

**Summary Minutes Of The
AASHTOWare Bridge Design-Rating (BrDR) Task Force Meeting
April 12 - 13, 2021
Salt Lake City, UT (Virtual)**

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General Information – Meeting of the Bridge Design & Rating Task Force

Date: Monday, April 12, 2021

Participants:

AASHTO	Judy Tarwater	AASHTO	Project Manager
	Chui McConnell	AASHTO	Marketing
	Tinika Fowlkes	AASHTO	Customer Success
SCOA	Tim Armbrecht	SCOA	SCOA Liaison
T&AA	Will Holmes	T&AA	T&AA Rep
BrDR Task Force	Todd Thompson	South Dakota DOT	Chair
	Mark Bucci	Louisiana DOTD	Bridge Design (BrD)
	Michael Johnson	Idaho TD	Bridge Rating (BrR)
	Jeff Ruby	Kansas DOT	Bridge Design (BrD)
	Tom Saad	FHWA	FHWA Liaison
	Vinacs Vinayagamoorthy	California DOT	Bridge Rating (BrR)
BrDR Contractor	Herman Lee	ProMiles	BrDR Contractor
	Geoff Trees	ProMiles	BrDR Contractor
	Tim Pilcher	ProMiles	BrDR Contractor
	Kyle Plummer	ProMiles	BrDR Contractor
	Krishna Kennelly	ProMiles	BrDR Contractor
	Subhadeep Ghosh	ProMiles	BrDR Contractor

Notes Taker: Judy Tarwater and Tom Saad.

Agenda Item 0: Review Aenda/Assign Minutes

Recorder

Todd Thompson opened the meeting at 9:00am. The agenda was reviewed. One agenda item was added.

- Item 9d: RADBUG Training Materials

Agenda Item 1: Prior Business

1a. Review January Meeting Minutes

Minutes from the January 13 - 14, 2021 Virtual Task Force Meeting (Savannah, GA) were reviewed. The meeting minutes were approved as-is.

1b. Review Action Items

Vinacs reviewed the Action Items and provided updates to the task force.

Agenda Item 2: Financial Overview and Work Plan Summary

2a. Update of the FY2021 MSE Work Plan

ProMiles provided an update of the FY2021 MSE work plan budget as of 02/28/21. A majority of the spending to date has been on TM1 (Project Administration), TM2 (Customer Support), TM3B (Routine Maintenance), TM5 (Work Plan and Long Range Plan Development), TM6B (User Group Meetings), TM8C (Minor Tasks), TM9 (Quality Assurance Reviews), and TM11 (Issue Management). Percent complete is 58.9%.



ProMiles also discussed budget details for TM11 (Issue Management) to make the task force aware of the projected spend against this time and materials task for the remainder of the contract.

2b. Update on Modernization Phase 4 Work Plan

ProMiles provided an update of the BrDR Modernization work plan budget as of 02/28/21.

2c. Update on BrDR 7.1 Work Plan

ProMiles provided an update of the BrDR 7.1 work plan budget as of 02/28/21.

BrDR 7.1 Beta Testing Schedule

- Beta 1 - April 30, 2021 FP 2-5, 7-9, 12, 25, and Rating Tool Upgrade
- Beta 2 - End of May FP 6, 10, 11, 13, 15, and 21
- Beta 3 - End of June FP 1, 14, and 20

* One or two tasks scheduled for Beta 2 may move to Beta 3 depending on the number of issues received for Beta 1

BrDR 7.1 Enhancement Tasks (Target for August 2021 release)	Beta Schedule
FP 2 BRDRSUP-1620 Phi factor for moment MCB PT	Beta 1
FP 3 BRDRSUP-1621 LLDF for one or two cell box girder bridges	Beta 1
FP 4 BRDRSUP-1622 Limiting lever rule on single lane	Beta 1
FP 5 BRDRSUP-1623 Limit applicability range values to lever rule	Beta 1
FP 7 BRDRSUP-1624 Establish LLDF using full box case	Beta 1
FP 8 BRDRSUP-936 Difference in skew between adjacent supports override	Beta 1
FP 9 BRDRSUP-1627 Range of applicability for slabs	Beta 1
FP 12 BrM Web Service Integration	Beta 1
FP 6 BRDRSUP-938 User-defined load distribution (DC2) to MCB webs	Beta 2*

FP 10 BRDRSUP-553 3D analysis for superstructure with hinges	Beta 2*
FP 11 Load Rating Tool's Permit Analysis Settings	Beta 2*
FP 13 Allow user to specify custom file paths for various output	Beta 2*
FP 15 Support Oracle Container Database Architecture	Beta 2*
FP 21 Simplified Analysis API for LRFR Permit Load Analysis	Beta 2*
FP 1 BRDRSUP-1619 Schedule based RC I beam with post tensioning	Beta 3
FP 14 API License Mechanism	Beta 3
FP 20 Analysis Results Comparison Tool	Beta 3

BrDR 7.2 Enhancement Tasks (Target for January 2022 release)	Beta Schedule
FP 25 Support Active Directory Authentication	7.1 Beta 1
FP 16 Prestressed Concrete Design Tool Phase 2	TBD
FP 17 Steel Plate Girder Design Tool	TBD
FP 22 Data Exchange via IFC Bridge Data Standard	TBD
FP 23 Load Rating Tool – Addition of MCB and Multi-Girder Superstructures LRFR	TBD
FP 24 Load Rating Tool – Addition of Slab System LFR and LRFR	TBD

ProMiles will conduct a webinar with the beta testers prior to each beta testing cycle.

