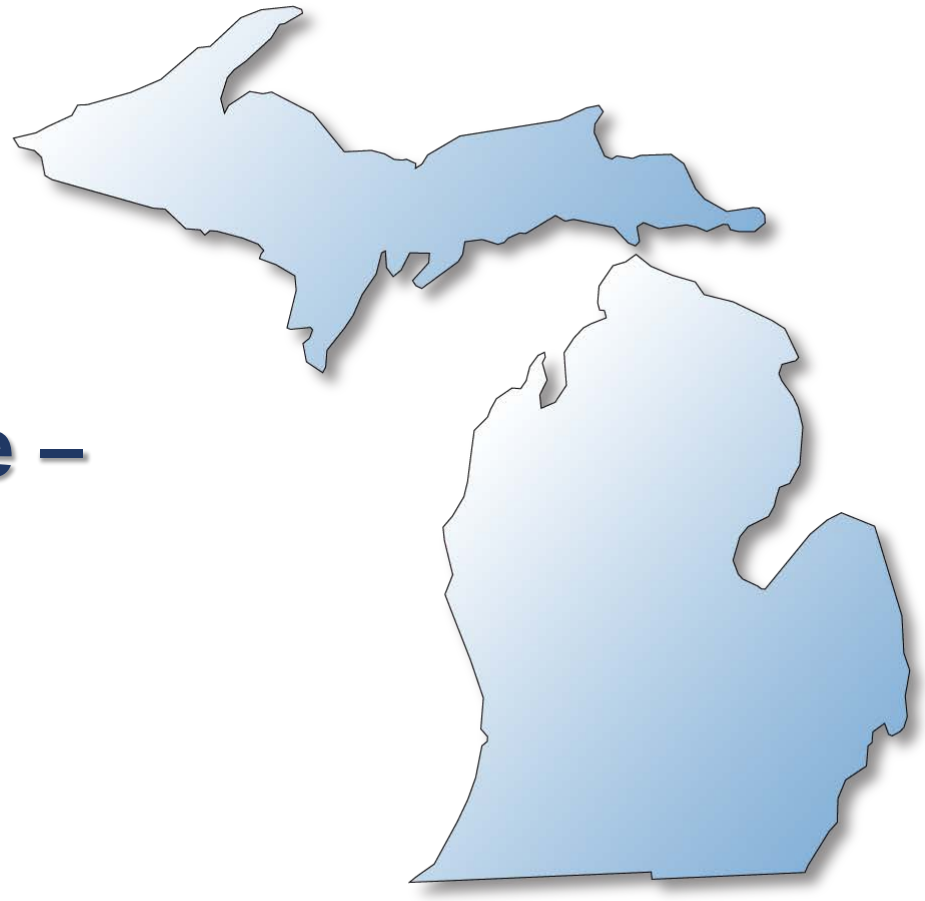
ANCILLARY STRUCTURES
PROGRAM

MDOT Ancillary Structures Preservation Unit



Highway Maintenance Conference – Bay City

April 25th, 2023

Presented by: Michelle Harris (TT 10)

MDOT Michigan Department of Transportation

BUREAU of BRIDGES and STRUCTURES

HNTB


SORRY, FOLKS!
DUE TO A LACK OF TRAINING AND PREPLANNING, WE'VE MISJUDGED OUR LADDER PLACEMENT AND I CAN'T REACH YOU...
HANG ON WHILE WE REPOSITION!
NOTPREPARED FIRE-RESCUE
PAUL COMBS
FIRE ENGINEERING


14 FT. 7 IN.

Ancillary Structures Unit

Who are we?

What do we do?

What's new?

Ancillary Structures Crew

Michelle O'Neill – Ancillary Structures Program Manager
(she's in Charge)

- Ph: 269-998-4044

Vacant LTE 13 – Statewide Ancillary Structures Development Specialist

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- Ph: 517-281-8384

Agenda

- Inventory and Asset Management
- New Features/ Innovations
- Retaining Wall Update
- Inspections
- Maintenance

