

Integrating Resiliency at CDOT Project Prioritization Fact Sheet



The Concept and Value

In order to develop a method for integrating Risk & Resiliency into daily business practices— particularly project selection—subject matter experts from CDOT, FHWA and DRCOG were assembled to determine how to integrate the “4R’s” (see link in Additional Resources) into project selection processes (local, regional and federal). The group thought it best to tightly link the resiliency approach with existing project selection methods, and to make adoption of the resiliency mindset a significant differentiator for projects that might otherwise not get funded. Key points of a successful scoring tool include:

- Resiliency would provide a 10% contribution of points
- These resiliency points would stay within existing scoring scales
- Majority of these points are contingent on a positive BC

The goal of this Case Study was to develop a scoring tool for incorporating resiliency into a project’s overall score and rating that provides additional justification for funding a project with added resiliency measures.

How To

The scoring tool that was developed to incorporate resiliency will need to be completed by Project Managers in order to assess resiliency considerations during project selection. An “Instruction” tab is provided in this tool/ spreadsheet which outlines the steps and logic in this process. The scoring tool addresses the following factors of

- Criticality
- Screening level risk assessment (high, medium, low)
- Whether using current standards incorporates resiliency
- Asset vulnerability
- Risk mitigation per threat
- Projects with multiple assets/risks
- Additional points earned based on positive BCA*

RESILIENCE

American Association of State Highway and Transportation Officials (AASHTO) Adopted Definition:
Resiliency is “the ability to prepare and plan for, absorb, recover from, or more successfully adapt to adverse events.”

Colorado Resiliency Working Group Definition:
Resiliency is the ability of communities to rebound, positively adapt to, or thrive amidst changing conditions or challenges – including disasters and climate change – and maintain quality of life, healthy growth, durable systems, and conservation of resources for present and future.

Project Prioritization Score Sheet Example

Questions 1-4 Initial Assessment - Bridge Replacement Project example	Logic	Scoring Logic	Type of Funds	Yes/No	General Instructions or Documentation needed
1. Is the funding program suitable for Resiliency?	If Yes, continue. If No, stop.	• Apply to AM, Bridge, Roadway Surface Treatment, Regional Priority Program (RPP), National Freight Highway Program at first • Bridge enterprise? Would need Board approval	Resiliency - all	Yes	
2. Assess criticality of the asset (use Criticality Map)	If highly-critical (H), moderate criticality (M), low criticality (L)	H = 2 points M = 1 point L = 0 points	Determination	Points	Use GIS tool to map location. The GIS Map tool attaches maps to the spreadsheet (see link)
3. Complete a screening level assessment of risk? • Are physical risks involved? • Are man-made risks possible?	Use GIS Map for potential risks from natural threats. Document logic for man-made risk	Assessment complete = 1 point Assessment not complete = 0 points	Yes	1	Use applicable map layer on the GIS Map tool (linked in Cell G5) - (attach spreadsheet with project location) Supply a narrative using the all logic for this instruction tab.
4. Does bringing the project from as-built specifications to current standards or construction practices incorporate resiliency? Examples: • As-built standard was a 24" culvert, new standard requires a 48" culvert. • As-built bridge had a less than 100-year capacity, new bridge meets or exceeds a 100-year capacity. • As-built roadway base was standard, new design incorporates large rock as base to prevent flood damage SH 71 base	Need to be able to document that assets at risk as identified in one of the GIS layers incorporates resiliency by using correct standards or construction practices. If current design standards don't incorporate resiliency no points will be allowed. Example: existing and new bridge are both at a 100-year design.	Using current standards or construction practices equates to resiliency = 2 points	No	0	The metrics can also be found here: https://www.cdof.gov/programs/initiatives/departmental-initiatives/asset-management/asset-management-and-operations/asset-management
Risk Mitigation Assessment					
5. Risk identification and mitigation BEYOND bringing designs up to current standards From question 2, list what assets are at risk in their current state?	What risks could affect the asset? (Use dropdowns to select all that apply)	How vulnerable is the asset based on this risk? Please select: Very vulnerable Somewhat Vulnerable Not Vulnerable	To what degree have you mitigated the risk and made the asset more resilient? Please select: • Mitigated • Not Mitigated		Use risk map layer on the GIS Map Tool (linked in Cell G5) - (attach spreadsheets showing all assets)
Bridge	100-year Floodplain	Very Vulnerable	Mitigated	4	
Bridge	Rock Fall Retention Hazard	Somewhat Vulnerable	Mitigated	2	
Bridge	Drought	Very Vulnerable	Not Mitigated	0	
Bridge	Aviation	Somewhat Vulnerable	Mitigated	2	
				0	
				0	
				0	
			Max Risk Mitigation Points (Max cannot exceed 4; Subject to BCA)	4	
6. BCA Tool Score	BCA Score	BCA Factor to Apply to Risk Mitigation Points 5 or better = 1.5 Between 2 and 5 = 1 1.0 to 2 = 0.5 Less than 1 = 0	Final Risk Mitigation Points		Link to R&B tool https://www.cdof.gov/programs/initiatives/departmental-initiatives/asset-management/asset-management-and-operations/asset-management
Enter your project's BCA Score in the cell to the right-->	8			6	
Sum of Initial Assessment points and Final Risk Mitigation Points			Total points (Max cannot exceed 10)		
			9		

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Case Study Results

This Case study progressed smoothly due to the brainstorming and collaboration with the SME's and their helpful feedback and insight. The case study team is confident that this practice of completing the scoring tool and, when practical, conducting the BCA to include the results in the spreadsheet can become part of CDOT's project selection "fabric." Further, the available points outlined in the tool can be refined over time to focus more on the impact of resilient solutions than the behavior.

The following are the main insights discovered throughout this Case Study:

- Those who oversee the projects must make sure that what is completed and filled out in the scoring spreadsheet is followed through; incentivizing the consideration of resiliency in an effective way will ensure the mitigation efforts listed in the spreadsheet are not dropped of the project later on if costs become too high
- Success and effectiveness of this tool will depend on the type of project and the types of funds allocated
- The scoring spreadsheet is initially recommended for the following programs:
 - Asset Management
 - Bridge
 - Surface Treatment
 - Regional Priority Program (RPP)
 - National Freight Highway Program
 - Bridge Enterprise—this will require approval from the Bridge Enterprise Board (a.k.a. the Transportation Commission)

Key Takeaways

- *This scoring process will only be used when Program funds are suitable for resilience.*
- The resiliency factor should be weighted at no more than 10%.
- Success and effectiveness of this tool will depend on the type of project and the types of funds allocated for the project .
- Once this method of thinking (incorporating resiliency) has become part of the project selection fabric, we can fine-tune the process to focus more on the positive impact of resilient solutions rather than the behavior.
- *The work and time required by the PM's to complete the BCA portion of this tool is minimal (<2 hrs. estimated), and may result in a higher overall score and funding for the project.

Contacts and Resources

For questions, please contact:

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Additional resources include:

- [Resiliency website](#)
- [Scoring Spreadsheet](#)
- [4R's Matrix](#)