Agenda Item 3: Update on BrDR Licenses (FY2021)

3a. Product Report

Judy Tarwater presented a product license summary report developed from the Excel output from AASHTOWare Manager. The report included licenses ordered as of 01/05/21.

Item	FY19	FY20	FY21	
Bridge Design - 120-Day Evaluation License	2	4	4	



Item	FY19	FY20	FY21	
Bridge Design Developer License	1	2	2	
Bridge Design Educational License	12	9	14	
Bridge Design Single Workstation Option	4	7	8	
Bridge Design Special Consultant Option	31	35	35	
Bridge Design Unlimited Option (Members)	16	17	17	
Bridge Design Unlimited Option (Non-Members)	0	0	0	
Bridge Design/Rating Service Units	38	106	47	
Bridge Rating - 120-Day Evaluation License				
Bridge Rating - 120-Day Evaluation License	6	8	8	
Bridge Rating Agency Sponsored Consultant Licenses	4	4	4	ILDOT, MIDOT, OHDOT, VADOT
Bridge Rating Developer License	7	7	6	
Bridge Rating Educational License	13	9	14	
Bridge Rating Single Workstation Option	26	27	42	
Bridge Rating Special Consultant Option	358	382	364	
Bridge Rating Unlimited Option (Members)	35	37	38	
Bridge Rating Unlimited Option (Non-Members)	12	16	17	
Consultant/Developer Extended Support	0	0	2	Pickering Firm, Inc. & Intergraph
Sponsored Consultant Licenses (Bridge Rating) - No Fee	119	137	117	ILDOT
Sponsored Consultant Licenses (Bridge Rating) - No Fee	94	106	96	MIDOT
Sponsored Consultant Licenses (Bridge Rating) - No Fee	99	106	107	OHDOT
Sponsored Consultant Licenses (Bridge Rating) - No Fee	78	78	78	VADOT
PGSuper Professional	3	4	5	KDOT, MassDOT, ORDOT, Caltrans(2)
BridgeLink Professional	2	2	2	ITD, MSDOT

Item	FY19	FY20	FY21	

3b. Service Unit Report

ProMiles presented the service unit summary report. 47 new service units have been purchased in FY2021.

3c. Evaluation Software

The current summary of BrDR software evaluations was reviewed.

Agenda Item 4: Support and Maintenance Report

4a. Incident and Report Summary

ProMiles presented the Defect History Report through April 2021. Seventy-three (73) new defects have been added since the task force meeting in January 2021. The total number of defects reported were 2824. Currently, 2736 defects have been resolved; 88 defects are unresolved (84 are high priority, 4 are low priority). None of the unresolved issues are urgent or critical. The goal is to get the unresolved bugs to zero.

4b. Progress on Bug Resolution

ProMiles presented the BrDR Maintenance Progress Report. As of 04/07/21, 18 bugs are open (submitted but not acknowledged), 1 bug is acknowledged, 2 bugs require more information, 26 bugs are on hold, and 41 bugs are in progress.

ProMiles has enhanced their process to triage new issues to determine some basic information (i.e. version). The ultimate goal is to resolve all outstanding bugs so new bugs can be resolved as soon as they come in.



4c. Enhancement List Update

ProMiles presented an update on the Enhancement List. Two handouts were provided; TAG Enhancements Bucket List and total BrDR Enhancement List. Approximately 15 new issues are received each quarter.

Eight (8) additional enhancements have been added to the BrDR Enhancement List since the January Task Force meeting.

Miss Function	BSSD-2730	Load rating tool needs to consider pedestrian load
Technical	BSSD-2738	BrR Improvements to gusset plate partial shear input and reporting
Miss Function	BSSD-2770	RTU and SCA regression files are not generated for Floor Truss members
Useability	BSSD-2782	Is there any way to save the settings for the print preview window in BrR 7.0?
Technical	BSSD-2794	BrR Gusset Module: Comments on the treatment of continuous chords
Useability	BSSD-2801	Separate out the Controls Options over multiple tabs
Useability	BSSD-2806	Messaging does not occur between Floor System Geometry and Stringer Unit Layout windows
Miss Function	BSSD-2828	7.0 Bottom Flange Lateral Support
Useability	BSSD-2837	Allow to edit analysis Template Name and Description boxes from Templates list window

4d. Maintenance Issues

No discussion.

4e. BSSD Reports (AI 2021-BrDR-009)

ProMiles provided an overview of the current BSSD tickets using the new Jira issue format.

