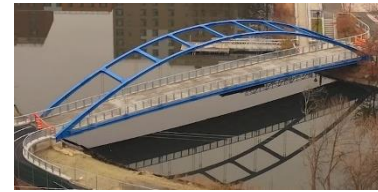




**Department of  
Transportation**



**Office of  
Structures**

# BrDR Report Generation Tool



**Joe Albert, P.E.**

**Project Engineer, Structure Design Bureau**

August 9<sup>th</sup>, 2023 –RADBUG Meeting

# Presentation Topics

## ➔ Background

- Previous Report TAG
- User Requests

## ➔ Report Generation Tool

- Why do we need a new report generation tool?
- Report Concept
- Report Format
- Phase 1

## ➔ What is the next step?

# Background

- ❑ BrDR software has been in use since 1996
- ❑ Many users have requested improved report generating capabilities
- ❑ Report TAG (RTAG) was formed in 2013
  - 7 members
  - Recommended many improvements to reporting features in BrDR

## Report to AASHTOWare Bridge Task Force

Prepared by the Br DR Report Technical Advisory Group (RTAG)

### RTAG Members:

1	Paul	Campisi	New York State DOT
2	Beckie	Curtis	Michigan DOT
3	Arthur	D'Andrea	Louisiana DOT
4	Jeff	Olsen	Montana DOT
5	Todd	Thompson	South Dakota DOT
6	Cindy	Wang	Ohio DOT
7	Amjad	Waheed	Ohio DOT

