



2022 FTBA Construction Conference

Embracing the Profound Presence of Each Individual

January 20th & 21st | Hyatt Regency Orlando

Presented by:
Kathryn Weisner,
PE, NRAEMT

FHWA's e-Construction Initiative



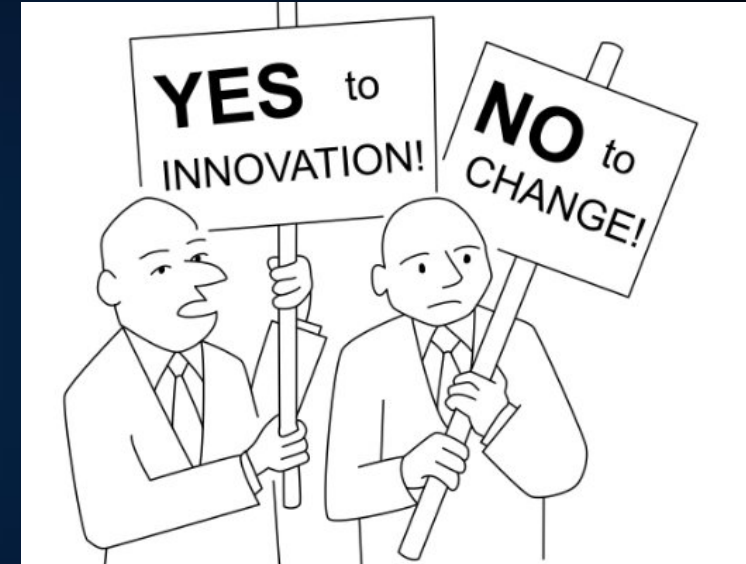
U.S. Department of Transportation
Federal Highway Administration



Technology is nothing.

*What's important is that you have a **faith in people**, that they're basically good and smart, and if you give them tools, they'll do wonderful things with them.*

-Steve Jobs



Notice

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A **State-based** model that identifies & rapidly deploys
proven, yet underutilized innovations...

*...to shorten the project delivery process,
enhance roadway safety,
reduce traffic congestion, and
integrate automation (FAST Act §1444)*

Market-Ready, Proven...Underutilized

- ✓ Every State advanced 19 or more of the 52 innovations promoted in the first five EDC rounds, and some states adopted 40 or more innovations





- **e-Construction** an EDC-3 & EDC-4 innovation
 - ✓ 46 “states” Advanced to the Institutionalized, Assessment or Demo Phase
- **e-Ticketing** an EDC-6 innovation
 - ✓ 48 of 54 “states” have a goal to advance **e-Ticketing** by December 2022, the **highest** acceptance rate in EDC history!
- **Digital As-builts** an EDC-6 innovation
 - ✓ 27 of 54 “states” have a goal to advance **DABs** by December 2022

Federal Technical Support

- Peer Exchanges & Workshops
- Webinars
- Articles in various publications
- Virtual Vender Showcase
- Update online e-C Matrices (by state & by Innovation)
 - <https://www.fhwa.dot.gov/construction/econstruction/peer.cfm>
- Technical Customer Support Hotline
 - FAQ posted on e-C Website
- TFHRC research projects and reports
- Pilot projects



Federal Financial Assistance



- Fosters & supports the **State Transportation Innovation Councils'** national network, \$100K/STIC/year

- <https://www.fhwa.dot.gov/innovation/stic/>



- Supports innovation thru the **Accelerated Innovation Deployment** grant program, up to \$1M per project

- <https://www.fhwa.dot.gov/innovation/grants/>



- **Accelerating Market Readiness** supports emerging transformative innovations in safety, project delivery, and infrastructure performance



- **SPR funds & Increased Federal Share**



Source: FHWA



U.S. Department of Transportation
Federal Highway Administration

Keep Informed

Sign up for EDC News and Innovator



Get on your mobile device! Text “FHWA Innovation” to 468311

<https://www.fhwa.dot.gov/innovation/>

<https://www.youtube.com/watch?v=GRR6sNWLrt0>

<https://www.fhwa.dot.gov/construction/econstruction/overview.cfm>



Source: FHWA



**Q: Why
e-Construction?**

**A: To improve
communication &
workflows for
efficient delivery
of projects in the
electronic & digital
age.**



U.S. Department of Transportation
Federal Highway Administration



<<< From this ...

... To this >>>



Top 6 State-of-the-Practice

- #1 = Electronic Bidding & Contracts
- #2 = Electronic & Digital Signatures
- #3 = Document Management Systems (DMS)
- #4 = Construction Management Systems (CMS)
- #5 = Mobile Devices
- #6 = MSAR (Federal Emergency Event Reporting)

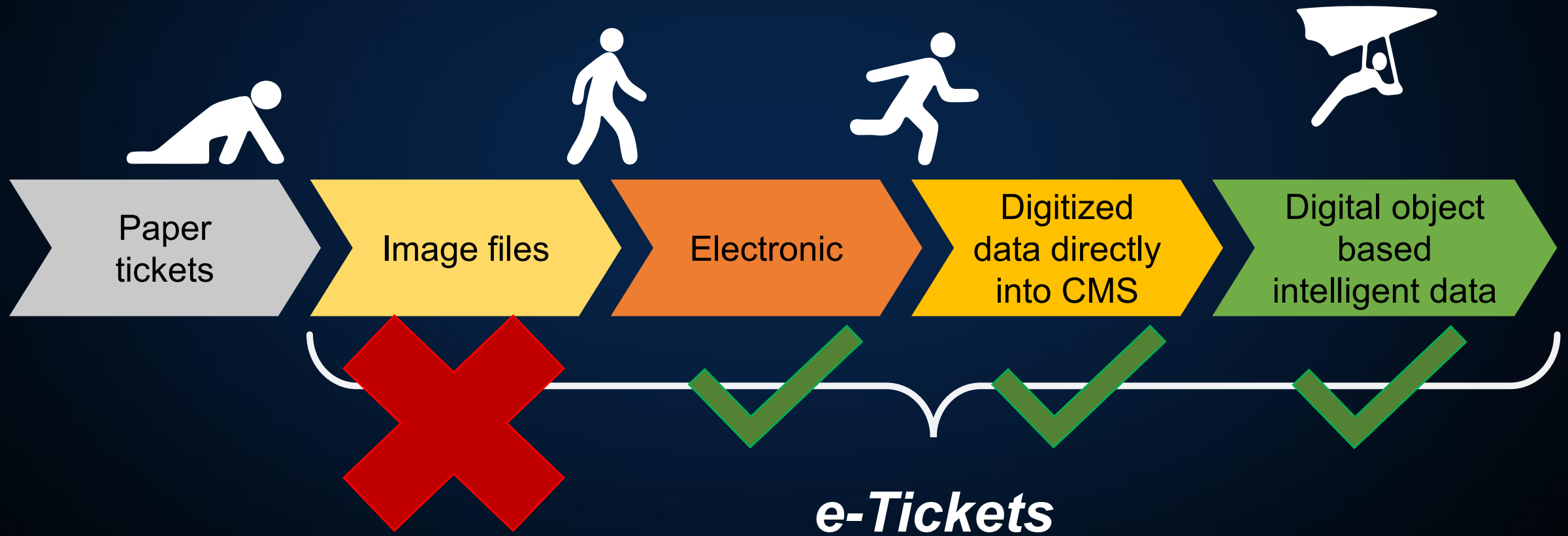


Top 3 State-of-the-Art

- #1 = e-Ticketing
- #2 = MALD & DABs
- #3 = Data Sharing Between Steps & Silos

**#4 = SmartPile
Inspector**

SoA #1: e-Tickets



Q: e-Ticketing...WHY? Safety!