Agenda Item 5: TAG Updates

5a. Culvert TAG

The Metal Culvert module slated for BrDR will be in accordance with Chapter 12 of the AASHTO LRFD Bridge Design Manuals and will be based on the methodology used in spreadsheets currently used by different agencies. ProMiles has reviewed the spreadsheets developed or modified by different states to assist in the planning for the Metal Culvert module and has developed a preliminary cost estimate. However, a consensus from the user community for the features and methodology to use is needed prior to finalizing the estimate and beginning development. Michigan DOT reviewed the Metal Culvert analysis procedures from several states (Ohio, Michigan, and Connecticut) and developed a report highlighting their findings.

The Culvert TAG met to discuss the features to be included in the AASHTOWare BrDR Metal Culvert module on 04/01/21. Mike Johnson walked the task force through the discussions and recommendations made during the meeting.

April 1, 2021 Meeting Participants:

Mike Johnson, Judy Tarwater, Krisha Kennelly, Geoff Trees, Subhadeep Ghosh, Mark Mlynarski, Michael Hagos, Robert Perkins, Ruben Boehler, Cindy Wang, Beckie Curtis, Daniel Jones, Mike Wall, Darren Status, Damian Silverstrim

The following Features Matrix was developed at the 4/1/2021 Metal Culvert TAG meeting.

Features Matrix

The matrix options are based on the CTT recommendations.

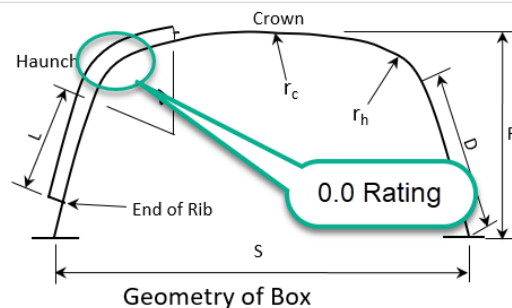
Feature	Recommendation	Comments
Computation of Thrust due to Applied Dead Load	Implement CT (AASHTO)	



Feature	Recommendation	Comments
Computation of Thrust due to Applied Live Load	Implement CT (AASHTO)	
Computation of Rating Factor Based Upon Plastic Moment	Implement Michigan procedure as a control option	
How will we handle less than minimum fill? - Montana Spreadsheet	HOLD	Mike to send out Montana spreadsheets
LFR/ LRFR?	Yes to both	The majority of the TAG would like to have both methods. To be discussed with the task force.
Structural Plate Box?	Yes	To be discussed with the task force. Perhaps we need to have some applicability limitations.
Axle load (Duncan and Drawsky method)?	??	We will look into this a bit more.
Other?		
CT method - Corner ratings for longer span structures (0.0 ratings) (Damian)	**See figures in Notes. Talk with Cindy.	Contech doesn't check those corners. Possibly have to iterate to obtain this solution. The number may be a range.
Plastic penetration (Damian)	Maybe a control option?	Is there a way to replicate this outside of CANDE?
Deterioration/Di stress (Robert/Ruben)	How do we handle section loss? Missing fasteners? Distorted shapes? Location of corrosion?	How do we handle all of these?
Materials (Robert/Ruben)	Steel and aluminum	
Skew (Robert/Ruben)	How do we handle skewed culverts?	

Notes:

** Location of 0.0 Rating



Cindy mentioned that the parameter below was more of a trial and error process. Need to discuss with her how to implement this.

84		$K_1 = \frac{0.08 - 0.002(S - 20)}{(H/S)^{0.2}}, \text{ for } 20 \leq S \leq 26$																		
85		$K_2 = 0.54H^2 - 0.4H + 5.05, \text{ for } 1.4 \leq H < 3.0$																		
86		$K_2 = 1.90H + 3, \text{ for } 3.0 \leq H \leq 5.0$																		
87	Then,	$P_{C1} = 0.45$	← one extreme end of the P_c allowable range																	
88		$P_{C2} = 0.70$	← the other extreme end of the P_c allowable range																	
89		$P_{c-adjusted} = 0.67$																		
90		$C_H = 1.04$																		
91		$R_h = 0.87$																		
92		$K_1 = 0.11$																		
93		$K_2 = 8.70$																		
94		$M_{DL} = 4.14$	k-ft/ft																	
95		$M_{E(crown)} = 2.88$	k-ft/ft																	
96		$M_{E(haunch)} = 1.42$	k-ft/ft																	
97		The total axle load and No. of axles on the bridge need to be verified for each bridge based on the span lengths.																		
98				HL-93 Truck	HL-93 Tandem	2F1*	3F*	4F1*	5C1*	SU4*	SU5*	SU6*	SU7*	EV2*	EV3*					
99	A_L (kips) =	32.0	50.0	20.0	34.0	42.0	34.0	42.0	50.0	50.0	50.0	50.0	57.5	62.0						
100	Number of axles in load	1	2	1	2	3	2	3	4	4	4	4	4	2	2					
101	Wheels per Axle	4	4	4	4	4	4	4	4	4	4	4	4	4	4					
102	C_1 =	1.00	0.80	1.00	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80					
103	C_2 =	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
104	C_{LL} (kips) =	32.00	40.00	20.00	27.20	33.60	27.20	33.60	40.00	40.00	40.00	40.00	46.00	49.60						
105	M_{LL} (k-ft/ft) =	6.09	7.61	3.81	5.18	6.39	5.18	6.39	7.61	7.61	7.61	7.61	8.75	9.44						
106	$M_{LL(crown)}$ (k-ft/ft) =	4.23	5.28	2.64	3.59	4.44	3.59	4.44	5.28	5.28	5.28	5.28	6.07	6.55						
107	$M_{LL(haunch)}$ (k-ft/ft) =	1.81	2.26	1.13	1.54	1.90	1.54	1.90	2.26	2.26	2.26	2.26	2.60	2.81						
108	$M_{cap(crown)} / M_{cap}$	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33						
109	$M_{LL(crown)} / M_{LL(haunch)}$	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33						