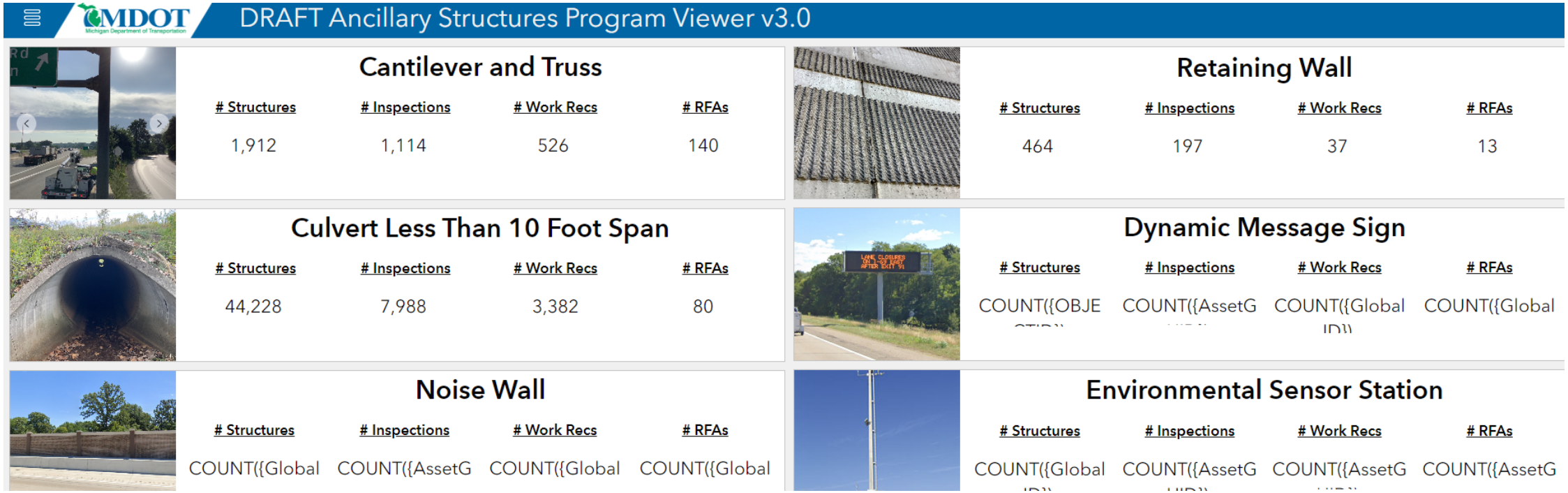
Inventory and Asset Management

MDOT's Ancillary Structures

- Culvert Less than 10-Foot Span
- Retaining Wall
- Truss Structure
- Embedded Pole (includes Wood Pole)
- Spun Concrete Pole
- Steel Strain Pole
- Noise Wall
- Mast Arm
- Dynamic Message Sign (DMS)
- Frangible Pole Structure
- Non-Frangible Pole Structure
- High Mast Lighting Tower (HMLT)
- Communication Tower
- Environmental Sensor Station

Program Reporting Web Page

- Objective:
  - Present inspection findings in easily understood format (including photos)
- Audience:
  - DOT staff *NOT* working inside the AS program and unfamiliar with the data structure



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Current Tasks & Initiatives

- Data Collection and Condition Assessment
- Review and Approval of Shop Drawings
- Requests for Information (RFIs)
- Project Scoping and Design Services

Asset Type	Quantity
Culvert Less than 10-Foot Span	44,051
Retaining Wall	456
Cantilever Structure	918
Truss Structure	832
Embedded Pole (includes Wood Pole)	390
Spun Concrete Pole	297
Steel Strain Pole	386
Noise Wall	274
Mast Arm	97
Dynamic Message Sign (DMS)	193
Frangible Pole Structure	760
Non-Frangible Pole Structure	946
High Mast Lighting Tower (HMLT)	157
Communication Tower	23
Environmental Sensor Station	102

Purpose and Need:

- Development of ancillary structure design, construction, maintenance and management for comprehensive asset management

Main Objectives of the Program:

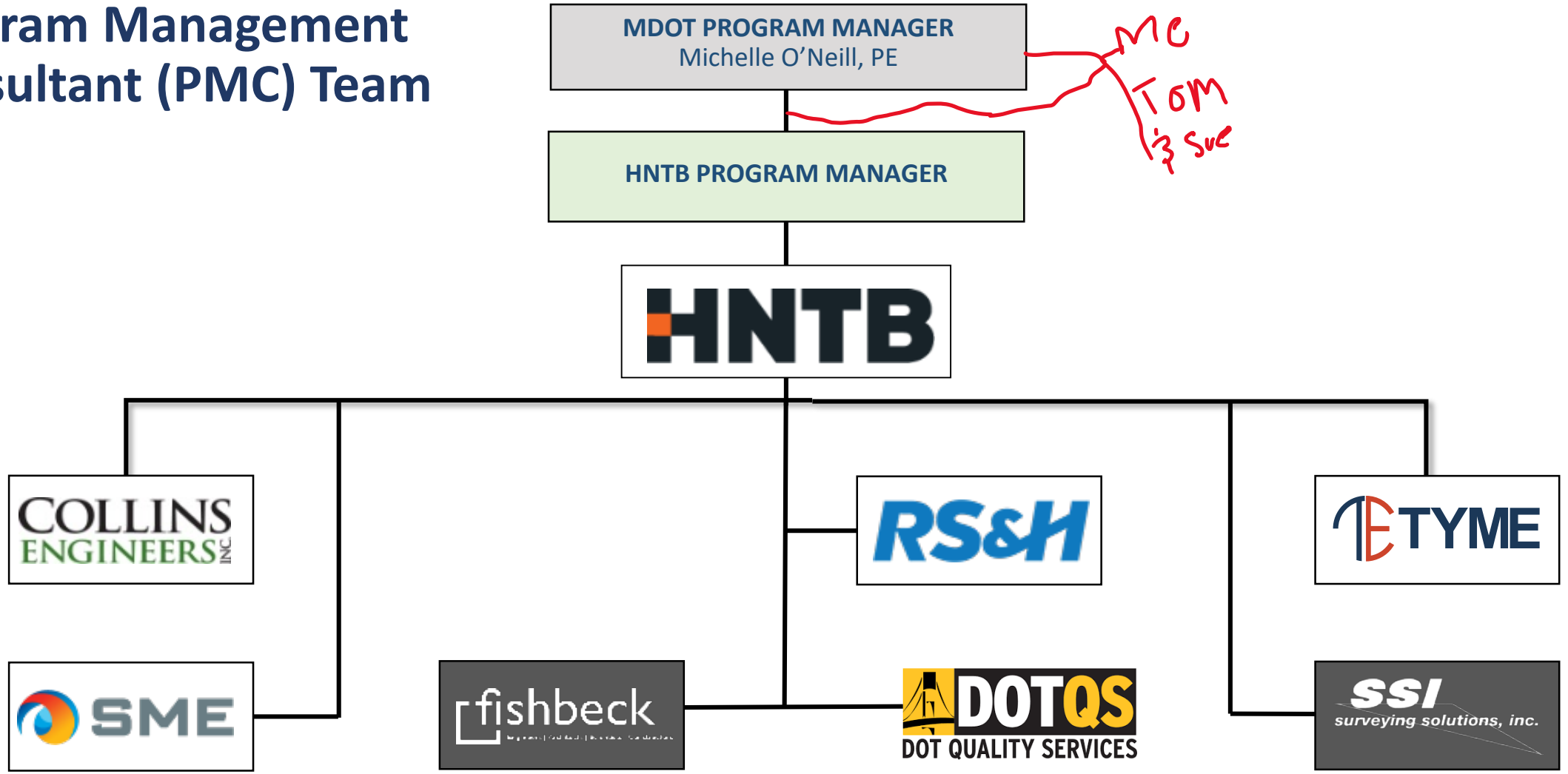
1. Develop and maintain an AS database framework
2. Collect and manage assets inventory and condition ratings
3. Develop and update standard plans and details
4. Scoping studies and preliminary engineering