- Removes the need to take tickets from the drivers

SAVES
LIVES

View from the driver's seat



View from the ground



Safety

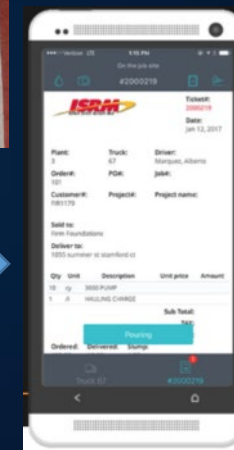
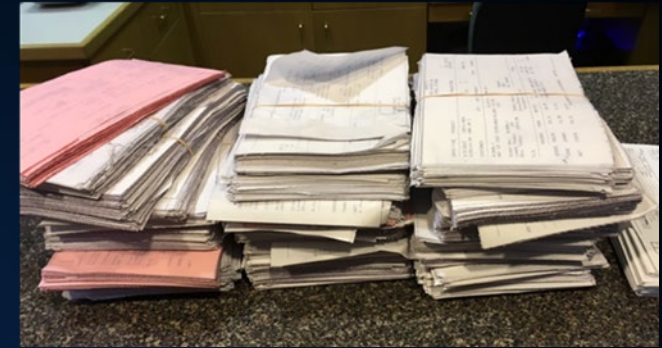
- Not a good place for inspector to be
- Picture this at night
- One wrong backward step
- Less visibility
- One slight weave by a driver...



Source: ALDOT

Types of e-Tickets

- **State-of-the-Practice: The Big 3**
 - HMA
 - PCC
 - Aggregate
- **State-of-the-Art: the Others**
 - Salt
 - Soil
 - Structural Steel and Rebar
 - Precast PCC: pipe, inlets, box culverts
 - Guardrail
 - Signs
 - Millings
 - Liquid asphalt/emulsions



e-Ticketing – Field data

#70 Inspection at job site

AT JOB SITE

Air content

+

Slump

+

Concrete temperature

+

Water added

+

Revolutions

Unit weight

Discharged at: click to select

ACCEPTANCE

Concrete accepted

INSPECTOR SIGNATURE

Verizon 8:24 AM 86%

eTicketing - SR-134: I-15 Interchange Modifications

LTDOT Keeping Utah Moving

GEOGRAPHIC INFO

Supplier Info

Order ID (supplier) 17263

Ticket Number (supplier) 8139284

Plant (supplier) WHO

Product Description 1/2"SHRP 75 64-34

Ticket Date & Time Thursday, Aug 1:50 AM

Item Number 27

PIN 15276

Visually Verify Delivery *
☒ Yes
☐ No

Temperature (F) 270

Sample Taken

Sample Taken
☐ Yes
☒ No

Reject
☐ Yes
☒ No

Partial Reject (Qty)

Notes

Point
40°40'N 111°57'W ± 50 m

Verizon 8:33 AM 84%

eTicketing - SR-134: I-15 Interchange Modifications

Sample Taken
☐ Yes
☒ No

Reject
☐ Yes
☒ No

Partial Reject (Qty)

Notes

Point
40°40'N 111°57'W ± 50 m

Verizon 8:25 AM 85%

eTicketing - SR-134: I-15 Interchange Modifications

Sample Taken
☐ Yes
☒ No

Reject
☐ Yes
☒ No

Partial Reject (Qty)

Notes

Point
40°40'N 111°57'W ± 50 m

Command Alkon

Comments

Water Added(Gal)	Qty on Truck	Time	Reason	
10.5	0	10:15 AM		<div>+ Add</div>
- 0 +	- 0 +	10:15 AM	Select	<div>Cancel</div> <div>Save</div>

