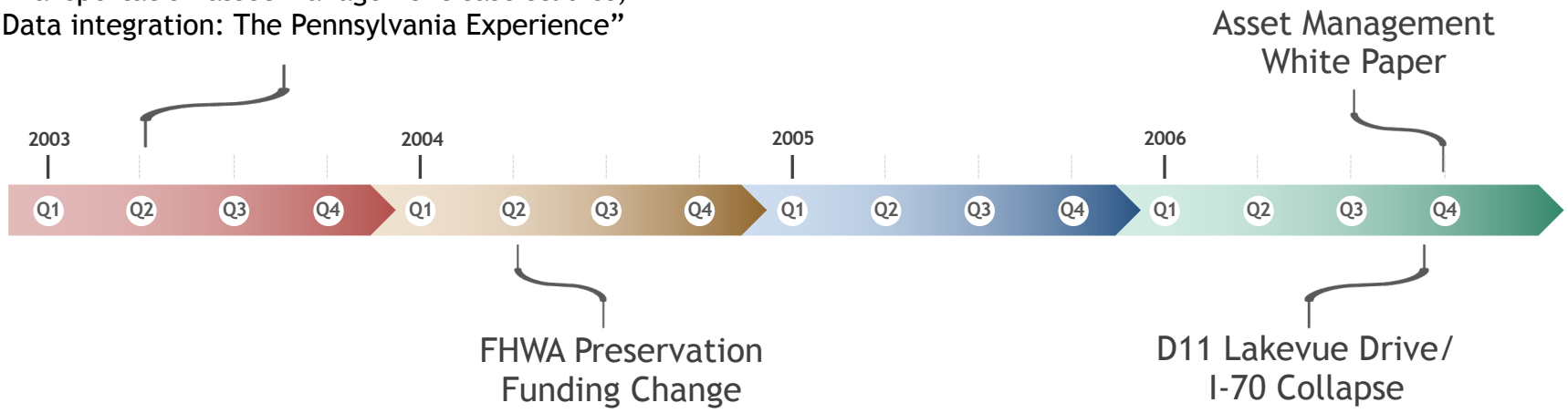
- Roadway Management System (RMS)
- Bridge Management System (BMS)
- Maintenance Operations Reporting Information System (MORIS)
- Engineering Construction Management System (ECMS)
- Multimodal Project Management System (MPMS)
- Automated Permit Routing/Analysis System (APRAS)
- Electronic Document Management System (EDMS)
- Financial Management Information System (FMIS)

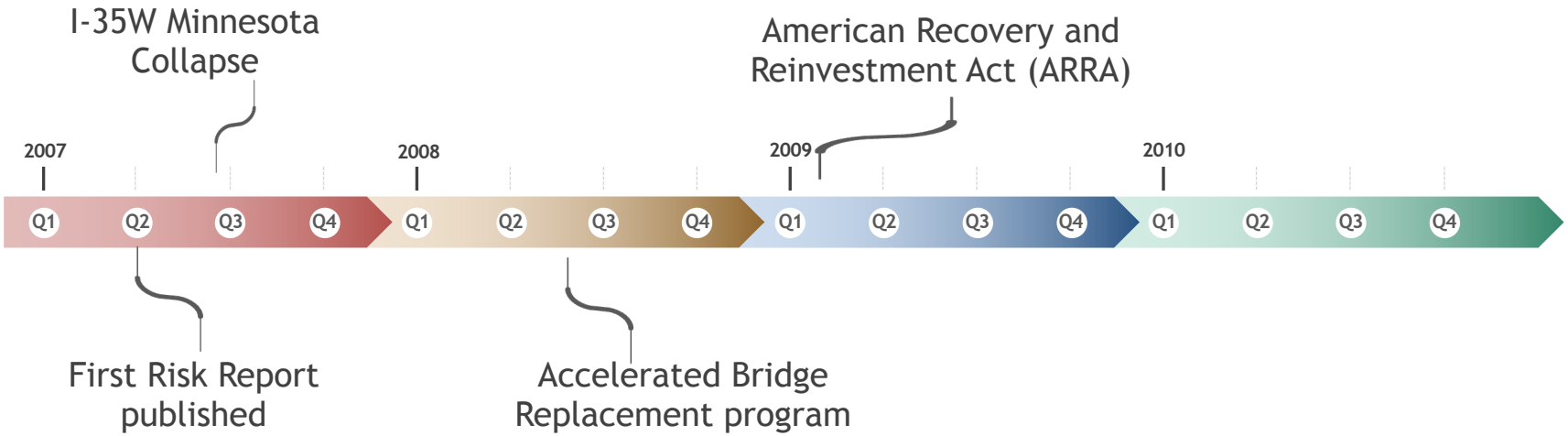
These systems are homegrown, mainframe applications that have evolved over time in reaction to the changing needs of PENNDOT staff. The systems provide a wealth of standardized inventory and condition data from the last 15–20 years. However, because of their origins, many of the systems are based on outdated technology and do not meet the expanding needs of the modern user community. Specifically, modern users need improved functions for needs predictions, cost tracking, and the integration of data and results across asset categories. Due largely to the size and complexity of the organization, and the rapid pace of technological advances, PENNDOT's previous information technology (IT) efforts have been uncoordinated and often performed without adequate consideration for other systems or the needs of staff outside traditional user groups.

TIMELINE

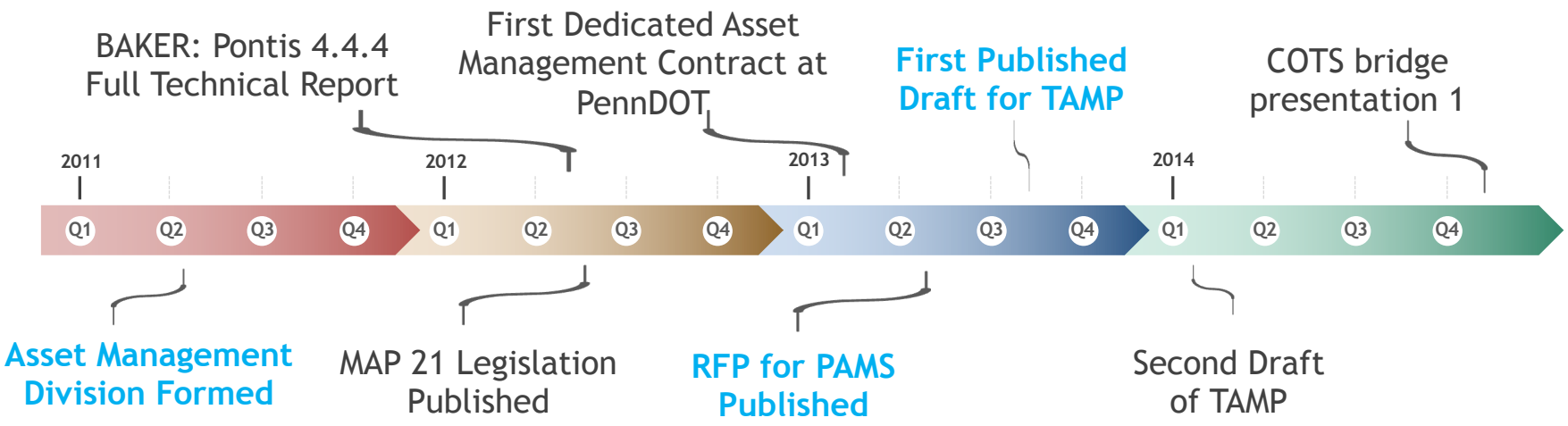
FHWA Red Report

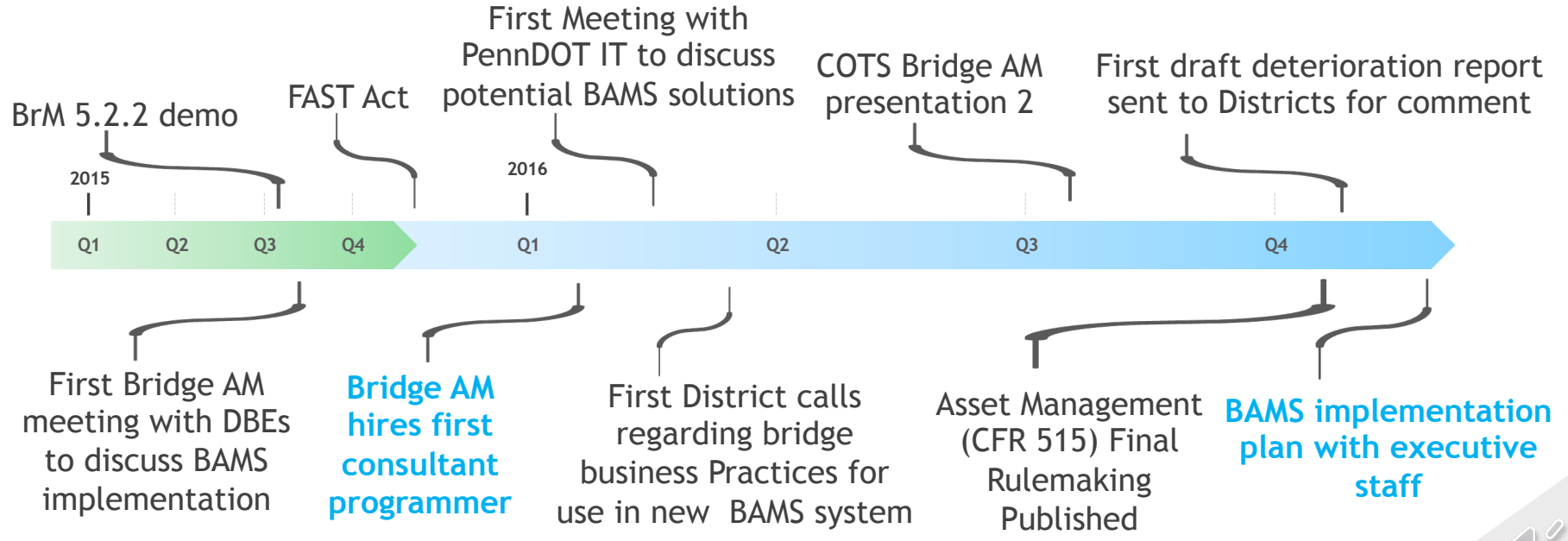
"Transportation asset management case studies; Data integration: The Pennsylvania Experience"