Ancillary Structures Program

- Program Management Consultant (PMC) model
  - PMC operates as an extension of MDOT

- PMC service areas:
  - Data management, coordination, and reporting
  - Inspections, inventory, data collection
  - Design standard reviews and updates
  - Scoping and preliminary engineering
  - Special inspections or assessments

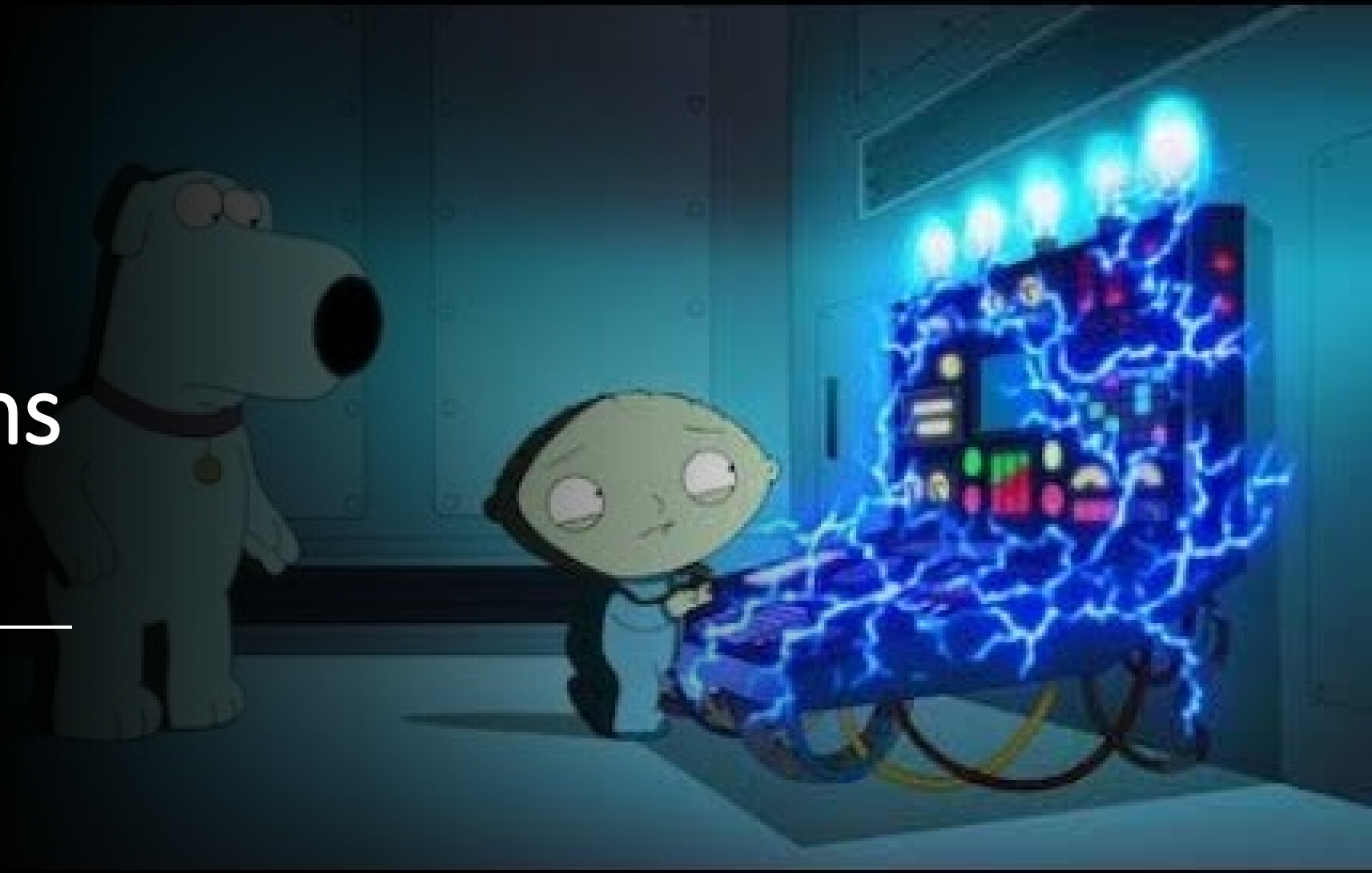
Program Management Consultant (PMC) Team