Customer Signature

John

Clear Signature

Save

Driver Rating

★★★★★

INSPECTION ON SITE

INSPECTOR: Ryan

ACCEPTED

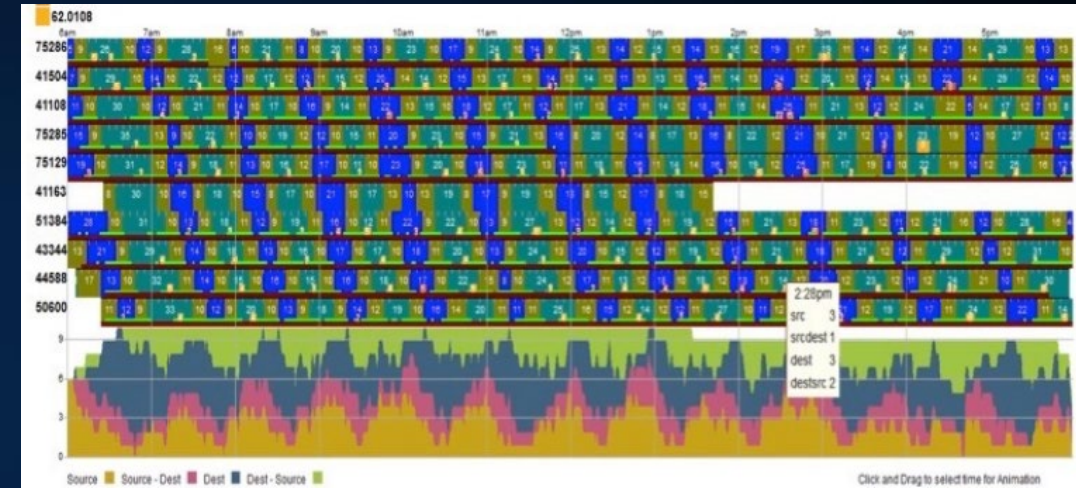
NOTES:
Sta 76+98 lt

AIR CONTENT: 8.90 SLUMP: 0.00 TEMPERATURE: 83.0 F WATER ADDED: 0.00 DISCHARGE TIME: 09:53:49
REVOLUTIONS: 30

e-Ticketing - Contractor Benefits

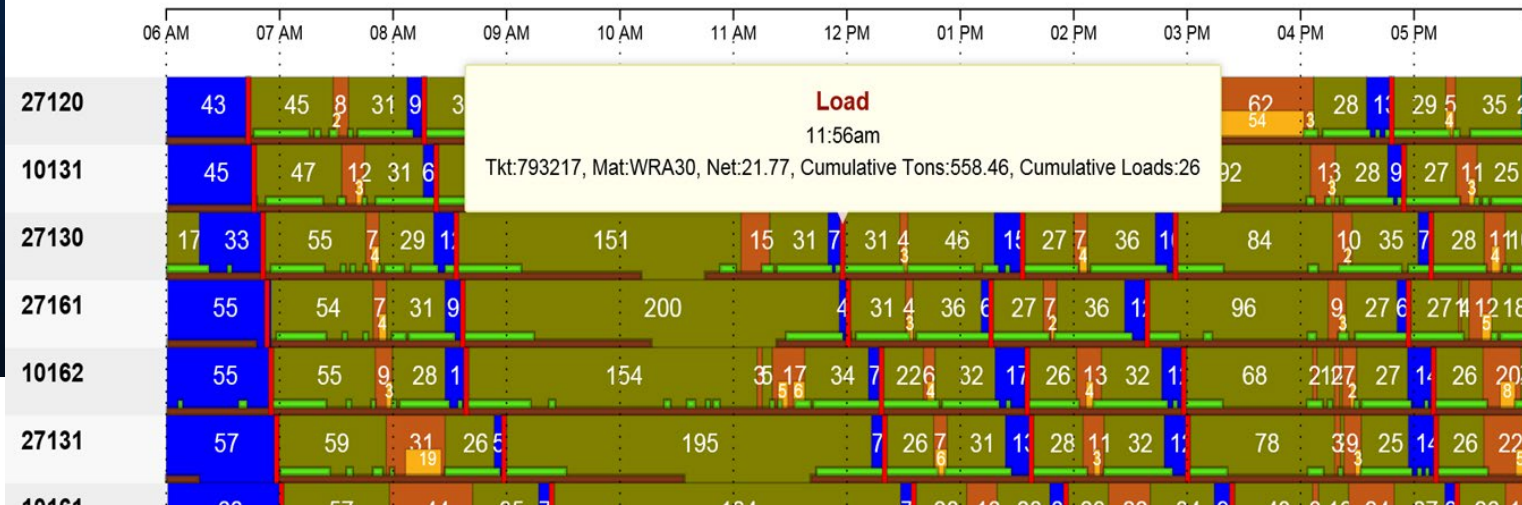
FLEET SAFETY & FLEET DATA

- Real-time fleet management
- Eliminate bottlenecks at plant and/or paver
- Data for trucking payroll
- Fleet optimization



Geozone Legend

- Travel (dark green)
- Engine On (brown)
- Moving (light green)
- Transport (cyan)
- Lindy - 2nd Ave (blue)
- A. Folino Shop (teal)
- ((71069 - Group 3 (ECMS# 105229, 111-17-7135-3) PAVING)) (orange)
- (53101) (yellow)
- Load (red)