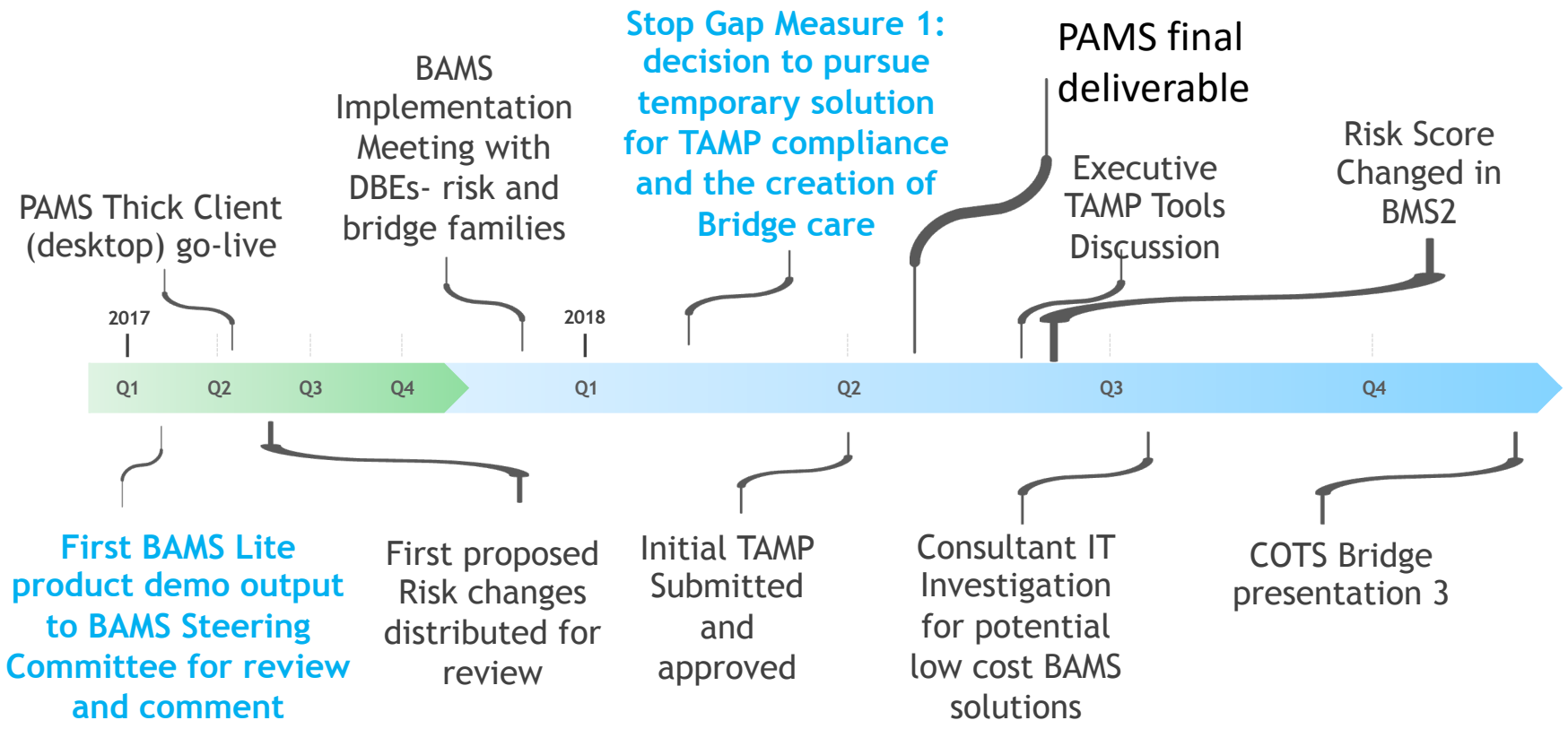


TIMELINE

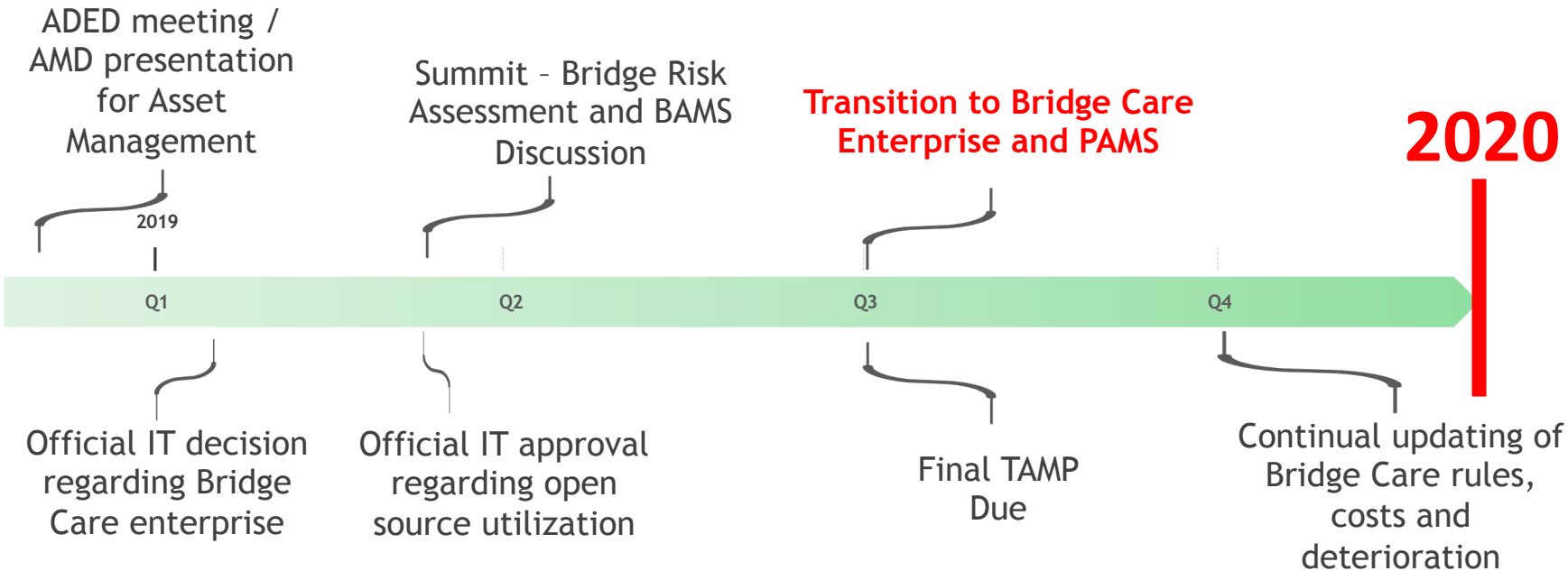

BAKER: Pontis 4.4.4 Full Technical Report
First Dedicated Asset Management Contract at PennDOT
First Published Draft for TAMP
COTS bridge presentation 1
2011
2012
2013
2014
Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4
Asset Management Division Formed
MAP 21 Legislation Published
RFP for PAMS Published
Second Draft of TAMP


BrM 5.2.2 demo
FAST Act
First Meeting with PennDOT IT to discuss potential BAMS solutions
COTS Bridge AM presentation 2
First draft deterioration report sent to Districts for comment
2015
2016
Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4
First Bridge AM meeting with DBEs to discuss BAMS implementation
Bridge AM hires first consultant programmer
First District calls regarding bridge business Practices for use in new BAMS system
Asset Management (CFR 515) Final Rulemaking Published
BAMS implementation plan with executive staff

TIMELINE


PAMS Thick Client (desktop) go-live
BAMS Implementation Meeting with DBEs- risk and bridge families
Stop Gap Measure 1: decision to pursue temporary solution for TAMP compliance and the creation of Bridge care
PAMS final deliverable
Executive TAMP Tools Discussion
Risk Score Changed in BMS2
2017
2018
Q1
Q2
Q3
Q4
Q1
Q2
Q3
Q4
First BAMS Lite product demo output to BAMS Steering Committee for review and comment
First proposed Risk changes distributed for review
Initial TAMP Submitted and approved
Consultant IT Investigation for potential low cost BAMS solutions
COTS Bridge presentation 3

TIMELINE


ADED meeting / AMD presentation for Asset Management
2019
Summit – Bridge Risk Assessment and BAMS Discussion
Transition to Bridge Care Enterprise and PAMS
2020
Q1
Q2
Q3
Q4
Official IT decision regarding Bridge Care enterprise
Official IT approval regarding open source utilization
Final TAMP Due
Continual updating of Bridge Care rules, costs and deterioration