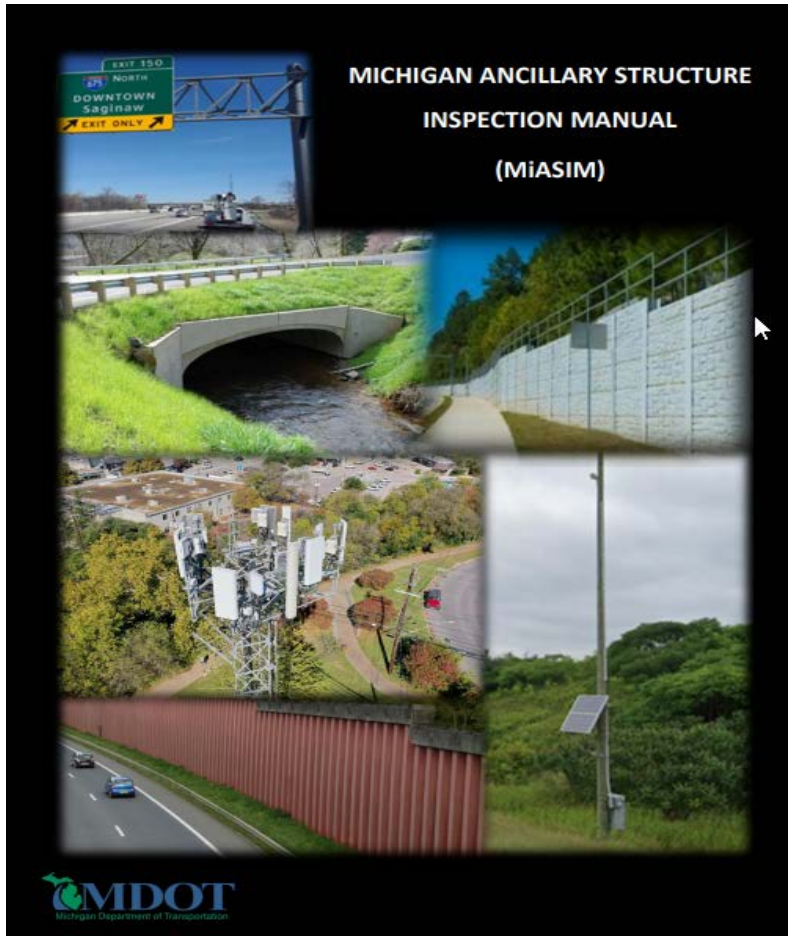
Shop Drawing Review & Approval

- Centralized and Standardized Review of Shop Drawings
- Structural Engineering Experts for Calculations Reviews
- Fabrication Expert Review of Shop Drawing Details

New Features and Innovations



Inspection Procedures & MiASIM