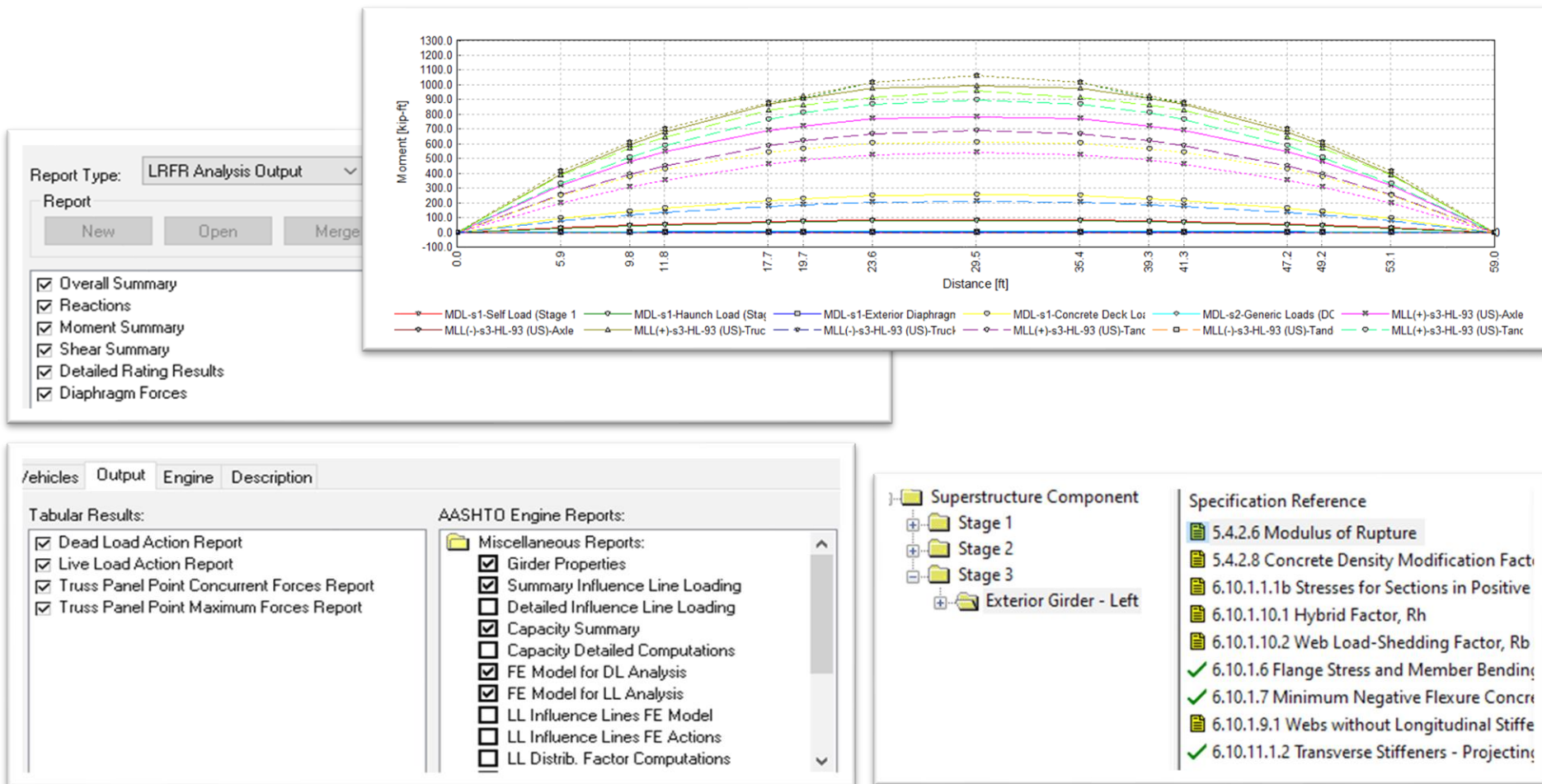
November 2013

# Background

- ❑ **2013 User Requests:**
  - **Load Rating Summary Report**
  - **Comprehensive input report**
  - **List Dead Loads in separate columns**
  - **List deflections for DL (by load type, stage) and LL separately**
  - **Provide separate Spec Check Reports with pass/fail summary**
  - **Provide essential cross-sectional properties at critical points**
  
- ❑ **2013 RTAG:**
  - **Some requests were implemented, and some were not**

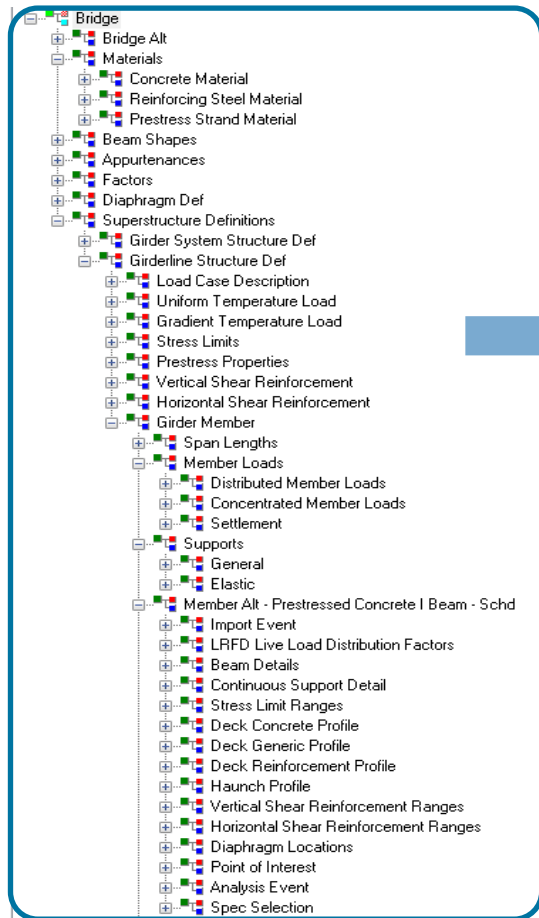
# Background

- Vendor has created many output reports over the years



# Background

- One of the most comprehensive reports is the BWS Report



## Bridge

Bridge Id: 40C0044  
 Structure Number: 40C0044  
 Name: NORTH FORK MERCED RIVER  
 Initial ADTTSL:  
 Present ADTTSL:  
 Limit ADTTSL:

## Bridge Alt

Name: 1950 (7/12) HB/MBM  
 Description:  
 Creation Timestamp: Tuesday, March 09, 2021 14:46:26  
 Last Modified Timestamp: Tuesday, March 09, 2021 15:49:09

## Superstructure

Name: Span 1 (MDL 1 of 1)  
 Description:  
 Creation Timestamp: Tuesday, March 09, 2021 14:46:26  
 Last Modified Timestamp: Tuesday, March 09, 2021 15:49:09  
 Super Structure Alternative Name - Existing: 3 STL Plate Girders  
 Super Structure Alternative Name - Current: 3 STL Plate Girders