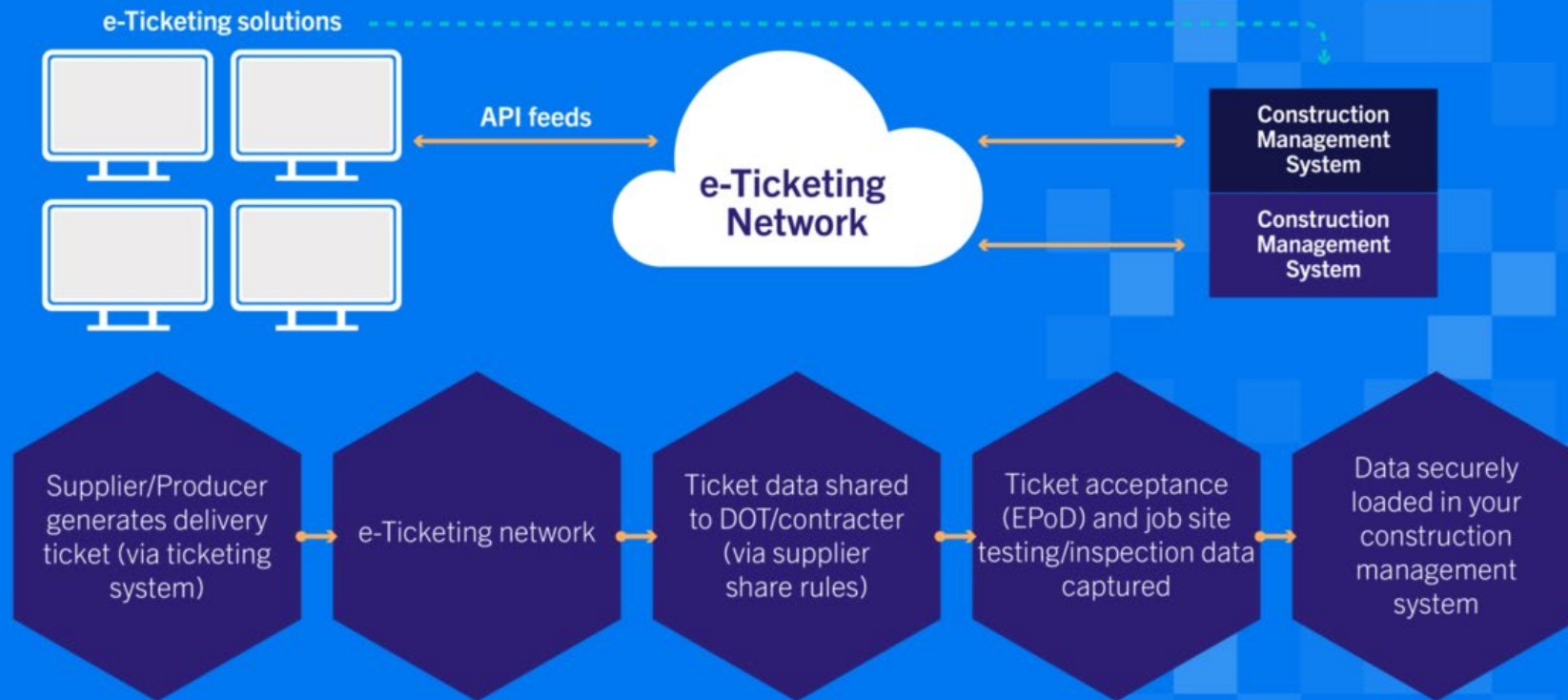
Source: KYTC, IOWA DOT

e-Ticketing – Data Management, Transfer, and Usage

SAVES
TIME

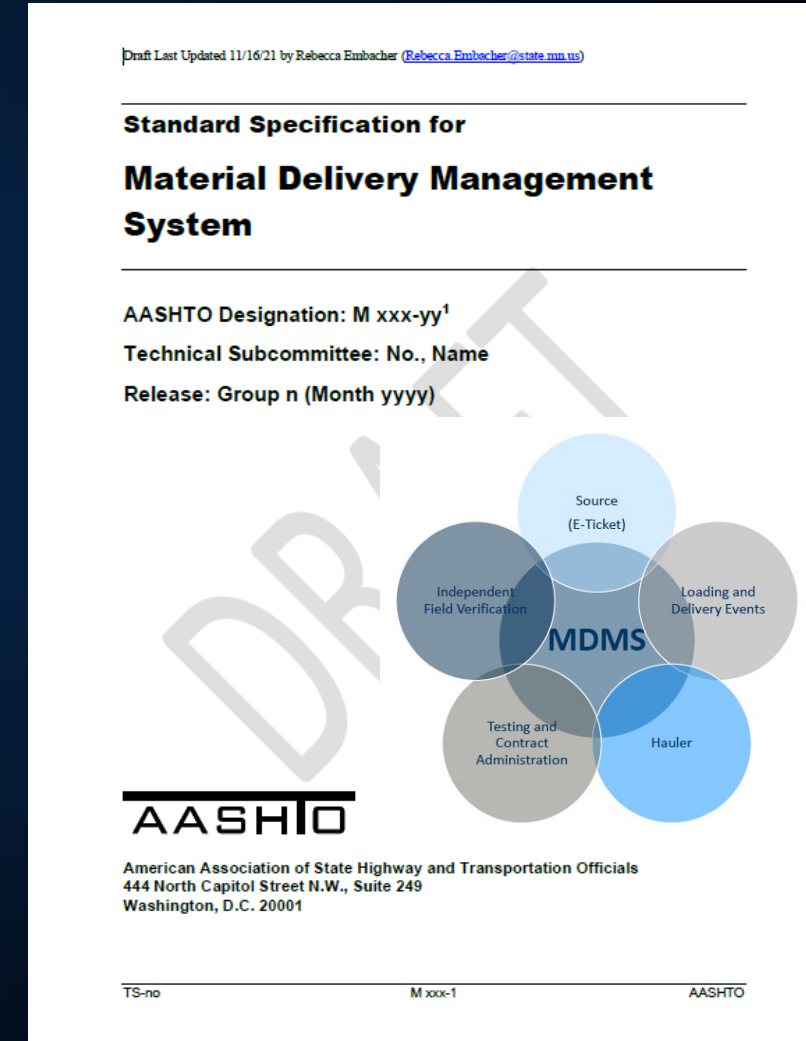
SAVES
MONEY

e-Ticketing Network Pilot

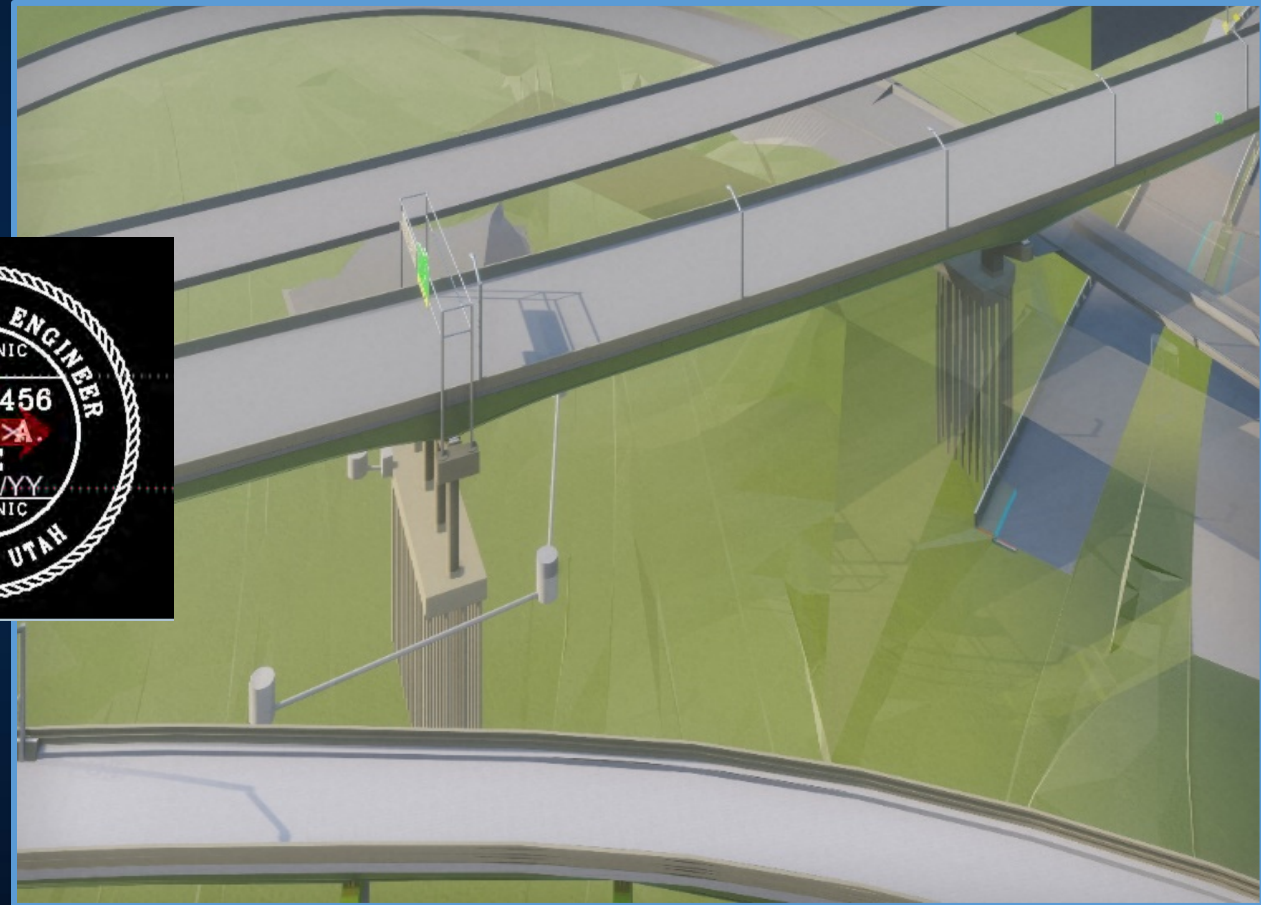
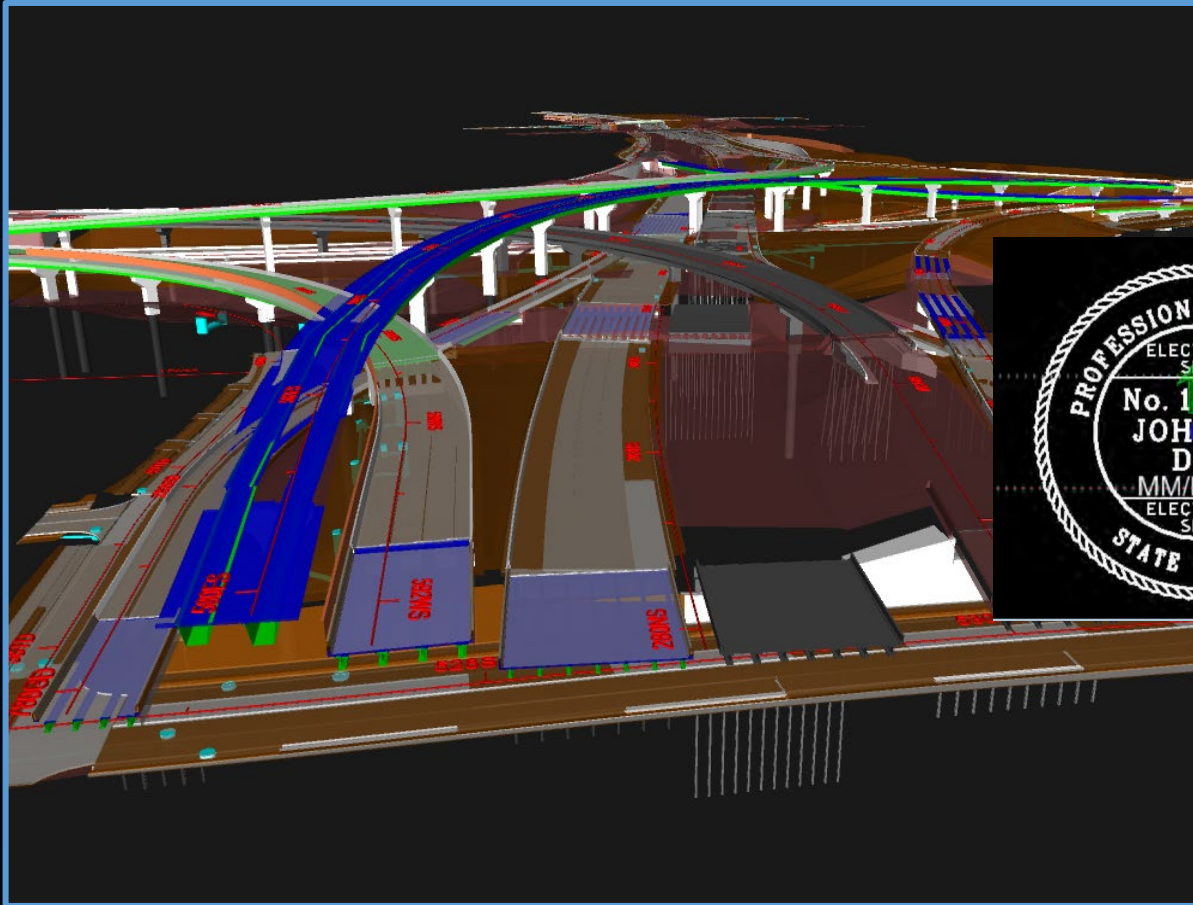