https://www.michigan.gov/mdot/programs/bridges-and-structures/structure-preservation-and-management/ancillary-structures

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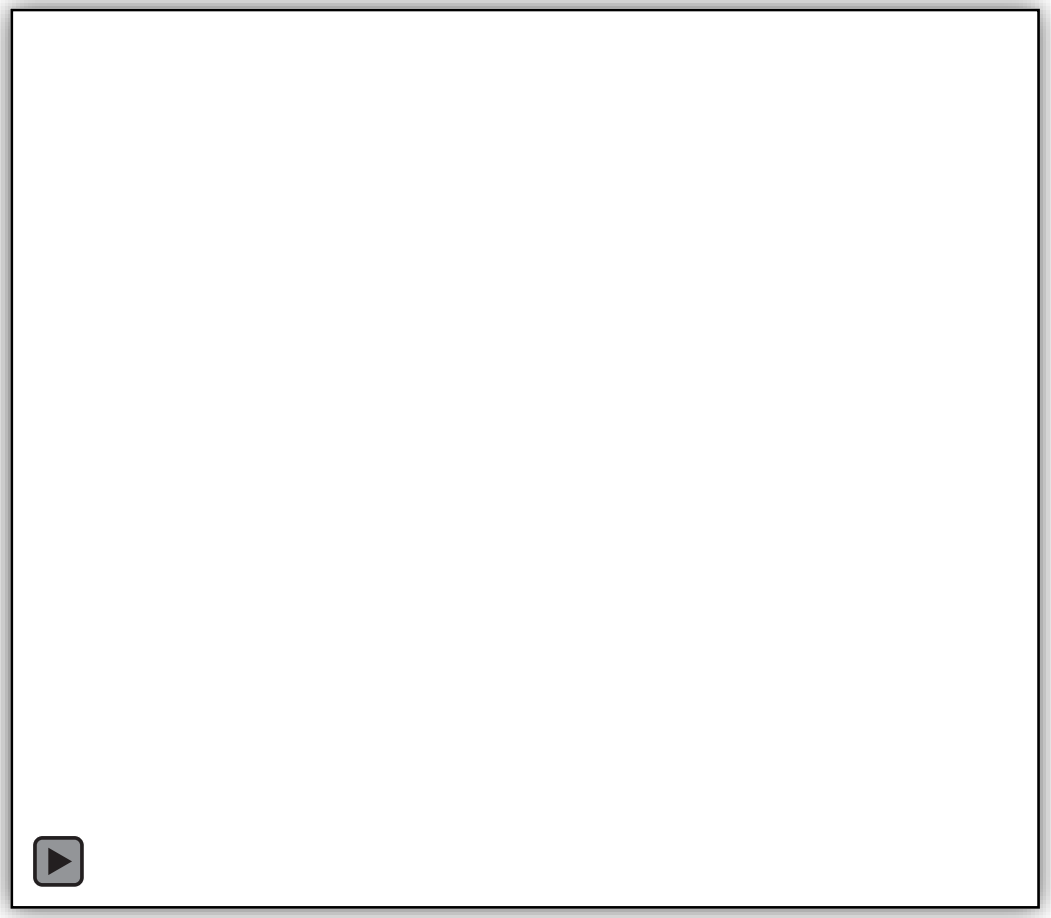
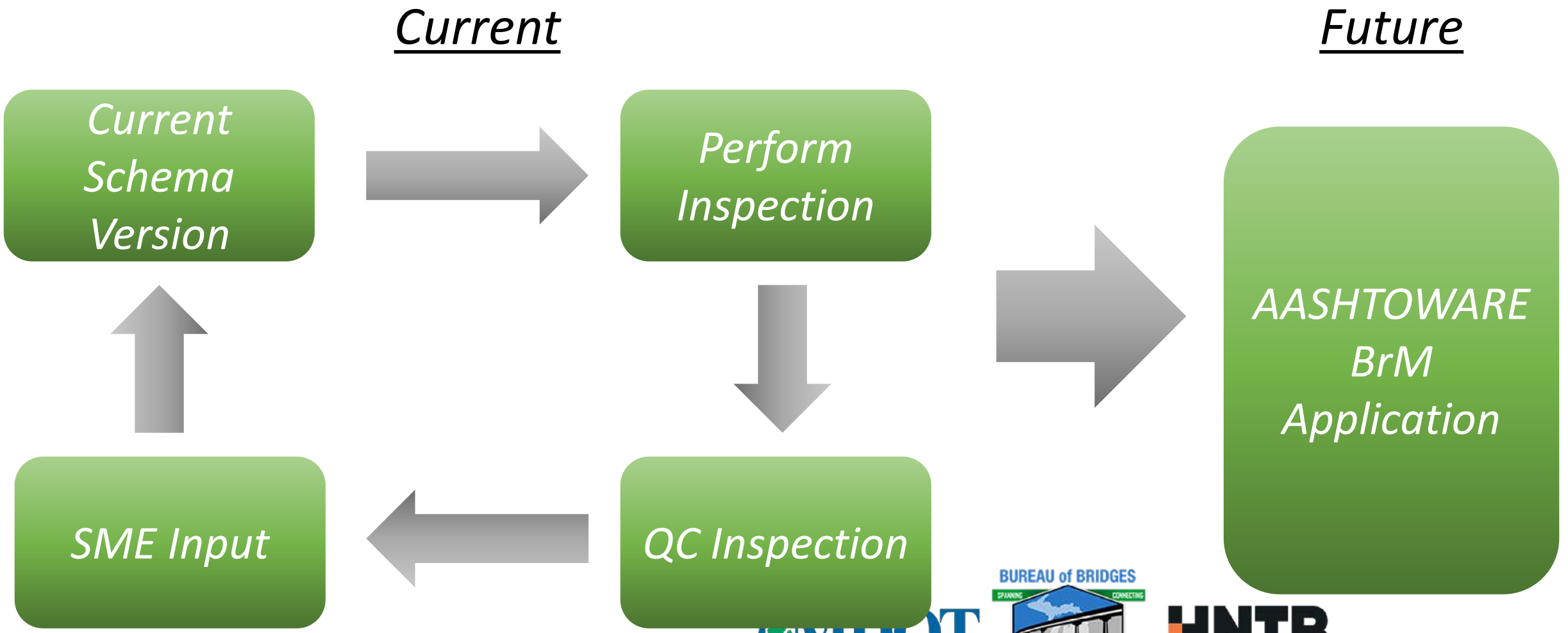
Data Collection & Condition Assessment