## Superstructure Alternative

Name: 3 STL Plate Girders  
 Description:  
 Creation Timestamp: Tuesday, March 09, 2021 14:46:26  
 Last Modified Timestamp: Tuesday, March 09, 2021 15:49:09  
 Superstructure Definition Name: Span 1 (MDL 1 of 1)

## Superstructure Loading Path

## Materials

### Concrete Material

Name: F'c= 3.000 ksi; Assigned per CAStdSpecs  
 Description: per Memo to Load Raters 11-1  
 28 Day Compressive Strength: 3.000 ksi  
 Initial Compressive Strength: 3.000 ksi  
 Density For DL: 0.150 kcf  
 Density For Modulus Of Elasticity: 0.145 kcf

## Superstructure Definitions

### Girder System Structure Def

Name: Span 1 (MDL 1 of 1)  
 Description:  
 Creation Timestamp: Tuesday, March 09, 2021 14:46:26  
 Last Modified Timestamp: Tuesday, March 09, 2021 15:49:09  
 Number Of Girders: 3  
 Number Of Spans: 1  
 Girder Spacing Display Type: Perpendicular

### Span Lengths

Span Length (ft)
1 59.0000

### Load Case Description

Name	Description	Load Type	Stage Name	Load Application Time (Days)
DC1	DC acting on non-composite section	D,DC	Non-composite (Stage 1)	
DC2	DC acting on long-term composite section	D,DC	Composite (long term) (Stage 2)	
DW	DW acting on long-term composite section	D,DW	Composite (long term) (Stage 2)	

### Structure Framing Plan Details

#### Support Skew

Support Number	Skew (Degrees)	Frame Connections Indicator
1	0.0000	FALSE
2	0.0000	FALSE

### Girder Spacings

Bay Number	Start Spacing (ft)	End Spacing (ft)
1	4.5000	4.5000
2	4.5000	4.5000

### Diaphragm Locations


#### Bay Number: 1

Right Member Distance (ft)	Left Member Distance (ft)	Number of Spaces	Spacing (ft)	Weight (kip)
0.00	0.00	1	0.00	0.1125
0.00	0.00	2	19.67	0.1125
59.00	59.00	1	0.00	0.1125

#### Bay Number: 2

Right Member Distance (ft)	Left Member Distance (ft)	Number of Spaces	Spacing (ft)	Weight (kip)
0.00	0.00	1	0.00	0.1125
0.00	0.00	2	19.67	0.1125
59.00	59.00	1	0.00	0.1125

# Background

- ❑ BWS Report can be customized
- ❑ Vendor provided standard BWS report templates for various bridge types 
- ❑ Vendor also provided Crystal Report Tool
- ❑ Amjad Waheed presented to User Group in 2015 on the reporting features available in BrDR at that time

## Creating Reports & Getting Results Out of AASHTO BrDR

Amjad Waheed, P.E.  
Assistant Administrator  
Office of Structural Engineering

August 5, 2015



# Report Generation Tool – Why?

- ❑ Not all of 2013 requests were implemented
- ❑ With current reporting features, users must piece together separate outputs and reports to produce a comprehensive report
- ❑ Formatting among various analysis results, BWS report, and Spec Articles are not consistent
- ❑ Section properties, Spec Checks, etc must be generated separately and combined into one document
- ❑ Formatting of existing reports are not efficient, a lot of white space exists, making the reports very lengthy
- ❑ Reporting features are not consistently presented for different structure types in BrDR
- ❑ Crystal Report Tool is not a royalty free software – requires separate purchase by state agencies, additionally it is being sunset.



# Report Generation Tool – Why?

## ❑ State agency workarounds

- Create custom reports, using cut/paste and in-house templates to combine existing reporting features in BrDR
- Consumes a lot of time, especially updating the custom reports with each new release of BrDR

## ❑ **Current Report TAG**

- **Goal:** Prepare mock-ups for the content and formatting requirements for a comprehensive and easy to use report generation tool
- **11 members**

Name	Agency
Vinacs Vinayagamoorthy	California DOT, Chair
Mark Bucci	Louisiana DOTD
Igor Chernioglo	California DOT
Joe Albert	New York State DOT
Craig Iser	West Virginia DOT
Christopher Patria	Connecticut DOT
Steven Paulson	Tennessee DOT
Jeff Ruby	Kansas DOT
Todd Thompson	South Dakota DOT
Amjad Waheed	Ohio DOT
Cindy Wang	Ohio DOT

# Report Generation Tool - Concept

- ❑ Create a REPORTS ribbon within the Bridge Workspace in the Modernized BrDR software
- ❑ Five buttons within the ribbon to generate various reports
- ❑ BrDR will have several standard templates to generate reports
- ❑ “Report Template Editor” will also be provided to create/modify/save report templates for user customized reports
- ❑ Data will be presented in tabular format, with capability for user to add comments(options being investigated), titles, and graphics to complete the report.