Span (ft)	Allowable Range of P_c
< 10.0	0.55 - 0.70
10.0 - 15.0	0.50 - 0.70
15.0 - 20.0	0.45 - 0.70
20.0 - 26.0	0.45 - 0.60

* To properly load rate a metal box culvert, the value of P_c selected from the allowable range must assign moments to the haunch and crown such that the same percentage of the available moment capacity of each is utilized. Using that specific value of P_c , the structure may be rated by load rating either the haunch or the crown. Where limits on the proportioning factor (P_c) do not allow for the equal utilization of available haunch and crown moment capacity, load rating must be based on that portion (haunch or crown) that experiences the greatest utilization of its moment capacity. This is done by selecting a proportioning factor (P_c) at one extreme end of the allowable range such that as much moment as possible is assigned to the under-utilized portion (haunch or crown). The load rating engineer shall manually adjust the P_c value within the allowable range such that Ratio for $M_{LL(crown)} / M_{LL(haunch)}$ will be as close as

The general consensus was that the TAG liked the direction being taken by the Michigan DOT.

Mike Johnson will schedule a follow-up Culvert TAG meeting sometime in the next month.

5b. Reports TAG

No updates.

5c. Beta Testing TAG

Discussed under agenda item 2c.

Agenda Item 6: Miscellaneous Topics

6a. Process to Manage BrDR Enhancement Requests

Requests

Mark Bucci presented the revised proposal for handling and managing BrDR bugs, issues, and maintenance going forward.



AASHTOWare BrDR Service Request Management

1.0 Introduction

This document establishes the service request review process for AASHTOWare BrDR software issues.

2.0 Definitions

Jira Service Desk – web-based service portal used to create, manage, and track software issues

<https://bridgeware.atlassian.net/servicedesk/customer/portals>

Bug – an issue which prevents the software from working the way it was originally designed to work

Urgent Bug – a bug which prevents users from performing critical business functions

Critical Bug – a bug which produces incorrect final results without warning the user

High Priority Bug – a bug which produces incorrect results or prevents portions of the program from functioning, however, the user is alerted to the error (e.g. the program crashes and an error window is displayed or a warning is issued)

Low Priority Bug – a bug which causes minor inconvenience to business process but has a known workaround

Maintenance – missing or improperly handled functionality or feature that was not identified or scoped during development, but should be addressed

Enhancement – new functionality or improved usability that would expand the software feature set

High Impact – resolution would benefit many states/clients, significantly improve software performance, or provide features that are in high demand

Low Impact – resolution would benefit few states/clients, address isolated issues, or provide nominal improvements to existing features

3.0 Issue Type

Reported issues will be categorized into the following types:

1. Bug
2. Maintenance
3. Enhancement
4. Education
5. Support
6. Duplicate

4.0 Issue Status

Status will be provided on all issues using the following status:

1. Open – New issue
2. Acknowledged – Issue has been received and response has been provided. Additional information may be needed. If user has not responded within two (2) days, change status to Need More Information.
3. In Progress – Issue is being addressed.
4. Client Review – Client review of proposed resolution.
5. Need More Information – Additional information needed from client.



6. Escalated – Issue will be reviewed and determination made regarding how to proceed.
 - a. Differences due to code interpretation, engineering approach, or issue type assignment that cannot be resolved.
 - b. Submit issues to the Backlog TAG and technical experts as appropriate.
 - c. Backlog TAG to provide recommendation to task force.
 - d. Task Force to make decision on how to proceed.
7. Planned – Issue has been added to a development work plan and will be delivered in an upcoming release.
8. Deferred – Issue may be addressed at a later date.
9. Closed – Issue has been resolved, culled, or closed due to non-responsiveness.
 - a. If submitter non-responsive after one (1) month, provide follow-up.
 - b. If submitter non-responsive after two (2) months, provide 2nd follow-up.
 - c. If submitter non-responsive after three (3) months, closeout task and note.