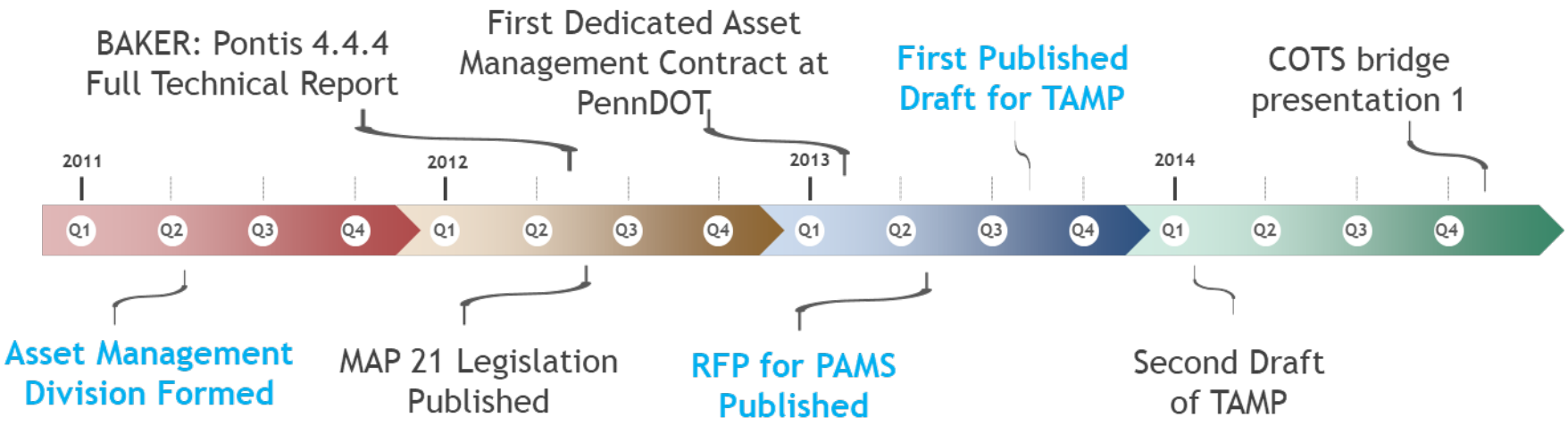
TIMELINE SUMMARY

- PennDOT has a 40+ year history of:
  - Asset Management
  - Creating custom software
- Software development based on DOT-defined needs
- Proven track record of successful development and implementation

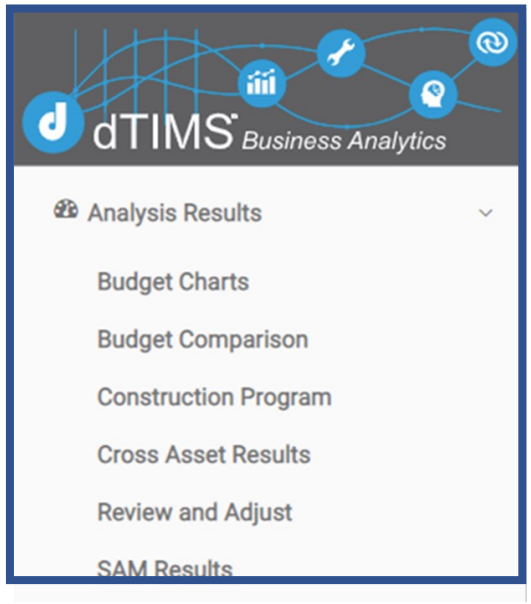
PAVEMENT ASSET MANAGEMENT

pennsylvania
DEPARTMENT OF TRANSPORTATION

PAVEMENT



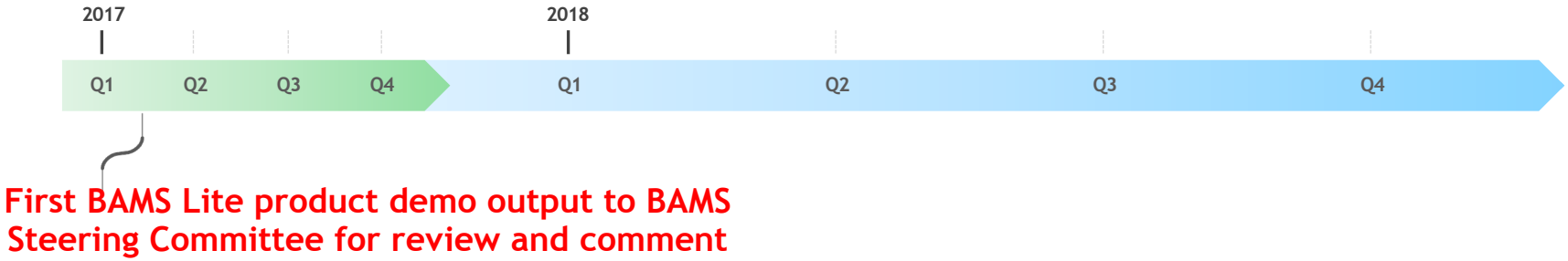
Current PAMS:
Deighton dTIMS



BRIDGE ASSET MANAGEMENT

pennsylvania
DEPARTMENT OF TRANSPORTATION

BAMS LITE

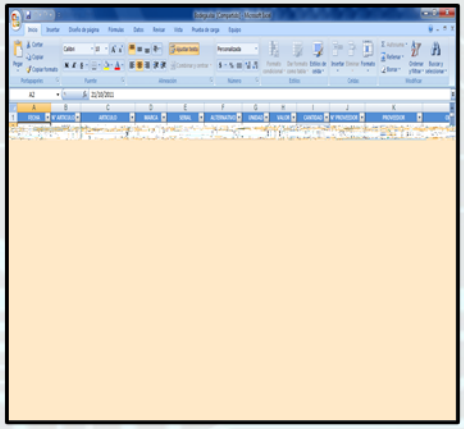


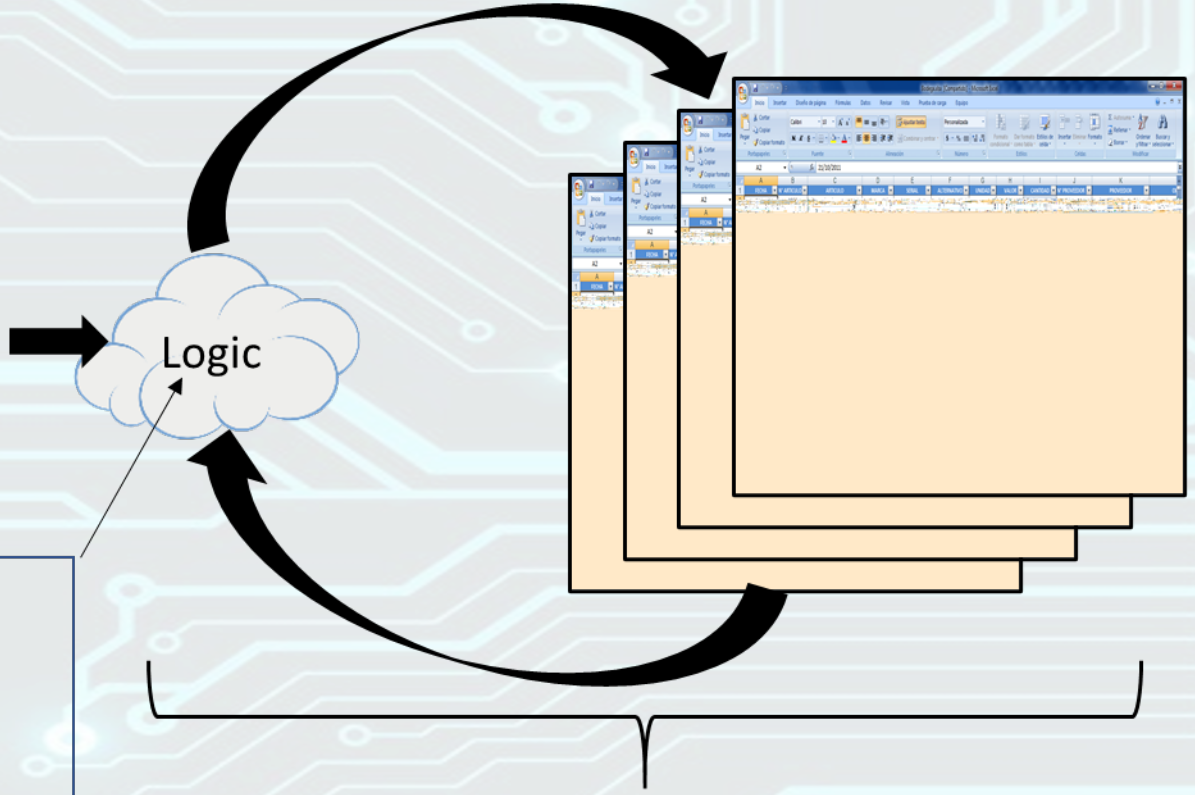
- Summary:
  - MS Excel based / VBA
  - PennDOT generated treatments and consequences
  - Selection criteria based on treatment type
  - Markov deterioration

- Benefits:
  - More accurate than simple average/ basic excel
  - Outputs showed clear need for further investigation into AM
  - Proof of concept for deterministic deterioration need

BAMS LITE

PennDOT Bridge data





- Current condition
- Durations of condition states
- Deterioration
- Work rules
- Work consequences
- Budget
- Risk

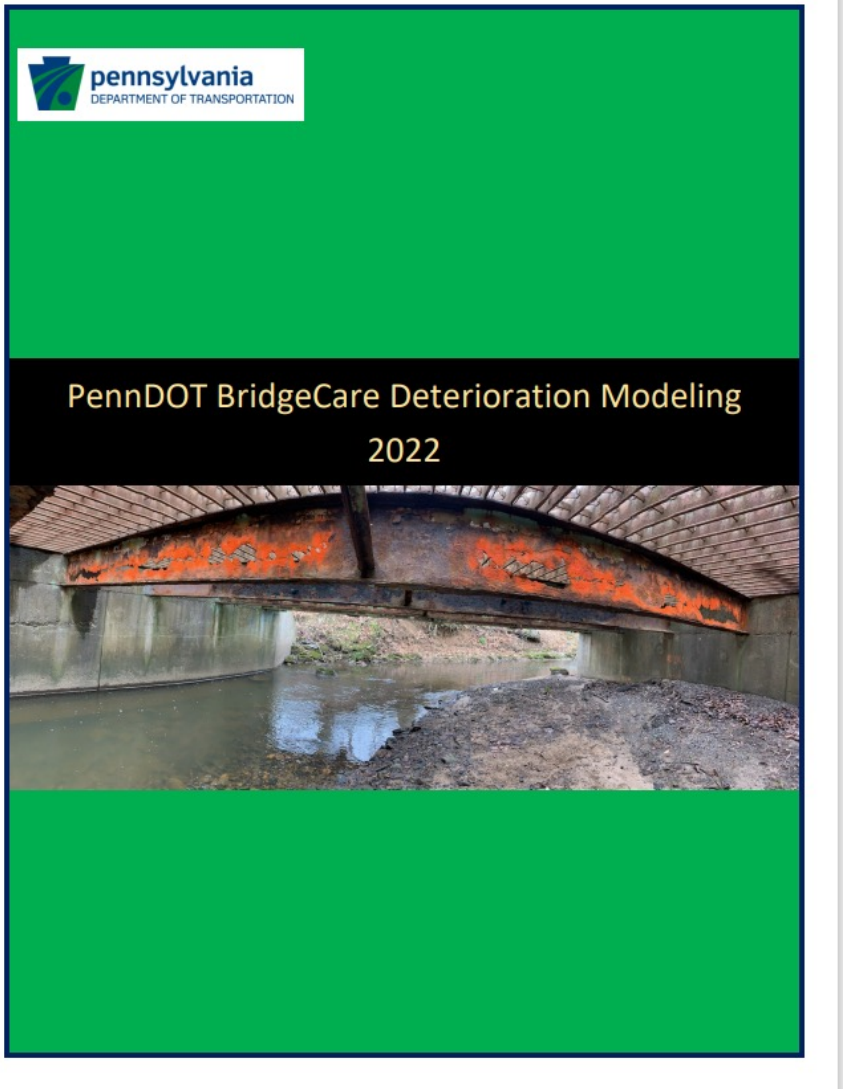
Output is a recommended list of projects per year