AASHTO Standard Specification

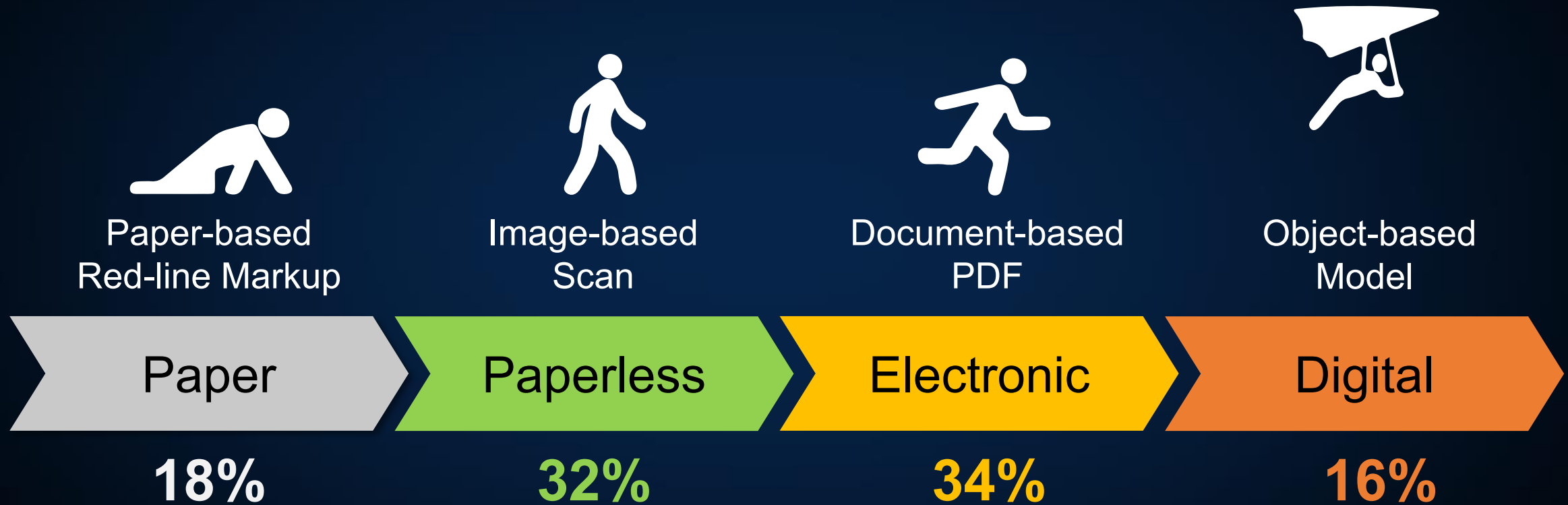
- AASHTO Provisional Practice for the Material Delivery Management System
- Publication in 2022 for Aggregate, Asphalt, and Concrete
- Pick and Choose which elements are most appropriate for your Agency
- Contact: Rebecca Embacher, MN DOT
 - rebecca.embacher@state.mn.us



SoA #2: MALD & DAbS



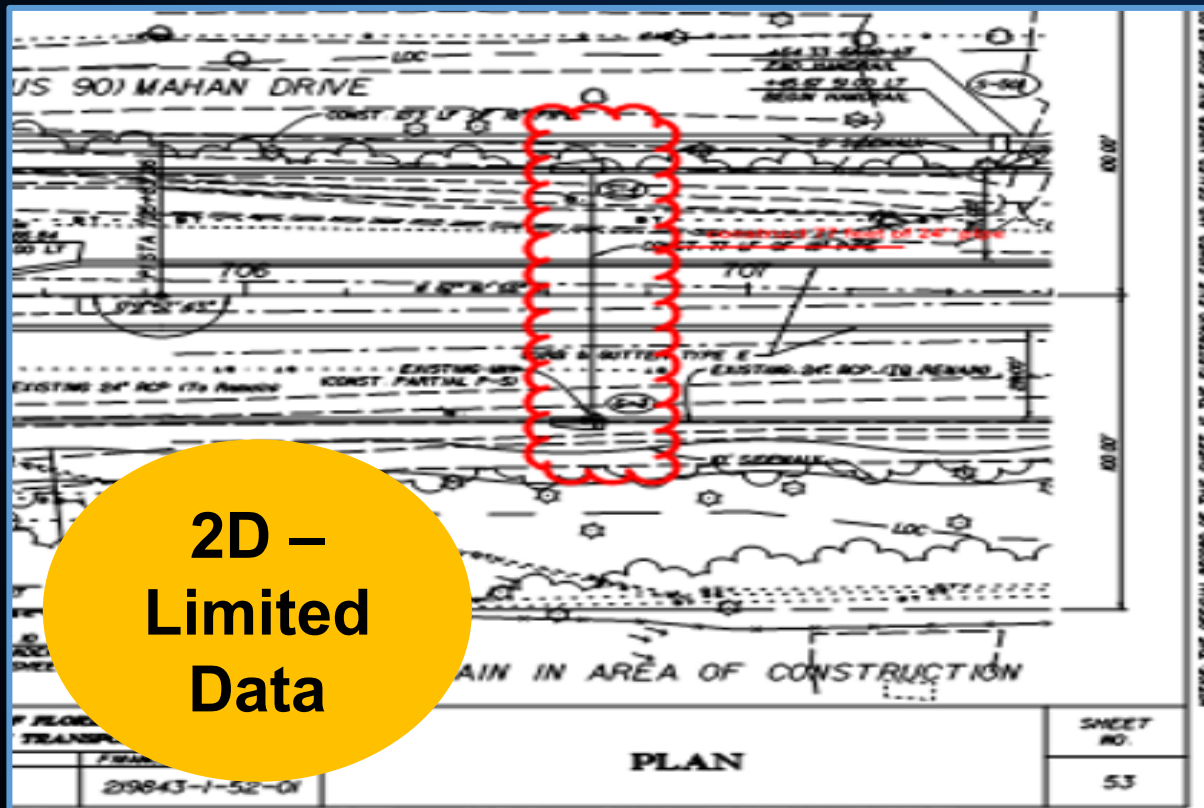
StateDOT – State of the Practice



State DOTs DABs Capability Maturity Model Recompiled from NCHRP 548 As-Builts Plans by State DOTs 2020