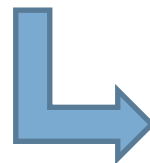
**Note:**  
All graphics  
are conceptual



# Report Generation Tool - Format

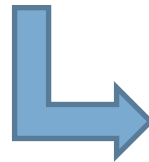
## 1. Bridge Level Report

## 2. Superstructure Level Report



One for each different  
superstructure type within  
the bridge

## 3. Member Level Report



One for each different  
member type within the  
superstructure

# Report Template Editor

- ❑ Use Report Template Editor to customize reports
  - Left side of screen shows available components to be included in your report.
  - Right side of screen shows the style editing and font properties to be able to customize the look of your report.
  - Middle of the screen is the preview for the individual component and the entire compiled report for the components you have selected.

# Report Template Editor

Report Editor

**File**

New Open Save Save As Refresh Print Duplicate Delete Close

Document Print Edit

**Template**

Search

- Single Tee W
- Multiple Tee
- U Beam Window
- Factors
  - LFR Window
  - LRFD Window
  - LRFR Window
- Materials
  - Concrete Window
  - Prestress Bar Window
  - Prestress Strand Win

**Section Contents**

- LRFD Window
  - Factors - LRFD
    - Summary
    - Load factors
    - Load factors (cont'd)
    - Limit states
    - Concrete
    - Steel
    - Wood
    - Buried structures
    - Load modifiers
    - Specifications

**Report**

Summary Report

**LRFD Window**

**Factors - LRFD**

**Summary**

Name: 1994 AASHTO LRFD Specifications  
Description: AASHTO LRFD Bridge Design Specifications, First Edition, 1994 including 1996 and 1997 Interim Specifications

**Load factors**

Limit state	DC min	DC max	D
STRENGTH-I	0.900	1.250	
STRENGTH-II	0.900	1.250	
STRENGTH-III	0.900	1.250	
STRENGTH-IV	1.500	1.500	
STRENGTH-V	0.900	1.250	
SERVICE-I	1.000	1.000	
SERVICE-II	1.000	1.000	
SERVICE-III	1.000	1.000	
FATIGUE-I	0.000	0.000	
EXTREME EVENT-I	0.900	1.250	
EXTREME EVENT-II	0.900	1.250	

**Load factors (cont'd)**

Component	LL max
Prestressed concrete components designed using the refined estimates of time-dependent losses as specified in Article 5.9.5.4 in conjunction with taking advantage of the elastic gain	0.800
All other prestressed concrete components	0.800

**Limit states**

Limit state	Reinforced concrete	Prestressed concrete
STRENGTH-I	True	True
STRENGTH-II	True	True
STRENGTH-III	False	False
STRENGTH-IV	False	False
STRENGTH-V	False	False
SERVICE-I	True	True
SERVICE-II	False	False

**Styles**

Styles

- Default Header Block Style
- Default Table Block Style
- Default List Block Style
- Default Header Font
- Default Data Header Font
- Default Column Font
- Default Row Font

New Delete Edit

**Properties**

Properties

LRFD Window

Header font style: Default Header

Hide header:

Margins

Top margin: 0

Bottom margin: 0

Left margin: 0.25

Apply

# Bridge Level Report

- ❑ **Input Data (*Phases 1 & 2*)**
  - **General Bridge Information, location, etc.**
  - **Number of structures, traffic information**
- ❑ **Output Data (*Future Phases*)**
  - **Analysis results**
  - **Design summary**
  - **Rating summary**  
(Controlling rating for entire bridge)

# Bridge Level Report

User will have ability to reorganize and customize components of the report. Previews for individual report components will be available