BAMS LITE

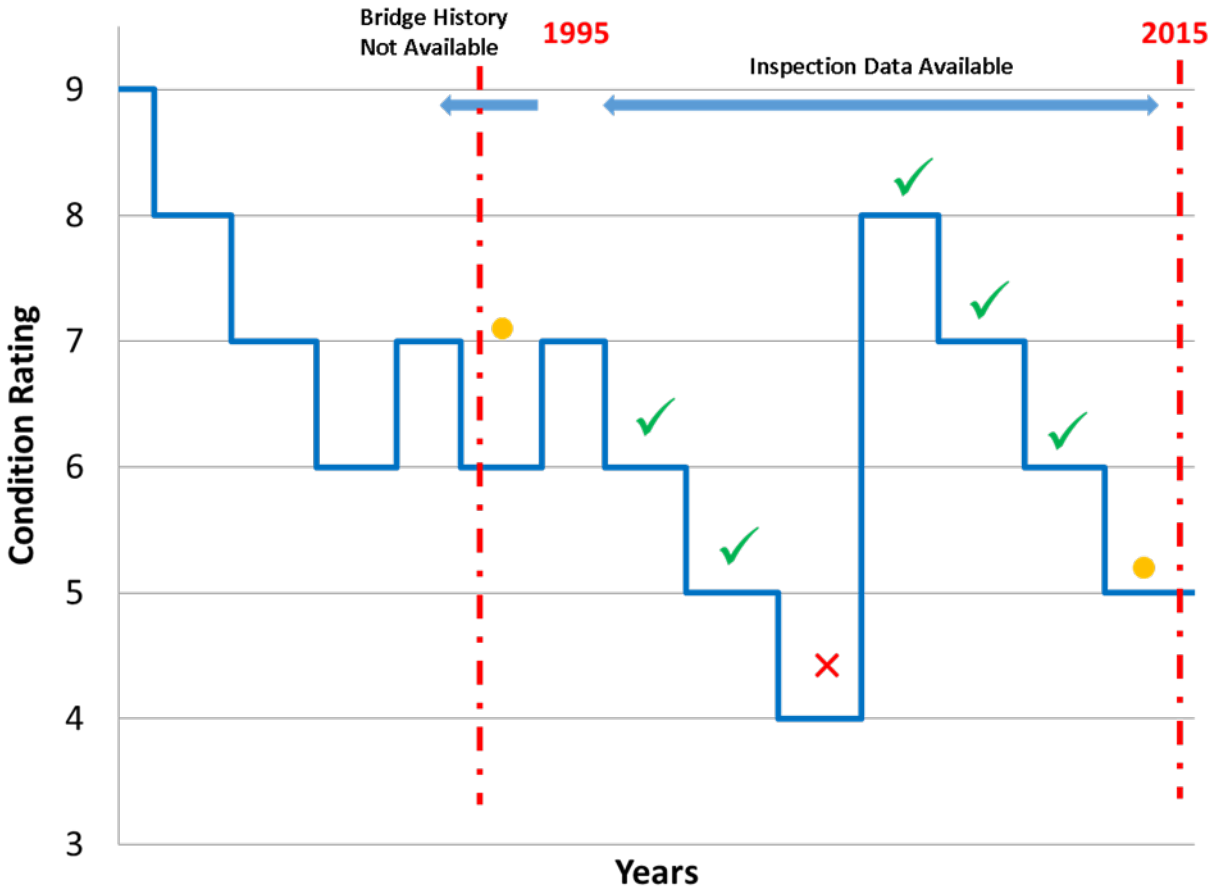
- Issues
  - Quickly reached limits of excel
  - Deterministic deterioration difficult in excel
  - Need MODA selection- ridged framework unacceptable
  - Slow… 3-5 DAYS

- Identified needs:
  - Recommended treatment for each structure
  - Ability to fully utilize committed projects
  - Usable, realistic deterministic deterioration modeling
  - Comprehensive treatments and consequences
  - Updated risk profile