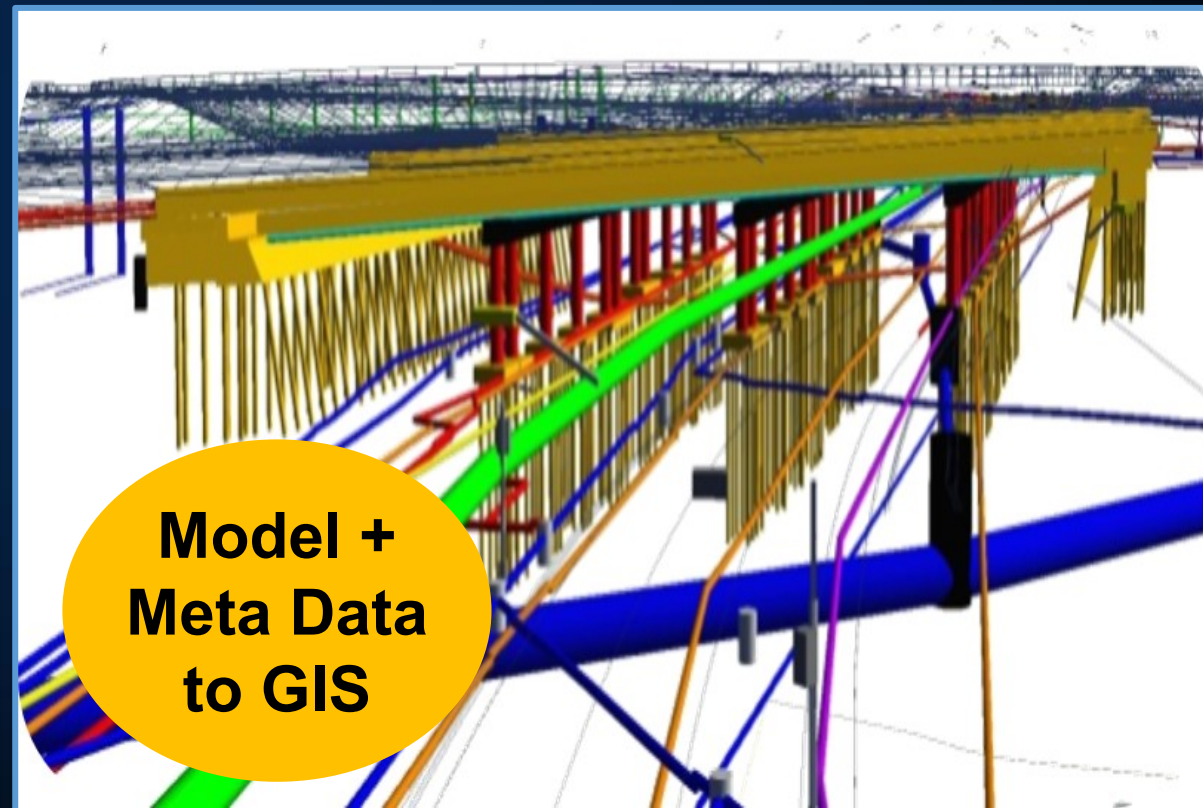

```

graph LR
    A[DESIGN] --> B[CONSTRUCTION]
    B --> C[O & M]
  