The screenshot displays the 'Report Editor' application window. The main area shows a report template for a 'BWS Detailed Report' with a 'Bridge Window' section. The sidebar on the left contains a tree view of report components, including 'Bridge Section', 'Components', 'Diaphragm Window', 'Lateral Bracing Window', 'Superstructure Definitions', and 'Girder System Superstru'. The 'Section Contents' panel at the bottom left shows a list of sections with checkboxes for 'Bridge Window', 'Summary', 'Description', 'Alternatives', 'Global Reference Point', 'Traffic', 'Custom Agency Fields', 'Bridge Association', and 'Alternatives'. The right-hand panel contains 'Styles' and 'Properties' sections. The 'Properties' section shows settings for 'Bridge Window', including 'Header font style' (Default Header), 'Hide header' (checkbox), and 'Margins' (Top: 0, Bottom: 0, Left: 0.25). The main report content includes a 'Summary' section with 'Bridge ID: PCITrainingBridge6' and 'NBI structure ID (8): PCITrainBridge6', a 'Description' section with 'Name: PCITrainingBridge6(LRFD)' and 'Description: This is PCI Design Example 9.9.6, which uses Load and Resistance Factor Design (LRFD)', and an 'Alternatives' table.

**BWS Detailed Report**

**Bridge Window**

*Summary*  
 Bridge ID: PCITrainingBridge6  
 NBI structure ID (8): PCITrainBridge6

*Description*  
 Name: PCITrainingBridge6(LRFD)  
 Description: This is PCI Design Example 9.9.6, which uses Load and Resistance Factor Design (LRFD)  
 Location:  
 Facility carried (7):  
 Feat. Intersected (6):  
 Default units: US Customary  
 Year built:  
 Length: ft  
 Route number: -1  
 Mi. post: mi  
 District:  
 County:  
 Owner:  
 Maintainer:  
 Administrative Area: Unknown  
 National Highway System Indicator:  
 Functional Class: Unknown

*Alternatives*

Existing	Current	Name	
True	True	Bridge Alternative #1	

*Global Reference Point*  
 X plane coordinate: 0.00 ft  
 Y plane coordinate: 0.00 ft  
 Elevation: ft

# Superstructure Level Report

User will have ability to reorganize and customize components of the report.  
Previews for individual report components will be available

- ❑ **Input Data**(*Phases 1 & 2*)
  - **Load case description**
  - **Framing plan, typical section, etc.**
  - **Superstructure loads**
  
- ❑ **Output Data** (*Future Phases*)
  - **Analysis results**
  - **Design summary**
  - **Rating summary**

(Controlling rating for entire superstructure)



# Superstructure Level Report

User will have ability to reorganize and customize components of the report.  
Previews for individual report components will be available

The screenshot displays the 'Report Editor' application window. The interface is divided into several panes:

- File:** A menu bar with icons for New, Open, Save, Save As, Refresh, Print, Duplicate, Delete, and Close.
- Template:** A tree view showing the report structure under 'Superstructure Definitions' and 'Girder System Superstructure Definitions'. The 'Definition' section is expanded, showing 'Summary', 'Span', 'Horizontal Curvature Along Line', and 'Modeling'.
- Report:** The main content area displaying the 'BWS Detailed Report'. It includes:
  - Superstructure Definitions**
  - Girder System Superstructure Definition Window**
  - Definition**
  - Summary**: Name: Structure Definition #1, Description: US Customary, Default units: US Customary, Number of spans: 3, Number of girders: 4.
  - Span**: A table with 2 columns: Span and Length (ft).
 

Span	Length (ft)
0	110
1	120
2	110
  - Horizontal Curvature Along Line**: Horizontal curvature: Superstructure alignment type: Curved, Distance from PC to first support line: ft, Start tangent length: ft, Radius: ft, Direction: Left, End tangent length: ft, Distance from last support line to PT: ft, Design speed: mph, Superelevation: %.
  - Modeling**: Modeling type: Multi Girder System, With frame structure simplified definition: Deck type: Concrete Deck, Average humidity: 70.000 %, Steel Member alt.types: False, P/S Member alt.types: True, R/C Member alt.types: False, Timber Member alt.types: False, D/T Member alt.types: False.
- Styles:** A panel for customizing report styles, including Default Header Block Style, Default Table Block Style, Default List Block Style, Default Header Font, Default Data Header Font, Default Column Font, and Default Row Font. Buttons for New, Delete, and Edit are present.
- Properties:** A panel for setting report properties, including Girder System Superstructure Definition Window, Header font style (Default Header Font), Hide header (checkbox), and Margins (Top margin: 0, Bottom margin: 0, Left margin: 0.25). An Apply button is at the bottom.