5.0 Issue Status Workflow

The following workflow will be used to track issues: ADD REVISED FLOWCHARTS

6.0 Issue Evaluation Process

Issues will be evaluated using the following evaluation matrix. Work will be prioritized considering the cost and time required to develop the resolution and following an investigation to identify potential implementation issues and related issues that may be incorporated into the development process.

	Urgent/ Short Term	Not Urgent/ Long Term
High Benefit/ High Impact	Quadrant 1 <ul style="list-style-type: none"> Urgent Bug Fix Critical Bug Fix 	Quadrant 2 <ul style="list-style-type: none"> High Priority Bug Fix Low Priority Bug Fix Maintenance Item Multi-State Enhancement Task Force Directed Work
Low Benefit/ Low Impact	Quadrant 3 <ul style="list-style-type: none"> State Specific Enhancement Isolated Issues 	Quadrant 4 <ul style="list-style-type: none"> Nice-to-Have Features Nominal Improvement to Existing Features

Quadrant 1 - issues will be fixed as soon as possible under the software maintenance contract.

Quadrant 2 – bugs will be fixed in upcoming releases other items will be addressed based on User Groupvoting, Task Force Directed work, or deferred.

Quadrants 3 & 4 – option will be provided for state funded service unit work or volunteer to champion issue to pool resources with other states to fund the effort. Otherwise, issue will be closed.

7.0 Issue Review Process



When a user identifies an issue with the software, the user shall enter the issue into Jira Service Desk. The developer will review the issue and update the issue type within 3 working days. During the review process if an issue must be reclassified to a different issue type, the submitter will be notified. All issues shall be closed upon completion. Each issue type will be resolved according to the following processes:

7.1 Bug

7.1.1 Urgent

1. Notify the submitter, AASHTOWare BrDR Project Manager, Task Force Chair, and the TestingTAG Chair that an issue has been classified as an urgent bug.
2. The task force and/or Backlog TAG will confirm the bug type.
3. Directly notify all licensees (by email or phone call and a post will be created on the Customer Support Center) of the issue, state that a resolution is under development, and provide an estimated time frame to resolve the issue. At the discretion of the task force, depending upon the severity of the issue and the time frame to resolve the issue, this notification may be delayed to be released concurrently with the patch.
4. An emergency patch will be developed by the Contractor and distributed to the licensee who reported the problem.
5. Directly notify all licensees that a patch is available and will be provided by the Contractor upon request.
6. The Contractor shall incorporate the fix into the base software in the next scheduled release.

7.1.2 Critical

1. Notify the submitter, AASHTOWare BrDR Project Manager, Task Force Chair, and the TestingTAG Chair that the issue has been classified as a critical bug.
2. Directly notify all licensees on a monthly basis of the issue status and any known workarounds.
3. The Contractor will apply the resolution to the base software in the next scheduled release provided the bug is received six (6) months prior to the published release date to allow for proper testing.
4. Technical Notes will be issued as soon as possible.

7.1.3 High Priority

1. Directly notify the submitter that the issue has been classified as a high priority bug.
2. The Contractor will apply the resolution to the base software within the next two (2) scheduled releases based on availability.

7.1.4 Low Priority Bug

1. Directly notify the submitter that the issue has been classified as a low priority bug.
2. The Contractor will apply the resolution to the base software within the next two (2) scheduled releases and prioritized based on recommendations from the Backlog TAG and Task Force.



7.2 Maintenance and Enhancements

1. Directly notify the submitter that the issue has been classified as a maintenance item.
2. The issue will be evaluated by the Backlog TAG and categorized as high impact or low impact.
3. Provide the submitter with the option to incorporate the enhancement thru state funded serviceunit work or champion the effort to pool resources with other states to fund the effort. These issues will be scheduled, developed, and incorporated into the software.
4. Otherwise, high impact items will be deferred and low impact items will be closed and noted with an explanation. Deferred items may be added to a work plan through User Group voting or through task force directed work.
5. The Backlog TAG will review deferred issues and provide a recommendation to the task force for consideration in a future BrDR software development work plan.

7.3 Education

1. Provide information to educate/inform the submitter as needed.
2. Incorporate additional documentation into the software help file as deemed appropriate.

7.4 Support

1. Provide technical support as needed.
2. Incorporated additional documentation with to assist with technical issues as deemed appropriate.

7.5 Duplicate

1. Add notes referencing the active service entry.
2. Add user of duplicate entry to receive updates for active service entry.
3. Close duplicate entry.