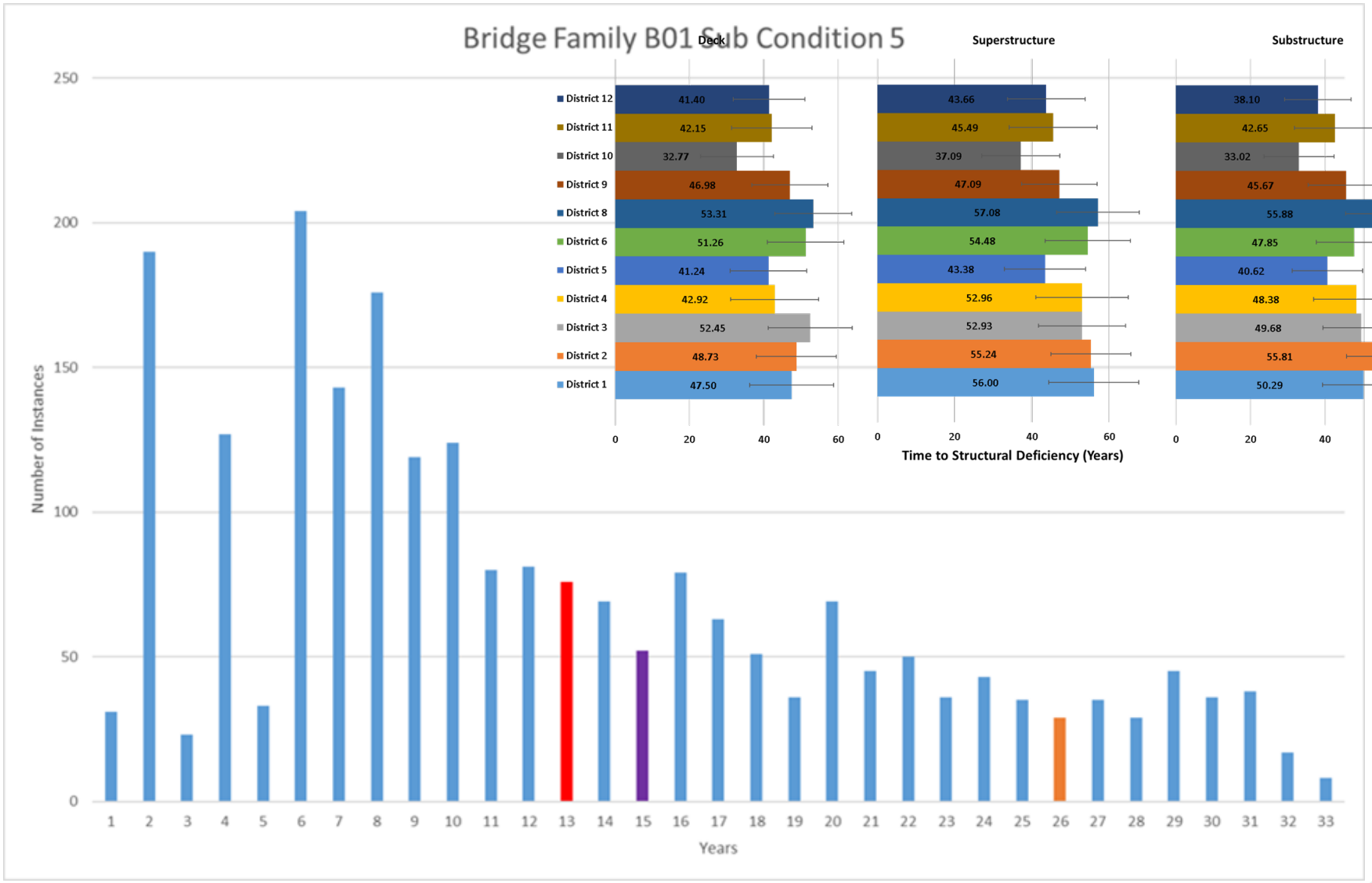
DETERIORATION



DETERIORATION

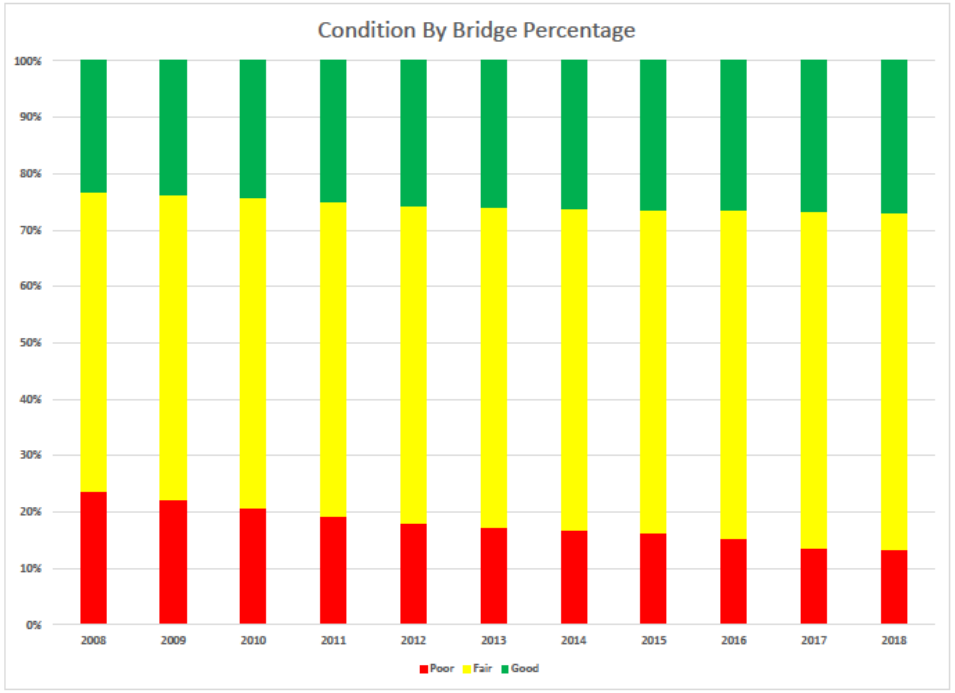


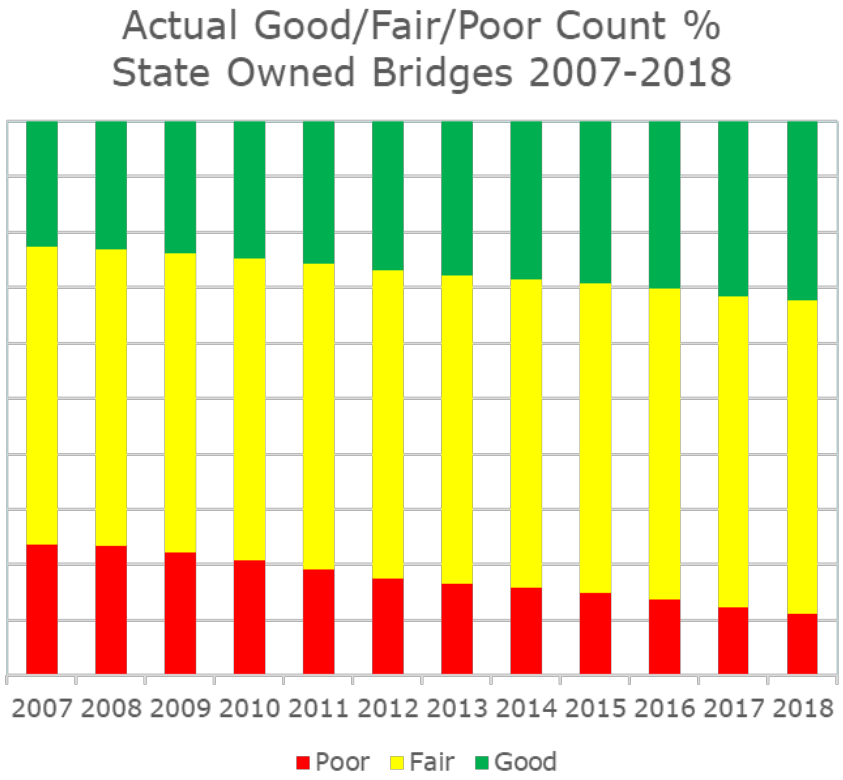
DETERIORATION



DETERIORATION

Output 2008-2018, Calculated vs Actual



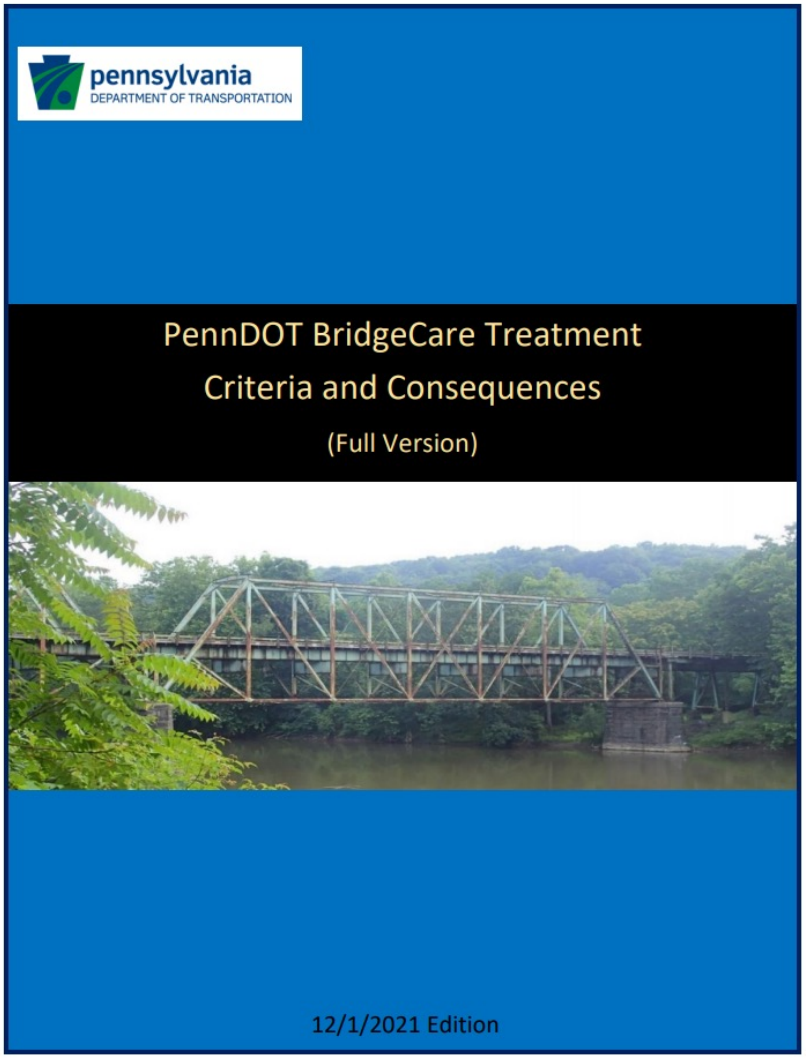


DETERIORATION

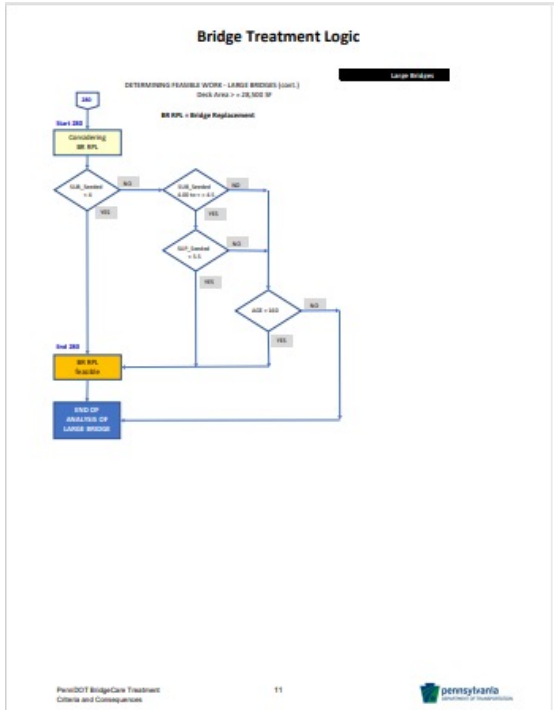
Summary:

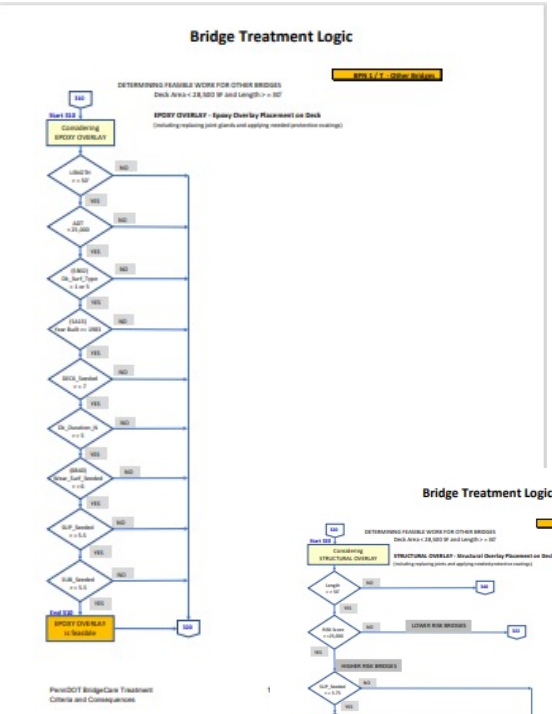
- MS Access script runs 10yr rolling average, updated every year, 4hr process
- Bridges broken down into families (11)
- Unique models per family, per District
- Plus top 500 individual largest structures