- Used ArcGIS Fieldmaps
- QA/QC Process
  - QC App (Web AppBuilder)
- Training/Certifications
  - Live and Virtual Option

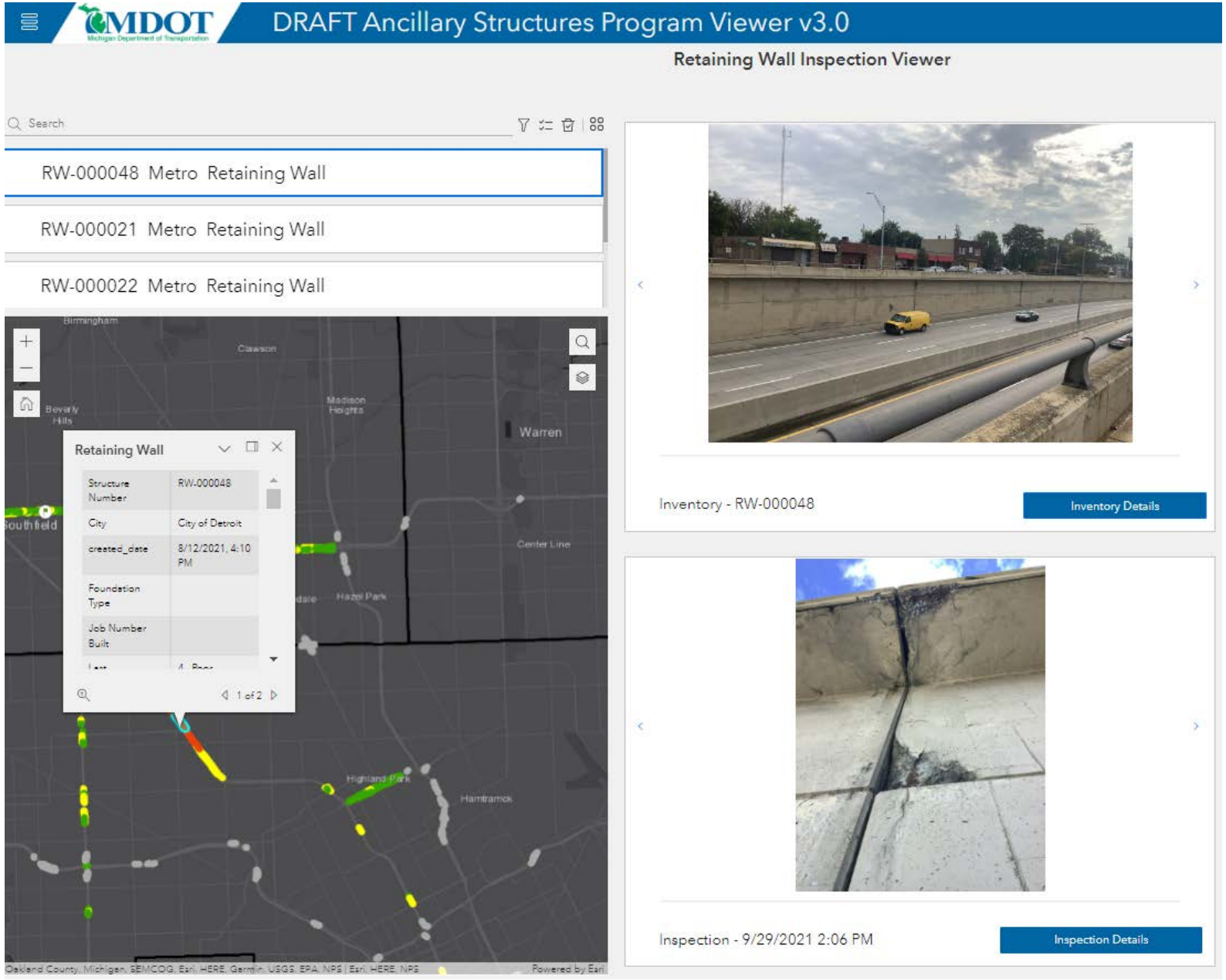


Program Data Refinement Process



New Labeling system for Cantilever Truss's and Lighting Towers

Retaining Wall Update



Retaining Wall Asset Management

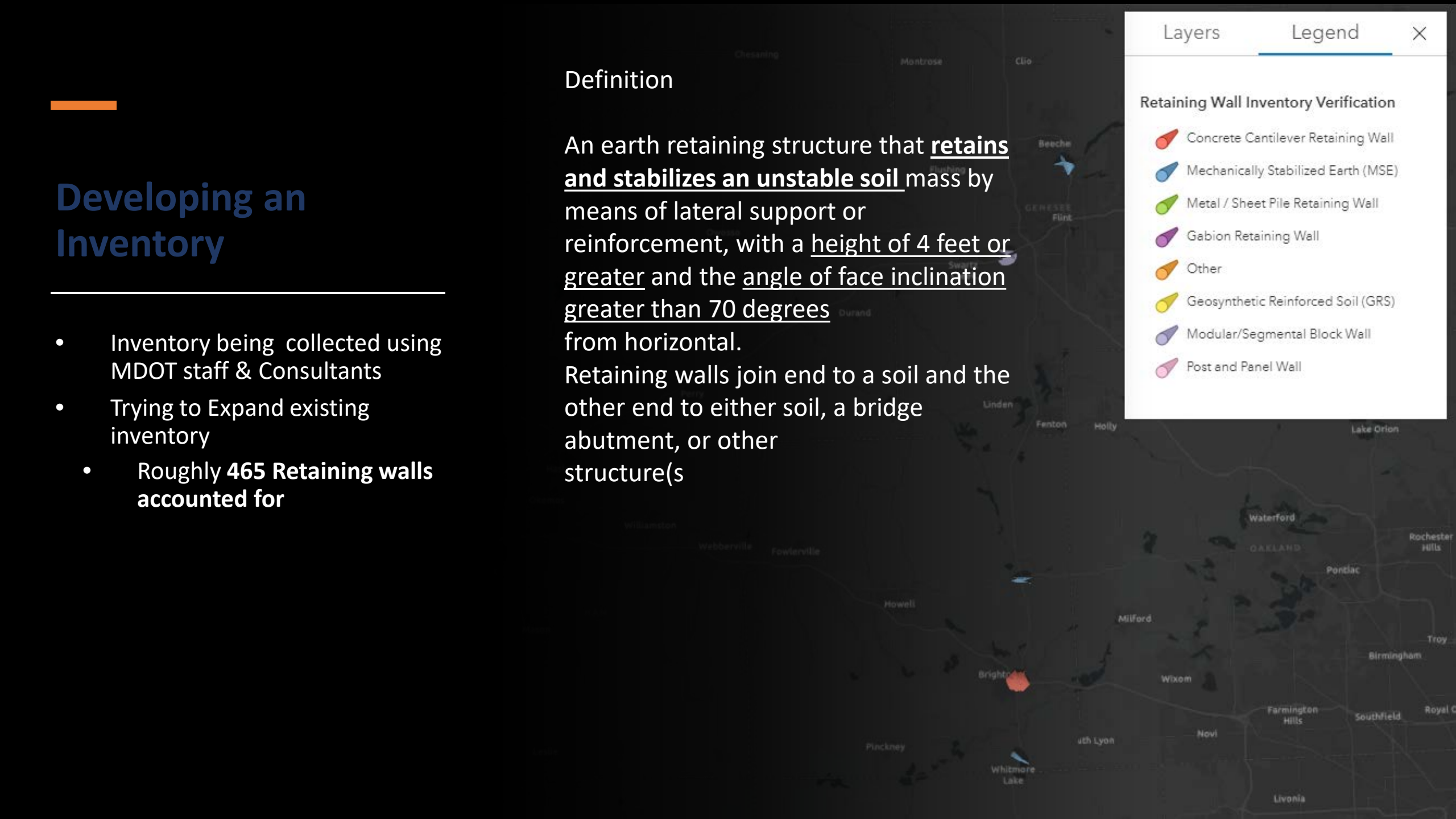
- Developing an Inventory
- Data Dictionary
  - Inventory
  - Inspection
- Components, Elements and Rating System

Developing an Inventory

- Inventory being collected using MDOT staff & Consultants
- Trying to Expand existing inventory
  - Roughly **465 Retaining walls accounted for**

Definition

An earth retaining structure that **retains and stabilizes an unstable soil** mass by means of lateral support or reinforcement, with a height of 4 feet or greater and the angle of face inclination greater than 70 degrees from horizontal.
Retaining walls join end to a soil and the other end to either soil, a bridge abutment, or other structure(s



Retaining Wall Naming dictionary

- General view of the wall (usually requires many similar photos)
- General view of top of wall
- Typical joint photos

Table 3.5.2: Retaining Wall and Noise Wall Photograph Naming Convention

Photo Name	*Description*
Wall_Entire_Front	General View of entire wall (retaining and noise walls)
Wall_Entire_Back	General View of entire wall (noise walls only)
Wall_Top	General view of top of wall
Wall_Joint	Typical joint photo
Wall_Attachment	Typical attachment

Note: Photo sequence should coincide with inspection direction for the walls.