Backlog TAG Review Process and Customer Outreach

Backlog TAG Review Process

1. Categorize
2. Evaluate
 - a. Benefit/Impact
 - b. Urgency/Time Frame
 - c. Cost/Development Time
 - d. Implementation Issues
 - e. Identify Related Issues

	Urgent/ Short Term	Not Urgent/ Long Term
High Benefit/ High Impact	<p style="text-align: center;">Quadrant 1</p> <ul style="list-style-type: none"> Urgent Bug Fix Critical Bug Fix 	<p style="text-align: center;">Quadrant 2</p> <ul style="list-style-type: none"> High Priority Bug Fix Low Priority Bug Fix Maintenance Item Multi-State Enhancement Task Force Directed Work
Low Benefit/ Low Impact	<p style="text-align: center;">Quadrant 3</p> <ul style="list-style-type: none"> State Specific Enhancement Isolated Issues 	<p style="text-align: center;">Quadrant 4</p> <ul style="list-style-type: none"> Nice-to-Have Features Nominal Improvement to Existing Features

3. Recommendation
 - a. Quadrant 1 – Contractor to fix ASAP under Maintenance Contract
 - b. Quadrant 2 – Items that meet Long Range Planning Objectives
 - i. Fix Remaining Bugs in Upcoming Releases
 - ii. Task Force Directed Work
 - iii. Recommended Issues for User Group Voting
 - iv. Assemble rough estimate for items
 - v. Identify implementation issues
 - vi. Prioritize work
 - c. Quadrants 3 and 4 – State Specific/Isolated Issues/Nice-to-Have Features
 - i. Provide option for state funded service unit work or champion effort to increase interest with other states and move to Quadrant 2.
 - ii. Otherwise, notify user that issue will not be incorporated and provide explanation (low demand for enhancement, limited benefit to most users, etc.)

Customer Outreach

1. Recommend providing Product Roadmap on BrDR website
 - a. Provide Long Range Planning Objectives
 - b. Provide High-level Overview of Contractor Workplan for upcoming releases
 - i. Provide Quarterly Status Update



Once the task force has memorialized the directions for handling BrDR bugs, issues, and maintenance requests in Jira, the Jira TAG, led by Mark Bucci and Jeff Ruby, will be established. TAG members will include a few existing BrDR Testing TAG members, Jeff Olsen, and Dean Teal. All task force members are welcome to join. ProMiles will also be available to participate as needed. Keeping the group to a maximum of ten (10) would probably be optimal. The Jira TAG will be tasked with making decisions on the massive number of existing Jira tickets, in line with the documented process.

6b. BrDR Customer Outreach / Issue Policy

Included in the proposal discussed under agenda item 6a.

6c. BrDR Design Process

ProMiles discussed the process of enhancement estimates.

6d. New BrDR Team Member

ProMiles advised that a new member has been added to the BrDR Development Team, Nathanael Rea, EIT. Mr. Rea holds a bachelor's degree in Civil Engineering (California State University, Fullerton) and a master's degree in Structural Engineering (University of California, San Diego). He recently moved to Pittsburgh.

6e. Hosted BrDR database for NYSDOT

ProMiles advised that NYSDOT has approached ProMiles to discuss potential options to provide hosting services to support the BrDR database management (i.e. support the NYSDOT Oracle database on a ProMiles server).

6f. Caltrans Blue Sheets and BrD Implementation

Tinika Fowlkes and Judy Tarwater had a call with engineers from the Caltrans bridge design section on 03/19/21 to discuss the status of their BrD implementation and additional needs they have to fully incorporate the software into their processes.

Vinacs advised that some of the Caltrans "Blue Sheet" requirements (i.e. AASHTO-CA BDS-8, primary design specifications for California bridges and transportation-related structures) are currently existing in BrR; however, their Blue Sheet requirements are not included in BrD. A review to determine the requirements that need to be incorporated and the associated level of effort needs to be undertaken. Caltrans bridge designers took an action item from the 10/19/21 meeting to discuss internally potential options to implement work-arounds to allow them to begin to use BrD sooner than later. The Caltrans bridge design team also developed a master list of Caltrans Blue Sheet articles that need to be included in BrDR to support the specifics of the Caltrans bridge design requirements.

Vinacs advised that most of the issues identified are specific to the AASHTO specifications. Some of the issues identified by Caltrans may already be addressed in BrD.

The task force discussed the need to make a decision on when and how to proceed with the inclusion of state-specific specifications in BrDR.

6g. Migration Wizard

ProMiles advised that the migration wizard utility (written in C++) needs to be upgraded in the near future.

A validation would be performed prior to the initiation of the migration. Errors existing at the



time the script runs would result in halting the migration process. All errors would be populated in the log file. The migration log data would also be added to the database.

ProMiles also advised that the Wisconsin DOT reached out to ProMiles to advise that they are interested in using AzureSQL to support BrDR.

Agenda Item 7: BrDR Strategic Directions

Mark Bucci walked the task force through the changes made to the BrDR Strategic Direction document since the January 2021 Task Force Meeting. The task force discussed the possibility of ranking the addition of new features and whether or not a specific percentage of the budget should be targeted for existing feature enhancements v. new feature additions. The task force needs to balance new feature enhancements with maintaining the system, addressing bugs, and addressing (and not incurring new) technical debt.

The task force also discussed soliciting feedback from the user community to determine their level of interest in addressing specific features of BrDR (new and existing/to be enhanced). As we move forward with finalizing priorities for future product enhancements and new features, we need to be aware that this information should be held within the DOT community to ensure that our strategic directions are not communicated to BrDR software competitors.