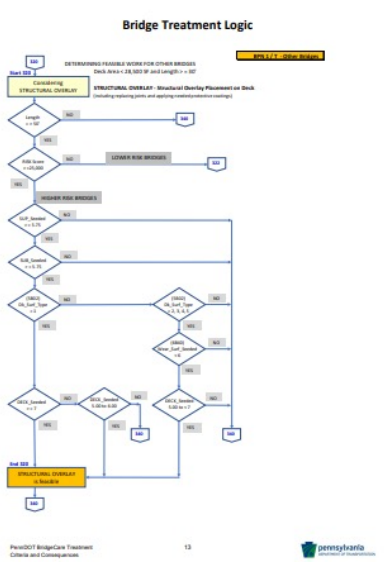
TREATMENTS

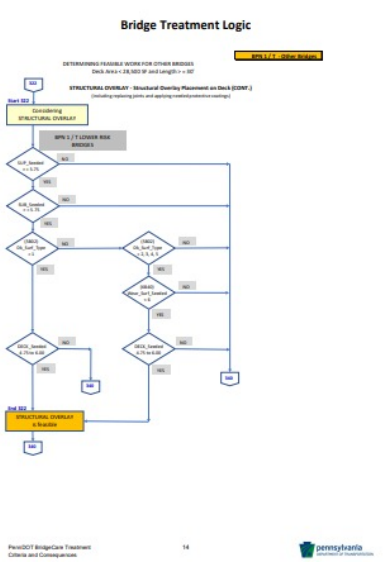

pennsylvania
DEPARTMENT OF TRANSPORTATION
PennDOT BridgeCare Treatment
Criteria and Consequences
(Full Version)
12/1/2021 Edition

TREATMENTS


Bridge Treatment Logic
Large Bridges
DETERMINING FEASIBLE WORK - LARGE BRIDGES (cont.)
Deck Area > = 28,500 SF
BR RPL = Bridge Replacement
Start 280
Considering BR RPL
End 280
BR RPL is feasible
END OF ANALYSIS OF LARGE BRIDGE
PennDOT BridgeCare Treatment Criteria and Consequences
11
pennsylvania


Bridge Treatment Logic
RPN 1 / 7 - Other Bridges
DETERMINING FEASIBLE WORK FOR OTHER BRIDGES
Deck Area < 28,500 SF and Length > = 50'
EPOXY OVERLAY - Epoxy Overlay Placement on Deck
Considering EPOXY OVERLAY
End 310
EPOXY OVERLAY is feasible
PennDOT BridgeCare Treatment Criteria and Consequences


Bridge Treatment Logic
RPN 1 / 7 - Other Bridges
DETERMINING FEASIBLE WORK FOR OTHER BRIDGES
Deck Area < 28,500 SF and Length > = 50'
STRUCTURAL OVERLAY - Structural Overlay Placement on Deck
Considering STRUCTURAL OVERLAY
LOWER RISK BRIDGES
HIGHER RISK BRIDGES
End 320
STRUCTURAL OVERLAY is feasible
PennDOT BridgeCare Treatment Criteria and Consequences
13
pennsylvania


Bridge Treatment Logic
RPN 1 / 7 - Other Bridges
DETERMINING FEASIBLE WORK FOR OTHER BRIDGES
Deck Area < 28,500 SF and Length > = 50'
STRUCTURAL OVERLAY - Structural Overlay Placement on Deck (CONT.)
Considering STRUCTURAL OVERLAY
RPN 1 / 7 LOWER RISK BRIDGES
End 320
STRUCTURAL OVERLAY is feasible
PennDOT BridgeCare Treatment Criteria and Consequences
14
pennsylvania

TREATMENTS

Summary

- 13 predefined treatments (unlimited user treatments)

- Predefined treatment windows thoroughly tested
  - 25k/year, 25 years, 0.08% error

- Adhere to LLCC principals

- Secondary treatments defined for funding that exceeds LLCC needs “wish treatments”

BRIDGECARE

pennsylvania
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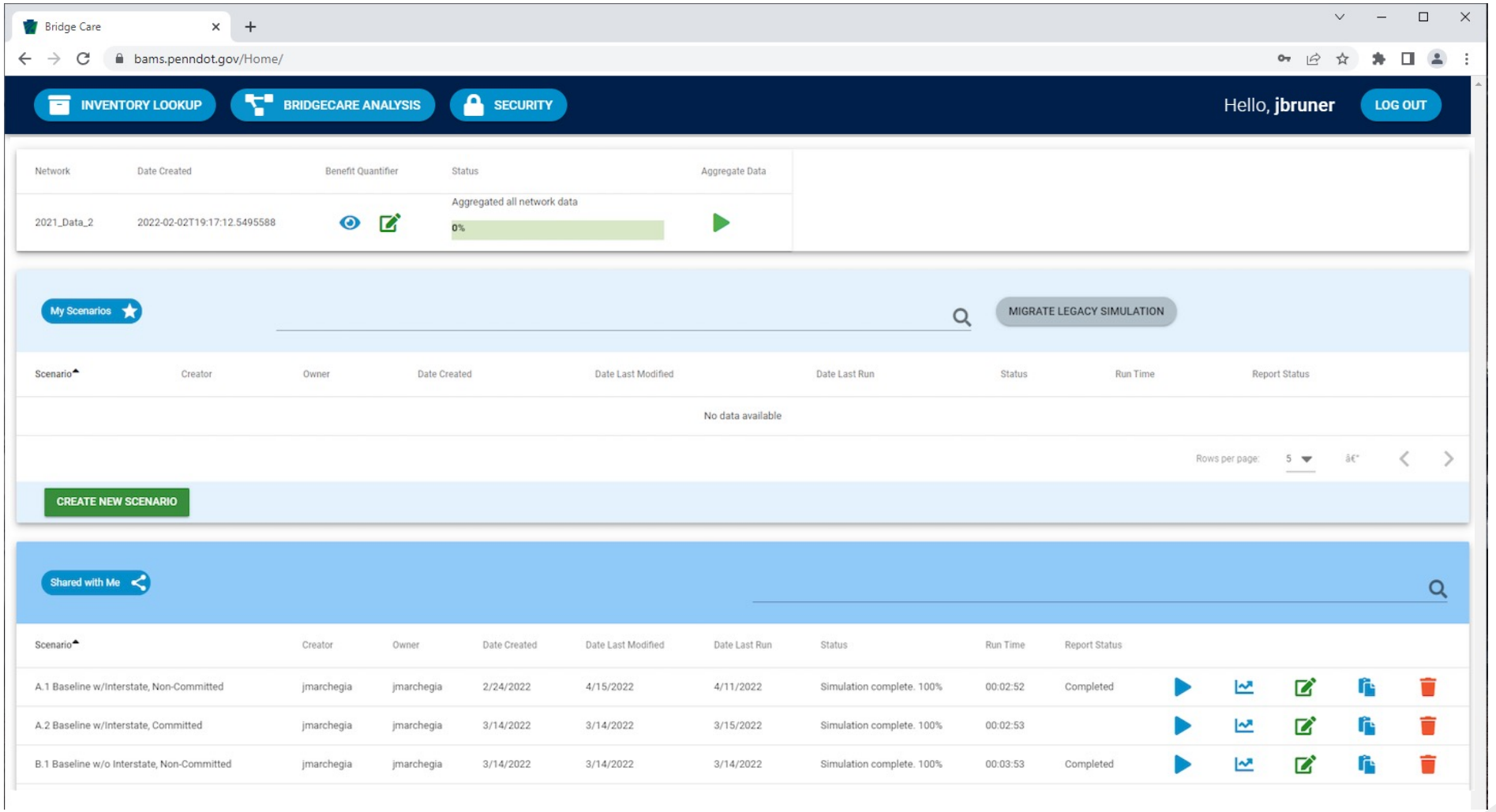
BAMS


Bridge Care
bams.penndot.gov/Home/
INVENTORY LOOKUP
BRIDGECARE ANALYSIS
SECURITY
Hello, jbruner
LOG OUT
Network
Date Created
Benefit Quantifier
Status
Aggregate Data
2021_Data_2
2022-02-02T19:17:12.5495588
Aggregated all network data
0%
My Scenarios
MIGRATE LEGACY SIMULATION
Scenario
Creator
Owner
Date Created
Date Last Modified
Date Last Run
Status
Run Time
Report Status
No data available
Rows per page:
5
CREATE NEW SCENARIO
Shared with Me
Scenario
Creator
Owner
Date Created
Date Last Modified
Date Last Run
Status
Run Time
Report Status
A.1 Baseline w/Interstate, Non-Committed
jmarchegia
jmarchegia
2/24/2022
4/15/2022
4/11/2022
Simulation complete. 100%
00:02:52
Completed
A.2 Baseline w/Interstate, Committed
jmarchegia
jmarchegia
3/14/2022
3/14/2022
3/15/2022
Simulation complete. 100%
00:02:53
B.1 Baseline w/o Interstate, Non-Committed
jmarchegia
jmarchegia
3/14/2022
3/14/2022
3/14/2022
Simulation complete. 100%
00:03:53
Completed

BAMS

- BAMS / PennDOT's bridge asset management system- "BridgeCare"