Inspections

- Rating Systems
- RFA vs Work Rec

Component Rating System

Table 7.1.2: Component Rating System

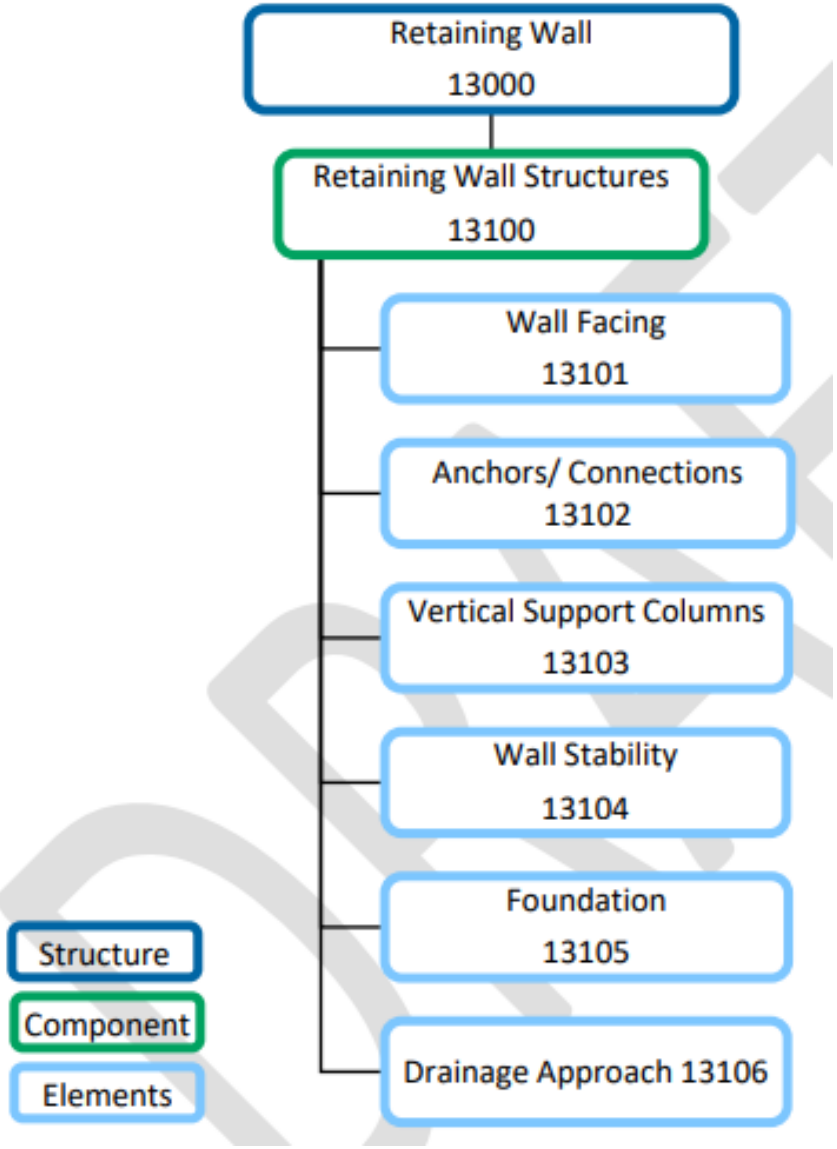
Component Rating	Condition	Condition State
9	NEW	Like new, within normal range for a newly installed structure.
8	GOOD	Only minor distress or deterioration
7	GOOD	Some problems noted
6	SATISFACTORY	Some moderate or multiple indications of distress/deterioration
5	FAIR	Moderate or multiple indications of distress/deterioration affecting performance
4	POOR	Significant distress
3	SEVERE	Significant distress/deterioration with potential for local failure
2	CRITICAL	Advanced deterioration with potential for failure of primary structural elements
1	IMMINENT	Imminent failure which could threaten public safety
0	FAILED	Failure has occurred

Element Rating System

Rate each element that is present for the structure using the 4-level scale from Good to Severe based on the observed conditions identified during the on-site inspection.

	1	2	3	4	
	Good	**Fair**	**Poor**	**Severe**	**Not Rated**
Action Indicated	No action is recommended. Note in inspection report only.	No immediate action is recommended but more frequent inspection may be warranted. Maintenance personnel should be informed.	Inspector evaluates need for corrective action and makes recommendations in inspection report.	Corrective action is required and urgent. Engineering evaluation is required to specify appropriate repair.	No action is required. (Except when review could not be performed due to conditions.)
Condition Description	Like new with little or no deterioration. Structurally sound and functionally adequate.	Minor to moderate deterioration. Structurally sound with adequate function.	Significant deterioration. May not have adequate function. Maintenance or repair required.	Major deterioration. Failure may have occurred. Requires maintenance, repair, or replacement.	The element was not part of the system design and is not required for functional adequacy. This includes items missing due to vandalism. Also includes inaccessible items that need to be reviewed.

Example Retaining Wall Component vs Element



Work Recommendations

- Work recommendations are used for maintenance related issues, **not safety related**
  - Immediate action is not required; however, a work recommendation is part of the inspection process and is completed by the inspector as part of their routine inspection.
  - Inspectors are responsible for clearly documenting the asset conditions
  - Inspectors are responsible for photographing their findings for others to understand field conditions to take appropriate action

Request for Action (RFA)

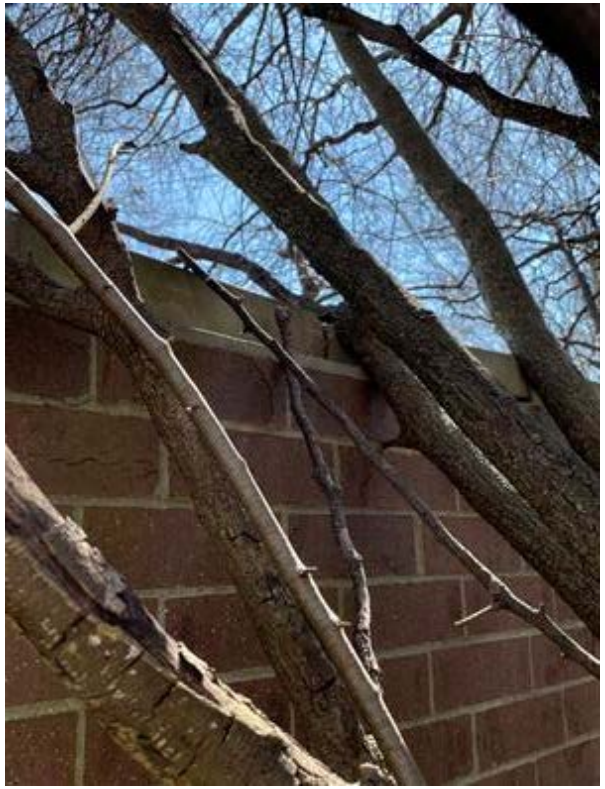
- **Conditions where public safety may be a concern.**
  - **Priority Level 1** – repairs, mitigation or monitoring is required as soon as reasonably possible for public safety. Onsite presence may be required until deficiency is addressed
    - Site personnel to immediately have a brief consultation with qualified personnel with structural engineering expertise
    - Emergency action guidance is provided in the following MDOT memo: https://www.michigan.gov/documents/mdot/MDOT_Memo_on_Bridge_Closure_policy_final_703291_7.pdf
  - **Priority Level 2** – repairs, mitigation or monitoring is to be completed within 1 year or as determined by a qualified engineer
  - **Priority Level 3** – repaired, mitigated or monitored as determined per engineering judgement. The deficiency is not deemed to be critical threat to public safety but could be if left unaddressed.