```



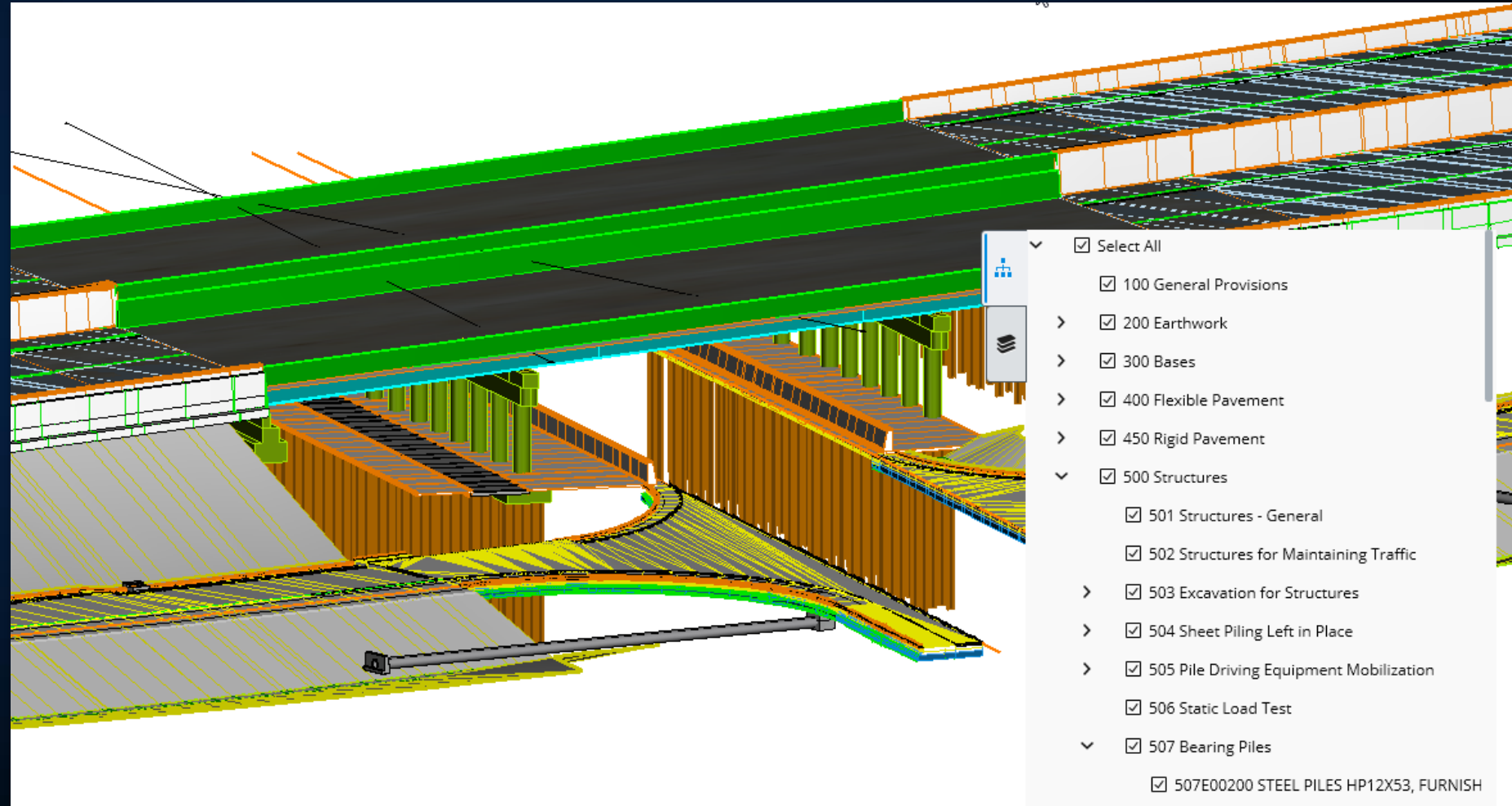
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graph LR
    A[DESIGN] --> B[CONSTRUCTION]
    B --> C[O & M]
  
```

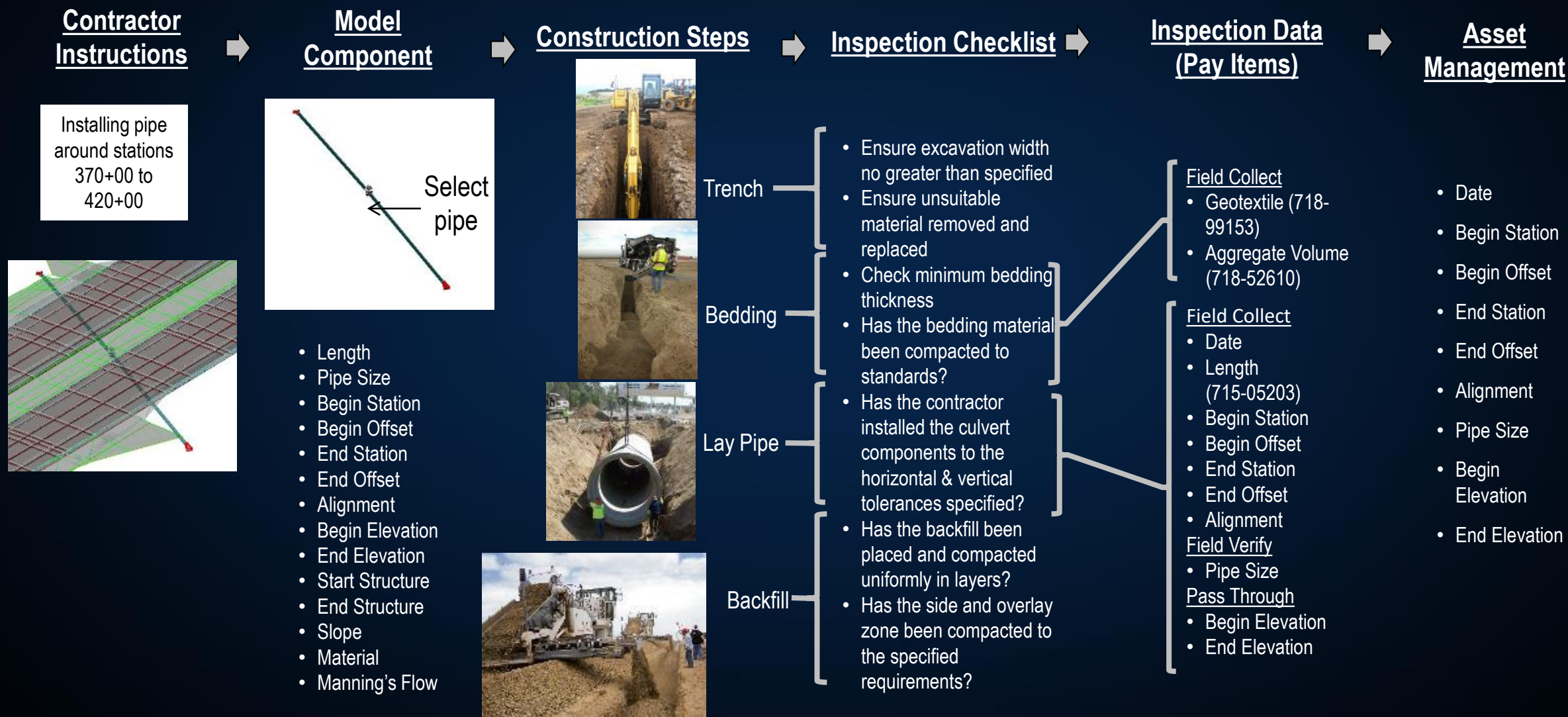


Model for Construction Inspection

- Communicate Inspection check lists
- Identify Pay Items



Model for Construction Inspection



Model for Construction Inspection

The screenshot displays the OpenRoads Navigator interface with a 3D model of a road construction project. The title bar shows 'OpenRoads Navigator' and 'IRD_plan_xs_2.imodel'. The left sidebar contains a tree view under 'Inspections' for '611E10400-24" CONDUIT, TYPE B'. The tree includes 'Admin' (green), 'Installation Plan' (green), 'Quality Form' (green), '14-Jan-19' (green), 'Field' (red), 'Excavation' (red), and 'Quality Form' (red). The 'Field' section is expanded, showing 'Excavation' (red) and 'Quality Form' (red). The 'Quality Form' section is further expanded, showing '611.04 C' (Pass), '611.05' (Pass), and '611.07' (Pass). The '611.07' section is circled in green. The main view shows a 3D model of a road with a green line indicating a re-inspected date. Green callout boxes provide additional context: 'Color coding reflects changed status' points to the green line; 'Re-inspected date is noted' points to the '15-Apr-19/17-Apr-' date; 'Save the form' points to the '611.07' section; and 'At a later date, the excavation was re-inspected and passed' points to the '611.07' section.

OpenRoads Navigator

IRD_plan_xs_2.imodel

Inspections

611E10400-24" CONDUIT, TYPE B

Admin V

Installation Plan V

Quality Form V

14-Jan-19

Field V

Excavation V

Quality Form V

15-Apr-19/17-Apr-

Item 611 Pipe

plan at their own risk.

CA-P-1 & CA-P-3 forms

Is the Contractor filling out the most up to date CA-P-1 and CA-P-3 forms during installation of each conduit run and drainage structure? These forms are required to be submitted before the start of the next work day. Do not compensate for Work prior to receiving the completed inspection forms.