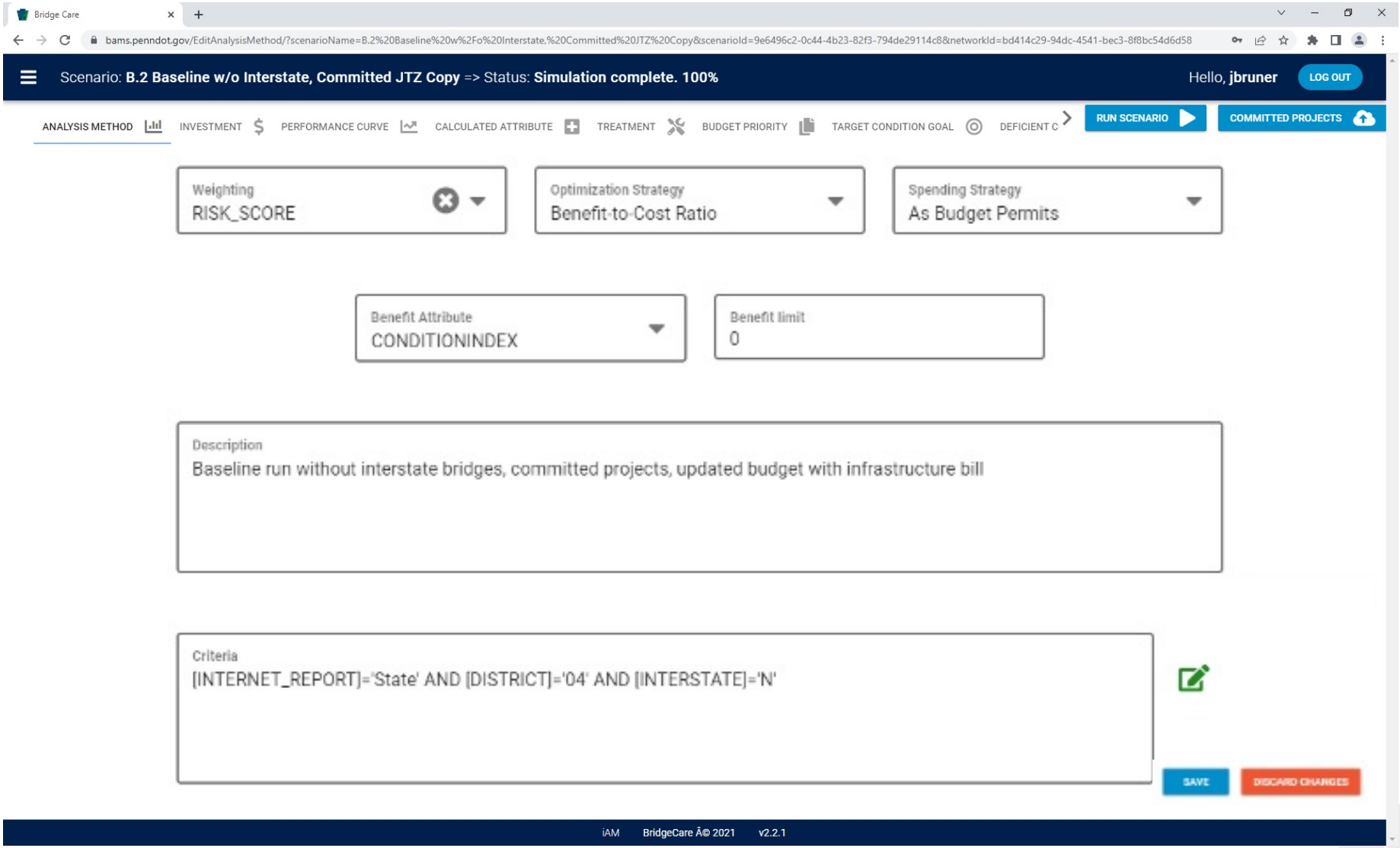
- Implemented with lessons learned from:
  - PAMS
  - BAMS Lite
  - Deterioration Modeling work
  - Treatment and consequence work
  - Risk score
  - TAMP (x3)
  - FHWA AM Requirements

BAMS

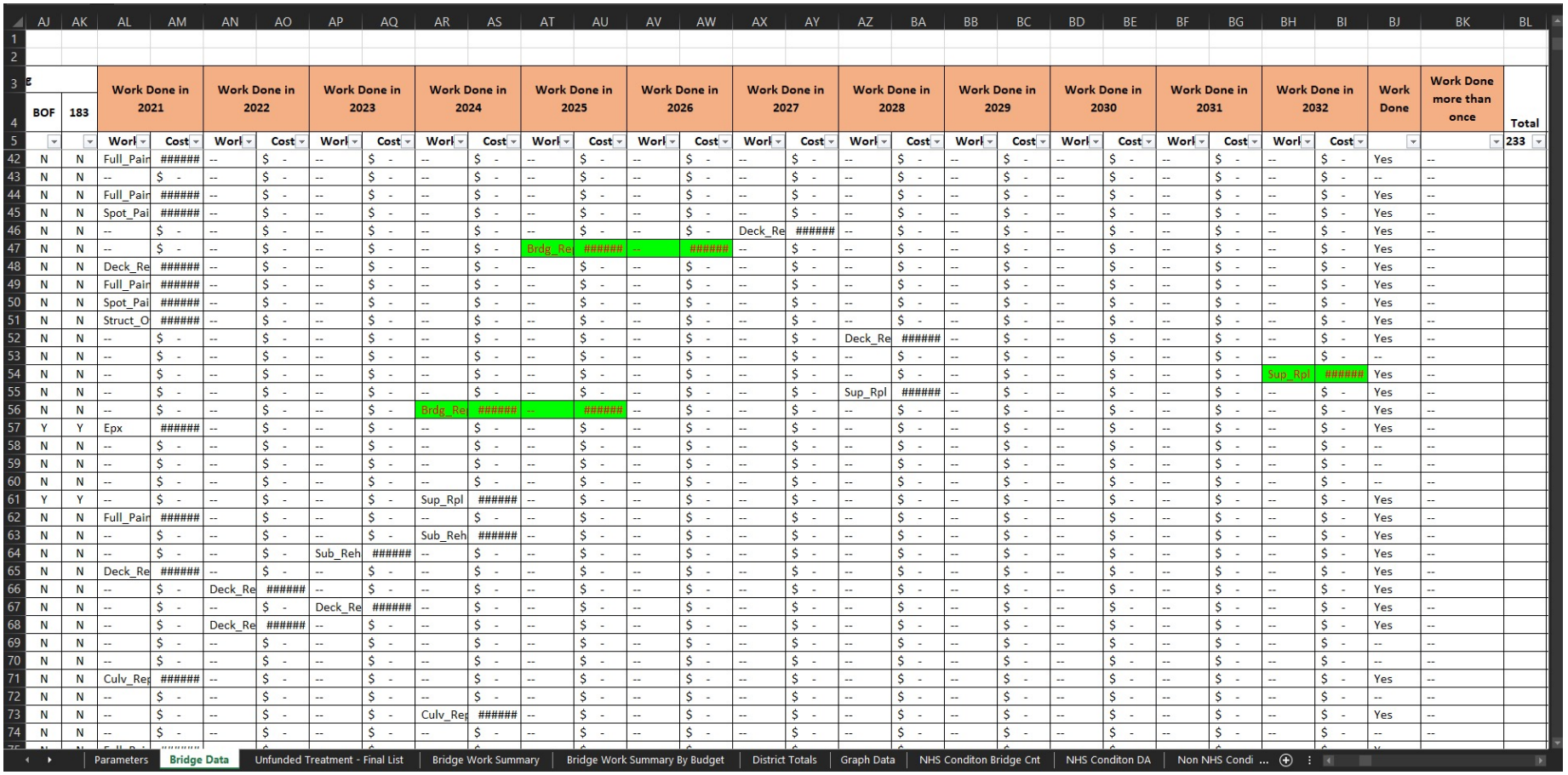
BridgeCare:

- Open-source platform
  - Complete control over core logic routine
- MODA engine
  - Complete control over prioritization calculations
- Deterministic deterioration
  - Ability to forecast specific treatment per bridge per year
- Full LLCC capable
  - Complete control over investment logic
- Ability to use “wish treatments”
  - Advanced logic routines

BAMS


Bridge Care
bams.penndot.gov/EditAnalysisMethod/?scenarioName=B.2%20Baseline%20w%2Fo%20Interstate,%20Committed%20JTZ%20Copy&scenarioId=9e6496c2-0c44-4b23-82f3-794de29114c8&networkId=bd414c29-94dc-4541-bec3-8f8bc54d6d58
Scenario: B.2 Baseline w/o Interstate, Committed JTZ Copy => Status: Simulation complete. 100%
Hello, jbruner
LOG OUT
ANALYSIS METHOD
INVESTMENT
PERFORMANCE CURVE
CALCULATED ATTRIBUTE
TREATMENT
BUDGET PRIORITY
TARGET CONDITION GOAL
DEFICIENT C
RUN SCENARIO
COMMITTED PROJECTS
Weighting
RISK_SCORE
Optimization Strategy
Benefit-to-Cost Ratio
Spending Strategy
As Budget Permits
Benefit Attribute
CONDITIONINDEX
Benefit limit
0
Description
Baseline run without interstate bridges, committed projects, updated budget with infrastructure bill
Criteria
[INTERNET_REPORT]='State' AND [DISTRICT]='04' AND [INTERSTATE]='N'
SAVE
DISCARD CHANGES
iAM
BridgeCare Â© 2021
v2.2.1