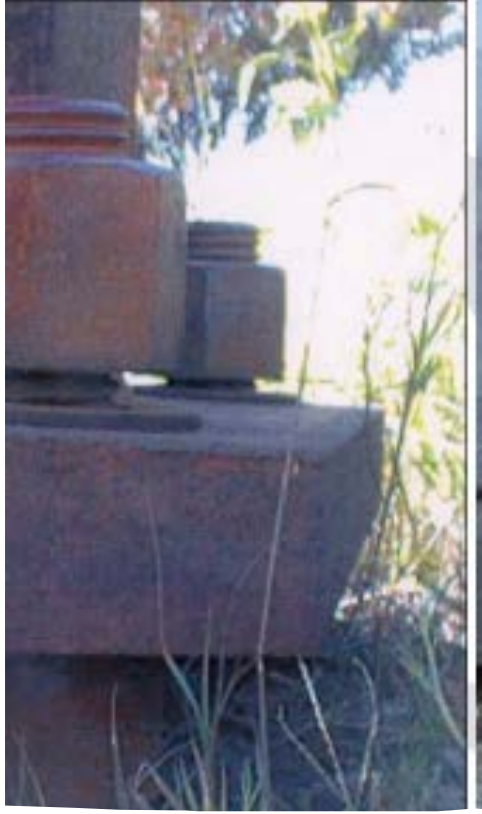
Maintenance Efforts

Inspection Findings - culverts

Figure 8.2.17: Blocked inlet

Inspection findings – Retaining & Noise Walls

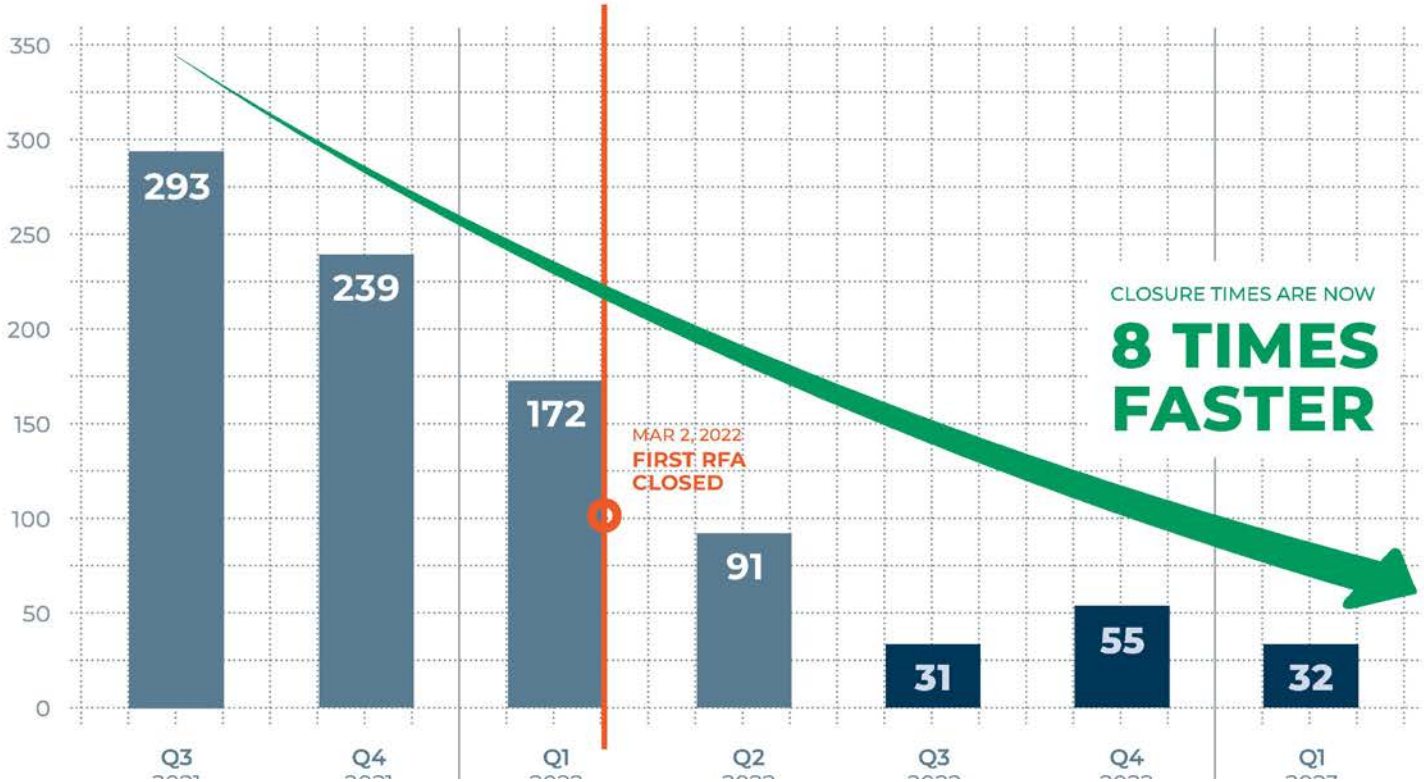





Inspection Findings – Sign Foundations

Requests for Action (RFAs) for Sign Support Structures

AVERAGE CLOSURE DURATION (by number of days)



Following the implementation of MDOT's new asset management program, average closure duration has been **reduced from 9 months to 1 month**.

Average closure duration Q3 2021

293 days

First Request for Action (RFA) closed

March 2, 2022

Average closure duration after first RFA closed

39 days

Sign Support RFA Close Out

Contact Information

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Recap

- Inventory and Asset Management
- New Features/ Innovations
- Retaining Wall Update
- Inspections
- Maintenance

Thank you!!