611.04 C

Pass

611.05

Unsuitable material

Was any unsuitable material encountered during excavation? If so, note locations of overexcavation. Muck is

611.07

Drainage maintenance

Is the Contractor maintain flows and drainage at times during installation of the conduit? Document any flooding issues occurring during construction.

General Comments

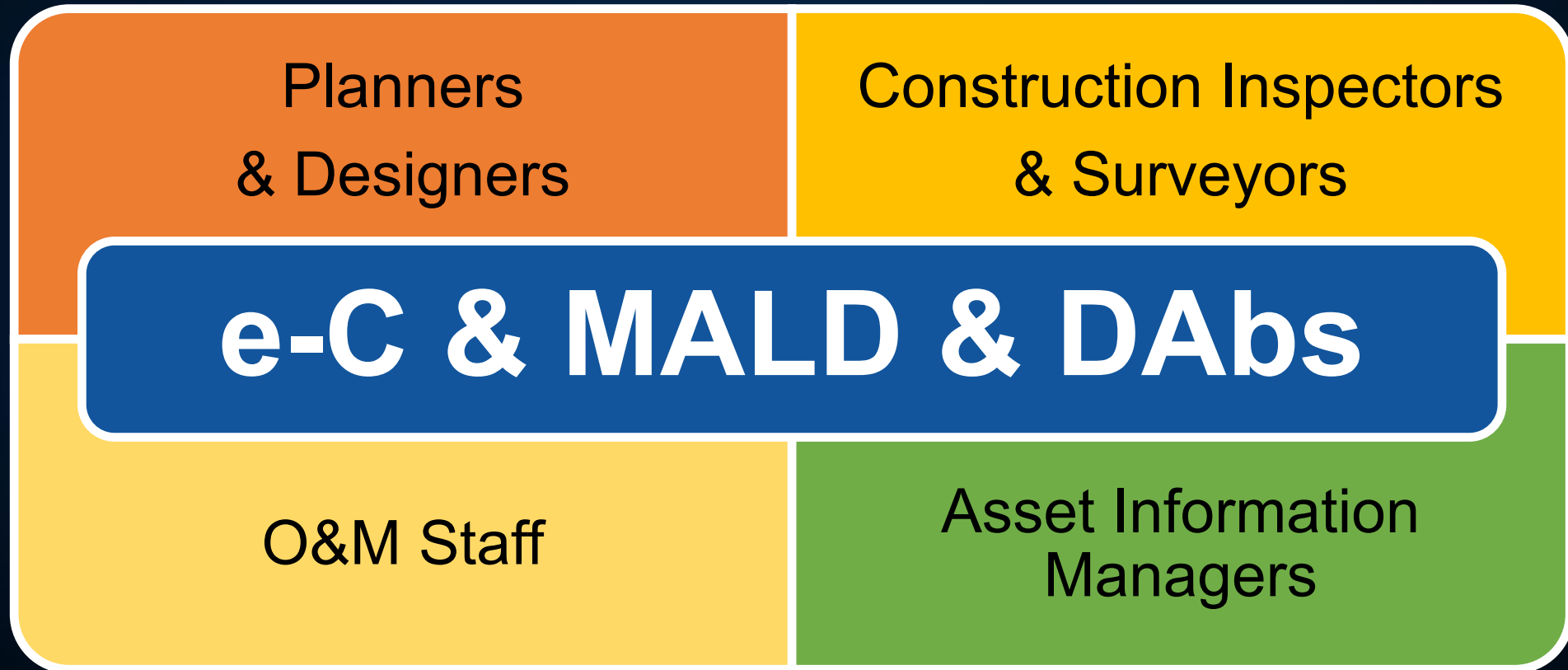
Color coding reflects changed status

Re-inspected date is noted

Save the form

At a later date, the excavation was re-inspected and passed

SoA #3: Data Sharing (steps & silos)

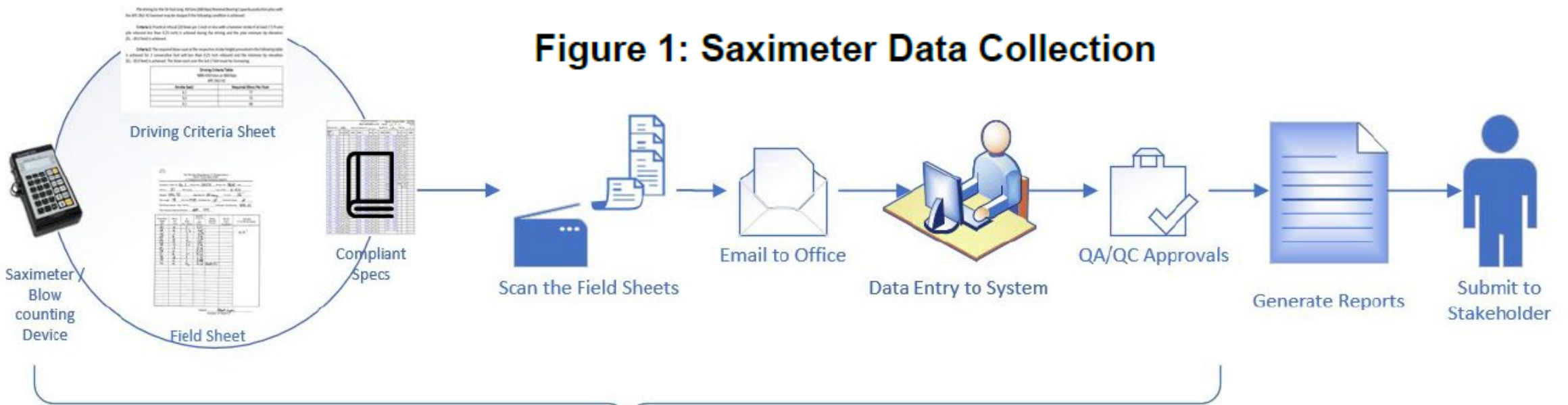


SoA #4: SmartPile Inspector

SmartPile® Inspector: Solution



- Over 100,000 piles driven annually
- Driving a pile correctly is **critical** to the health, integrity, and longevity of the entire structure
- Incomplete and Missing **data!!!**
- **Delays** in inspection and approval



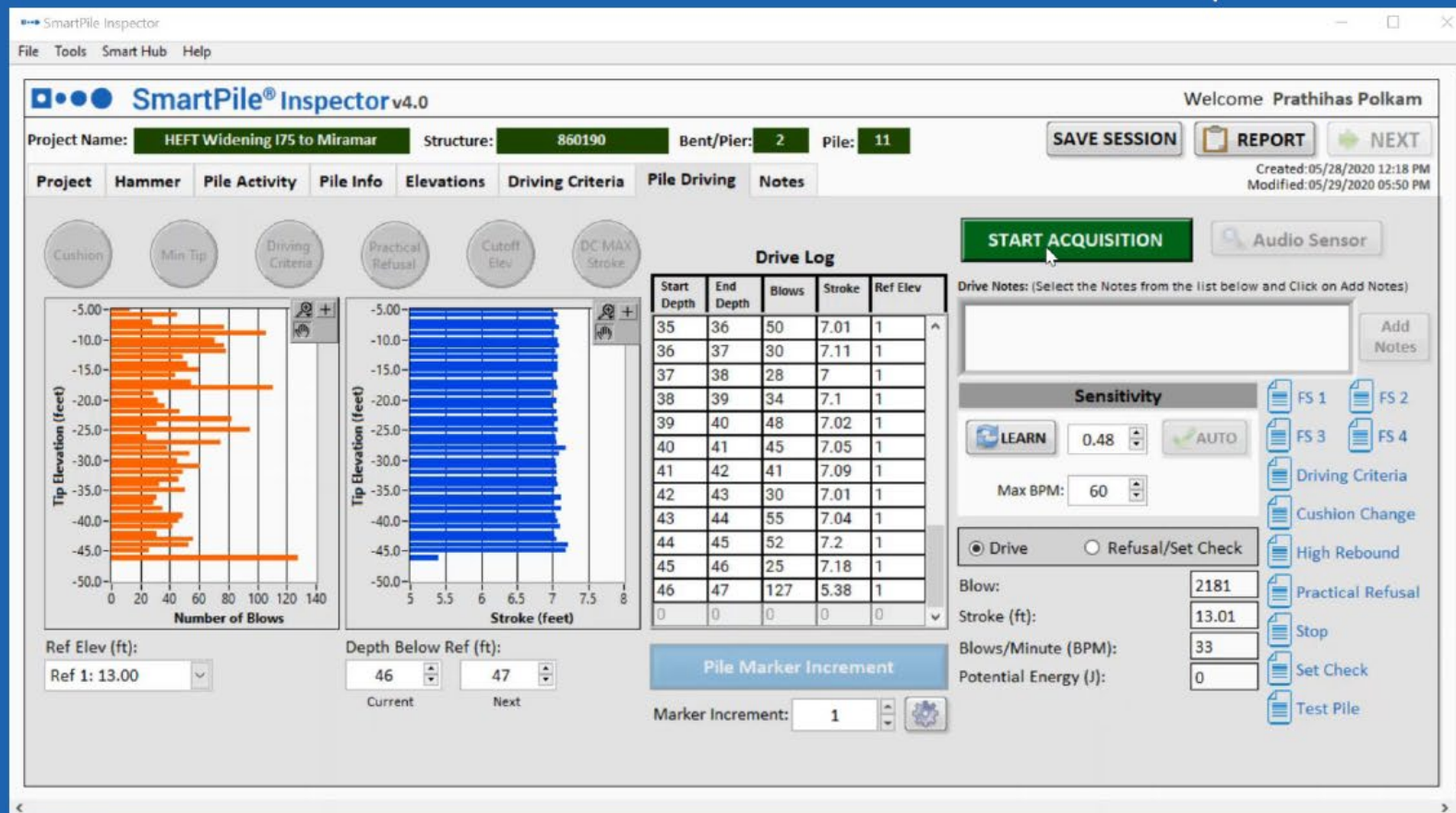
SoA #4: SmartPile Inspector

Source: SmartPile Inspector

Digital Transformation



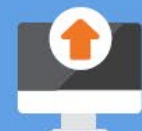
Data-Driven
Decisions



Data Quality



Data Storage



Data Integrity

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Final thought ... our Future Employees

TECHNOLOGY

V A R Y I N G P R E F E R E N C E S

	BOOMERS	GENERATION X	MILLENNIALS	GENERATION Z
SUMMARY	Some Tech	High Tech	All Tech	What Tech?
VIEW	Enhancer	Balancer	Amplifier	Extension of Oneself
ATTITUDE	Want to Master It	Want to Enjoy It	Need to Employ It	Have to Manage It

Thank you for your attention!

Don't get buried in materials tickets.



Go digital.

 U.S. Department of Transportation
Federal Highway Administration

 EDC

www.fhwa.dot.gov/construction/econstruction

For FHWA support and opportunities for engagement involving e-C & e-T, please contact:

Kathryn Weisner

Resource Center, kathryn.weisner@dot.gov



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Federal Highway Administration

CENTER FOR ACCELERATING INNOVATION



Quiz the Fed...

... Q&A @ the end

Source: FHWA