# Member Level Report

- ❑ **Input Data (*Phases 1 & 2*)**
  - **Member description**
  - **Girder profile, loads**
  - **Deck profile, Haunch profile, etc.**
  
- ❑ **Output Data (*Future Phases*)**
  - **Analysis results**  
(DL and LL demands)
  - **Design summary**  
(Design ratios, spec checks)
  - **Rating summary**  
(Detailed rating for that member)

# Member Level Report

User will have ability to reorganize and customize components of the report. Previews for individual report components will be available

The screenshot displays the Report Editor interface for a Member Level Report. The main report area is titled "Girder Member Window" and contains the following sections:

**Summary**  
**Members**  
**Girder Member Window**  
*Summary*  
 Name: G1  
 Description:  
 Link with: None  
 Number of spans: 3

**Alternatives**

Existing	Current	Name

**Spans**

Span no.	Span length (ft)
1	110
2	120
3	110

**Girder Member Window**  
*Summary*  
 Name: G2  
 Description:  
 Link with: None  
 Number of spans: 3

**Alternatives**

Existing	Current	Name
True	True	Member Alternative #2 (9.9.6)

**Spans**

Span no.	Span length (ft)
1	110
2	120
3	110

**Girder Member Window**  
*Summary*  
 Name: G3  
 Description:  
 Link with: None

The interface also includes a File menu with options: New, Open, Save, Save As, Refresh, Print, Duplicate, Delete, Close. The Template pane shows a tree view of report components. The Section Contents pane shows a list of sections: Summary, Alternatives, Spans, and Frame Connections. The Styles pane lists various default styles and fonts. The Properties pane shows settings for the selected component, including header font style, hide header, and margins.

# Report Template Editor Tool - Needs

## Phase 1

- Modify and save templates for customized reports
- Export, share, and import custom templates to other users
- Provide ability for user defined font choices
- Export the report to PDF

# Report Template Editor Tool - Needs

## Phase 2 and beyond

- ❑ Export the report to DOC (Phase 2)
- ❑ Insert text, PDF documents, graphics/photos produced outside of the software anywhere within the report template (Future phases)
- ❑ Presentation of BrDR graphics in report (framing plan, typ. section) (Future Phases)
- ❑ Export results into .XLSX and .CVS (analysis results, design review, spec report, rating results) (Future Phases)
- ❑ Filtering and sorting capabilities within all tabular reports (Future Phases)

# What are the next steps?

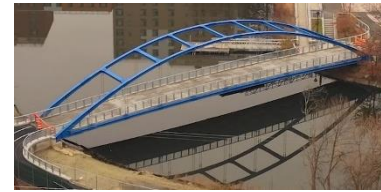
- ❑ **Vendor is finishing up Phase 1 of the report tool to be included in version 7.5. BETA 4 will include testing of the roll out of Phase 1.**
- ❑ **Vendor has been and will continue to produce detailed mockups of reporting features for future phases.**
- ❑ **Report TAG and Vendor currently working together to customize report tool for future phases.**

# Do not worry!!

- ❑ **All existing reporting features will remain in BrDR and BrR until the Report Generation Tool is complete and fully functional. (Future Phases)**
- ❑ **Existing reporting tools will be moved to new REPORTS tab ribbon for consistency during the overlap. (Phase 1)**
- ❑ **Existing reporting features will be sunset with new Report Generation Tool eventually. There will be adequate advance warning of when the existing report tool will be sunset. (Future Phases)**
- ❑ **Looking for input from users! This is the time to fine tune the report tool to tailor it for the specific needs of all users. Reach out to the Chair of the Report TAG or submit a ticket to JIRA with your comments and/or suggestions. (Starting with Beta 4 for V. 7.5)**



**Department of  
Transportation**



**Office of  
Structures**

# Thank You!

**Joe Albert, P.E.**

*Project Engineer, Structure Design Bureau*

*[Joseph.Albert@dot.ny.gov](mailto:Joseph.Albert@dot.ny.gov)*

*(518) 485-2089*