Agenda Item 8: Enhancements

8a. Updated BrDR Planning Spreadsheet

The task force reviewed the BrDR Planning Spreadsheet recently updated to combine the enhancements included in the BrDR 7.1 / 7.2 spreadsheets and the enhancement list maintained by Vinacs.

8b. Option for considering pedestrian load

Promiles presented their proposed solution for considering pedestrian load separately for rating and design (BSSD-2730).

8c. Next Generation Report Tool – Core functions, one structure type

ProMiles presented the high level estimate for the modernized report tool which presents a new way of representing bridge input data, analysis data, design or design review data and load rating data.

ProMiles walked the task force through the tasks documented in the report tool estimate to describe the flow from data input, analysis, design data, load rating data, consolidated data, building preview and save report, build and implement report filters, export/import template, and implementing context menu reporting from the Bridge Workspace tree. Within the engine, current results data structure to support preserving results will be refactored and specification checking will be refactored to report design and load rating data.

8d. 3D Analysis Case Studies

ProMiles presented the estimate to create two (2) documents regarding BrDR 3D analysis for publication. The second document will contain the performance improvements in the BrDR 3D modernized engine compared to the legacy engine.

- **3D Analysis Results Benchmark Document**
 - Input 2 benchmark cases into BrDR, run analysis and compare results
 - Allow for investigation of modeling assumptions if results differ
 - Write the report



The following examples are suggestions for the benchmark result study. We may want to pick 2 from this list. "Manual for Refined Analysis in Bridge Design and Evaluation, FHWA-HIF-18-046 (<https://www.fhwa.dot.gov/bridge/pubs/hif18046.pdf>)" contains the FE results for the following:

- Example 2 is a straight, nonskewed steel bridge.
- Example 3 is curved with skewed supports BID26 in the sample database is the example from the Appendix of AASHTO Guide Specifications for Horizontally Curved Steel Girder Highway Bridges 2003
- **3D Analysis Performance Improvements Document**
 - Identify 5 test case steel bridges based on increasing number of degrees of freedom with BrDR default mesh refinement. Test cases will include one curved and one splayed model.
 - Add timing logs to the engines to track individual component operation times (Timing logs of individual components of the full analysis (FE analysis, transverse lane loading, influence surface loading, writing FE results) will offer insight into what analysis component improved from legacy and where future engine improvements will be most effective)
 - Run the analyses and gather the timing logs
 - Write the report

8e. Modeling Diaphragm Linkages

ProMiles presented the estimate to improve the modeling of diaphragms in the BrDR 3D Finite Element Analysis.

Model diaphragm connection plates in the 3D FE model

- Research appropriate stiffness to use for connection plates when the user did not define the connection plate sizes
- Revise the FE model generation to consider user input stiffener sizes and assumed sizes
- Revise FE model generation to add beam elements to model connection plates, attach diaphragms to nodes in beam elements instead of webs
- Create test cases in alternate 3D software to verify BrDR FE results
- **Allow user to specify a reduced stiffness factor for Diaphragm Definition Members (LRFD C4.6.3.3.4 recommends 0.65 factor for single angles and WT's)**
 - Database, domain, model domain, etc.
 - Migration/version conversion
 - UI work: Add a column on the Diaphragm Definition: Members tab where user can enter a reduced stiffness factor
 - Modify FE model generation

8f. 3D Analysis Performance Improvements

ProMiles presented an overview of possible approaches to improve 3D analysis performance.

- A. Reduce analysis time
- B. Reduce memory usage
- C. Reduce disk usage

8g. Straight/Curved MCB Enhancements

ProMiles presented an overview of Caltrans-requested enhancements for concrete box girder superstructures.

8h. Load Rating for Emergency Vehicles

ProMiles presented the estimate to revise AASHTOWare BrR as necessary to implement



rating of Emergency Vehicles as per VADOT requests related to NCHRP Project 20-07, Task 410.

The proposed changes will allow VADOT to run their various EV analyses via multiple runs. EV vehicles would be included in the new “Emergency” category. Under this option, the user would be allowed to override the LL factor indicator and LL factor.

The task force made the decision to consider this approach and discuss this enhancement for possible incorporation into future versions of BrDR during the June Task Force meeting.

Agenda Item 9: User Group

9a. Summary Minutes from the January Task Force Meeting

The summary minutes for the January BrDR Task Force Virtual (Savannah, GA) were provided. Judy Tarwater will post these on the SharePoint site for task force review and comment. Once in final form, the summary minutes will be forwarded to David Schroeder (RADBUG Secretary) for posting on the RADBUG website.

9b. 2021 RADBUG Meeting

Judy Tarwater advised that she plans to reach out to the RADBUG officers to discuss moving forward with the development of the agenda for the 2021 RADBUG. The Task Force agreed to provide any assistance needed to help the officers develop and finalize the agenda.