BAMS



AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL
BOF	183	Work Done in 2021		Work Done in 2022		Work Done in 2023		Work Done in 2024		Work Done in 2025		Work Done in 2026		Work Done in 2027		Work Done in 2028		Work Done in 2029		Work Done in 2030		Work Done in 2031		Work Done in 2032		Work Done	Work Done more than once	Total
		Work	Cost	Work	Cost	Work	Cost	Work	Cost	Work	Cost	Work	Cost	Work	Cost	Work	Cost	Work	Cost	Work	Cost	Work	Cost	Work	Cost			233
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N	N	Spot_Pai	######	--	$ -	--	$ -	--	$ -	--	$ -	--	$ -	--	$ -	--	$ -	--	$ -	--	$ -	--	$ -	--	$ -	Yes	--	
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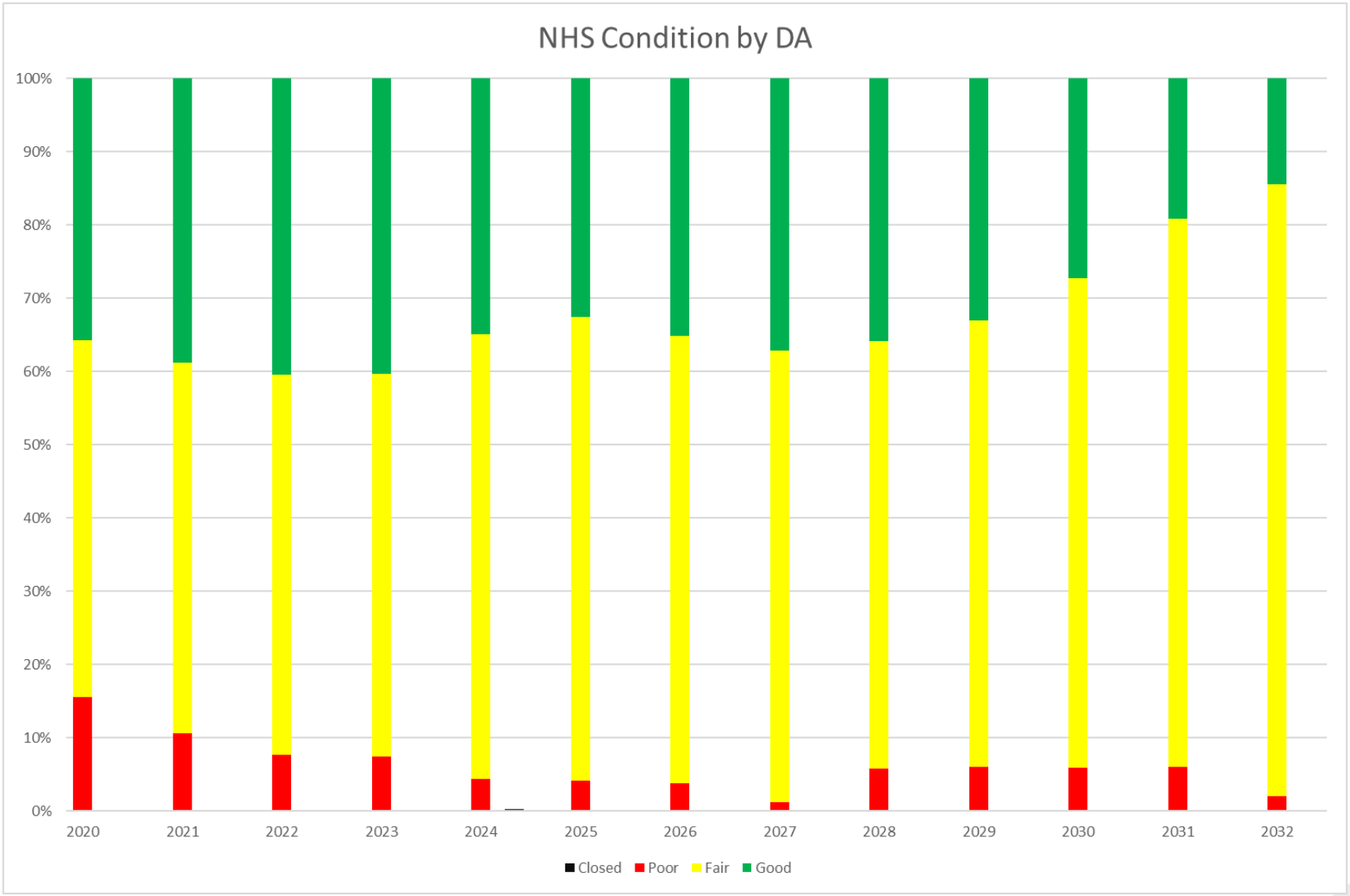
Parameters | Bridge Data | Unfunded Treatment - Final List | Bridge Work Summary | Bridge Work Summary By Budget | District Totals | Graph Data | NHS Conditon Bridge Cnt | NHS Conditon DA | Non NHS Condi ...

BAMS


NHS Condition by DA
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
Closed
Poor
Fair
Good

BAMS

Custom vs COTS implementation:

- Implementation roughly same timeframe
- Cost is equivalent
- Internal effort is significantly more for custom
  - Can be mitigated with consultant support

Custom software benefits:

- Near-absolute control (funding limited)
- Internal logic made to follow DOT/GOV process
- Heightened financial sensitivity
- Trust

Bonus

- Fully open source- free to all!
- Asset agnostic- manage any asset

BAMS

KEY takeaways…

- Open source- feel free to copy and use, free of charge.
- Deterministic deterioration- allows for individual treatment recommendations for all years (not possible with some COTS)
- Committed project integration- allows for accurate forecasting based on actual planned work (difficult for COTS)
- Complete customization- able to faithfully emulate current business processes…

ASSET MANAGEMENT

- The utilization of BAMS and PAMS is one piece of the puzzle
- Program development is still a human process
- Local knowledge is important to that process
- Lowest Life Cycle Cost decisions can be made with limited funding

PROJECT BUILDER

- BAMS and PAMS provide *TREATMENTS,* but money is spent through **PROJECTS**
- Ability to accurately predict future conditions can only be based on **PROJECTS**
- ProjectBuilder based on lessons learned from BAMS and other efforts, part of PennDOT AM open-source software suite

PROJECT BUILDER

BAMS

BR 388

BR 1244

TYP

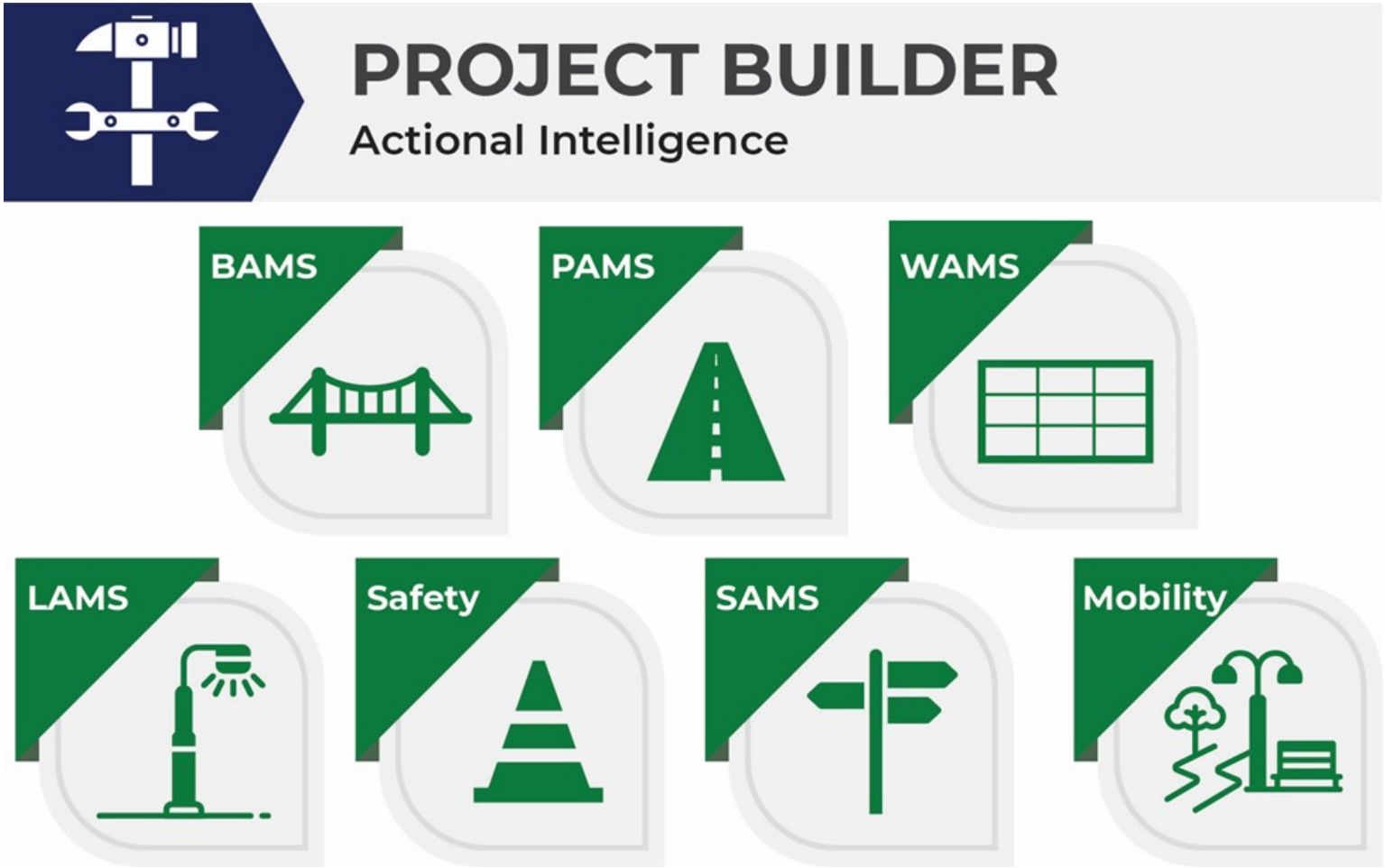
SR 1012

SR 322

SR 1044

PAMS

PROJECT BUILDER



QUESTIONS?

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Colorado DOT Presentation

Britton Stocks and Toby Manthey

Dialogue and Q&A

Submit your questions using the webinar's chat feature

Menti Poll

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9744 1075

What did you find the most valuable from today's webinar?

lessons learned

Lessons learned

Multi-Asset management

The need for good data and not trying to do too much right off the bat.

Systems available

Train the trainer: train one district and have them help train the others (NMDOT)

seeing what else is out there

Different practices and approaches across states

feedback/practical examples from presenters

What did you find the most valuable from today's webinar?

Understanding that everystate has a wealth of experience to share and help guide development of TAM Tools

Open Source is a great idea

Agencies have taken different approaches.

The input from states with varying levels of TAM and MQA maturity. A lot of agencies feel they are behind and this helps them recognize that they can still improve processes and systems.

that most systems are not up-to-date

asset management system briefs

The ability to compare these states' processes similar to Kansas

I didn't get a lot of value out of this

Hearing more perspective

What do you want most from an asset management system that you do not have today?

good data

integration and simplification

Optimizing across multiple assets

An asset management system

User interface

Open Source to share advancement from agency to agency with out paying for it

Ability to be flexible in data management

Easier analysis of the output from the system.

to use AASHTO

What do you want most from an asset management system that you do not have today?

Cross-asset allocation

Decision-makers using the insights from our management systems.

differences between AASHTO Bridge Managements and State's one

Knowledge Management element to Asset Mgmt. Systems.

Skills of personnel integration

different practices and approaches across states

More automation

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Federal Highway Administration

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