2021 RADBUG topics proposed by the task force:

- RADBUG President’s Welcome – William Metcalf
- AASHTOWare Overview – Judy Tarwater

- AASHTOWare Bridge Task Force Update – Todd Thompson
- BrDR Analysis Results Comparison Tool – ProMiles
- BrDR Report Generation Feature – Julianne Fuda (if progress has been made)
- Testing and Implementation of BrDR 7.0 in the Idaho TD – Mike Johnson
- New Features Delivered in BrDR 7.1 – ProMiles - total of 2 or 3 presentations (demo version to be made available to licensees prior to the meeting)
- BrM Web Service Integration? – ProMiles
- Active Directory Integration – ProMiles

ProMiles’ recommendations for ‘professional quality’ videos to be presented during the 2021 RADBUG:

- Introduction to BrDR 7.0 – ProMiles (create the video using version 7.1) – this video would be a ‘soft’ version that highlights the features delivered
- Multi Cell Box
- Post Tension I Beam

9c. 2021 RADBUG Survey?

The task force reviewed the 2020 BrDR user survey and made the decision to survey only the member agency licensees.

- Rank the broad categories.
- Include some multiple choice options.
- Example: Please rank your top three for potential improvements to the analysis engine
- Example: What level of interest do you have in securing hosting or web based analysis cloud services



The BrDR Task Force will meet on Friday, August 6, 2021 following the conclusion of the RADBUG.

Agenda Item 10: FHWA Update

Tom Saad provided the following FHWA update.

Derek Soden has been selected for the position of Principal Structural Engineer and Team Leader, Structural Engineering Team, within the FHWA Office of Bridges and Structures (HIBS). Since 2012, Derek has been a part of the Resource Center's (RC) Structures Technical Service Team. Mr. Soden began the first eleven (11) years of his career designing, constructing, inspecting and maintaining bridges as a Structural Engineer for the AK Department of Transportation.

Debbie Lehmann has been selected to fill the Mid-America Senior Bridge Safety Engineer position within the Office of Bridges and Structures. Debbie comes from the FHWA Washington Division office where she has worked as the Division Bridge Engineer for the past 10 years. Prior to that, she was the Assistant Bridge Engineer in the Missouri Division office for three years, a bridge inspector and bridge designer with Eastern Federal Lands for three years, and was a Structural Engineer in the private sector for four years.

Dr. Justin Ocel joins the Resource Center Structures Technical Service Team as a Senior Structural Engineer. In his new role with the RC, Justin will help advancing the state of practice in bridge and tunnel program areas through the delivery of technical assistant, technology deployment, and training. For the last 15 years Justin, has worked at the Turner-Fairbank Highway Research Center Structures Laboratory,

11.5 of those as FHWA's Structural Steel Research Program Manager.

On March 25, 2021 the FHWA Office of Bridges and Structures hosted a load rating webinar entitled *Bridge Load Rating for Implements of Husbandry*. The webinar focused on impacts of implements of husbandry on highway bridges and proposed load rating provisions for implements of husbandry. The webinar was the 32nd in the FHWA Bridge Load Rating Webinar Series. The objective of these webinars is to share state of practice, lessons learned, research advancement and available resources to assist bridge analysis engineers. The 32 recorded sessions are available for review at <https://www.fhwa.dot.gov/bridge/loadrating/>

FHWA has recently updated the National Highway Institute (NHI) Course No. 130092, *Load and Resistance Factor Rating of Highway Bridges*, to bring the course up-to-date with MBE revisions that have been adopted in recent years and to add content on gusset plate, culvert and timber bridge load ratings, among other content. With travel restrictions due to COVID19, NHI has postponed the delivery of a number of these 4-day instructor led courses. In the meantime, NHI is offering the course, virtually, if States request the training in a virtual format. Please contact Thomas.saad@dot.gov if your agency is interested in hosting this 4-day course, virtually. You may track the availability of courses and open seats at <https://www.nhi.fhwa.dot.gov/course-search?tab=0&key=130092&res=1>. Additionally, you can find excellent Reference Manuals that coincide with many of the FHWA NHI Course curriculum for bridge design and analysis engineers at <https://www.fhwa.dot.gov/bridge>.



Agenda Item 11: Licensing Issues

11a. AASHTOWare License Fee Strategies and Customer Success Roadmap

The task force discussed using the AASHTOWare License Fees Strategies and Customer Success Roadmap document as a reference on an ongoing basis to support future licensing directions.

Agenda Item 12: Marketing Activities

12a. BrDR Marketing Ideas

No discussion. Document to be reviewed during the June Task Force meeting.

12b. BrDR Modernization Release Announcement

Chui McConnell presented draft BrDR marketing materials for 7.0.

12c. Marketing needs to be communicated to Chui McConnell

No additional discussion.

Agenda Item 13: Five Year Projection for BrDR

No discussion.

Agenda Item 14: Review Action Item list from this meeting

Judy Tarwater read the action items recorded during the meeting.

Agenda Item 15: Task Force Executive Session (as needed)

Meeting was adjourned at 5:08pm.

