



Design Workflow Integration

Mike Johnson, PE

Idaho Transportation Department

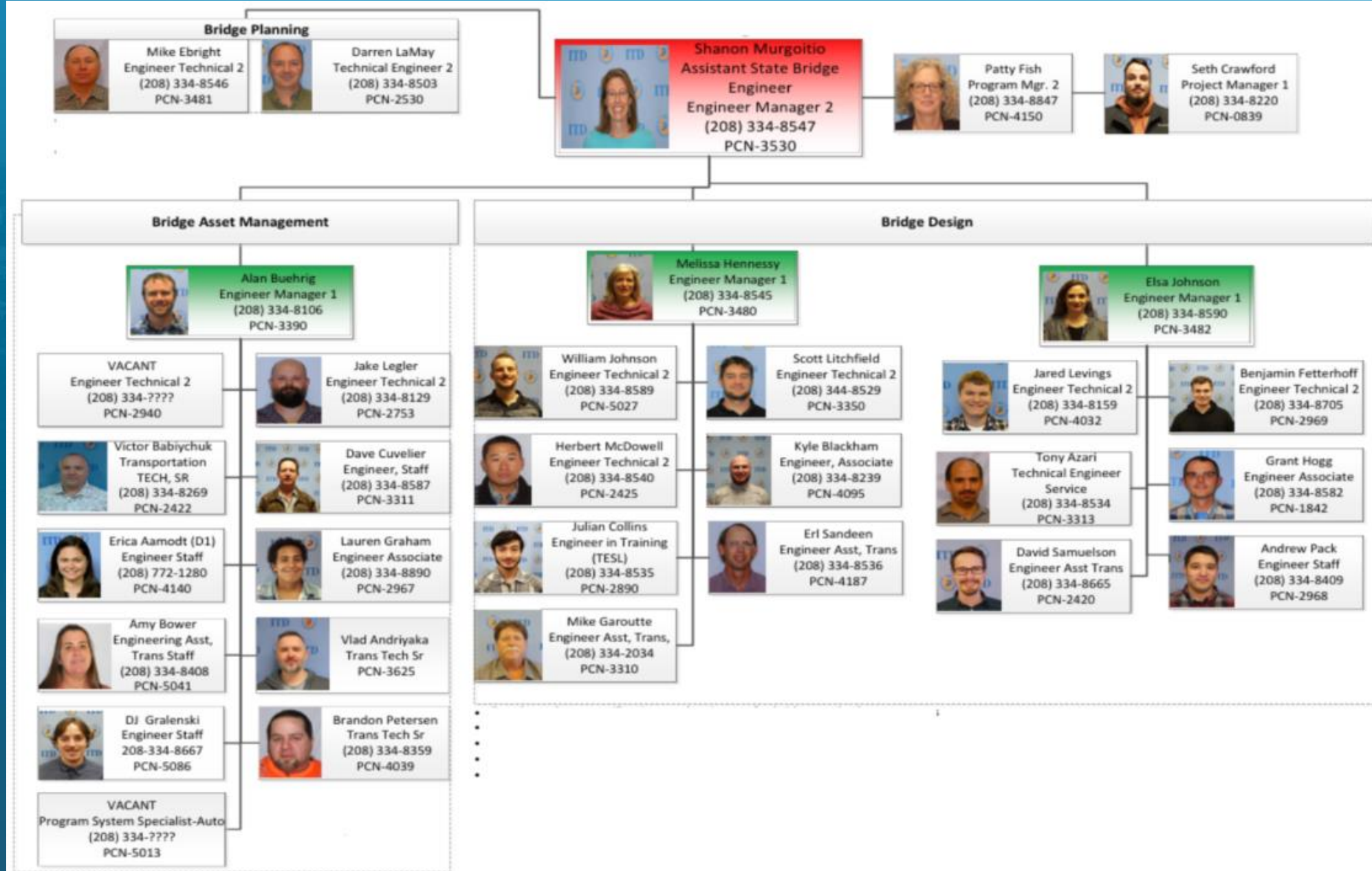
ITD Bridge Section

Bridge Inventory:

- 4403 – Total on State and Local System

Bridge Construction:

- \$100 Million Annual Bridge Program
- Average 24 Bridge Replacements per Year
 - 175,000 SF per Year
- \$1.05 Billion in FY25



ITD Common Bridge Types



An aerial photograph of a city, likely Pittsburgh, featuring a river with several bridges. A large mountain is visible in the background. The entire image is covered with a semi-transparent blue filter. The title 'Past Practice' is centered in white text.

Past Practice

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Design

Bridge Design & Rating
Version 6.8.4.3002
Build date May 12 2020

Project Chicagoland Road over I-54

Subject Chicagoland Rd. GS

Task Interior - Cedar Ridge

Computed MTJ

Checked _____

Sheet _____

Date 8/14/2020

of _____

Loading Information	
S _{ps} =	94.91667 ft
S _{lew} =	0.000 deg
Bridge width (Deck face)	77.000 ft
Bridge width with curb to curb	43.450 ft
	Number Lanes = 4
Gender type ▼ ☒ Interior ☐ Exterior	
Interior or Exterior ? Number of Girders = 10 Spacing = 7.575 ft Decking Overhang = 3.625 ft Other Overhang = 3.625 ft t deck = 0.0 in t deck out = 0.0 in t deck face = 0.0 in	
Rail Type: _____ Concrete rail of ft ▼	
t curb = 0.153 klf	n = 1.0000
t curb = 0.153 klf (girders only)	E deck = 5220.6 k
t deck = 8.0 k	E girder = 5220.6 k
t girder = 8.0 k	E release = 4925.3 k
t release = 7.0 k	
Metal Deck Forms? ▼ ☒ Yes ☐ No weight FWS- 0.031 klf t curb strip = 0.00 in Actual ave. camber = 0.28 in	
1 Lane Load = 10.0 klf 2 Lane Load = 13.1 klf 3 Lane Load = 13.1 klf 4 Lane Load = 13.1 klf 5 Lane Load = 13.1 klf	

Notes:

1. **Interior - Cedar Ridge**

2. **Bridge width with curb to curb = 43.450 ft**

3. **Span = 77.000 ft**

4. **Overhang = 3.625 ft**

5. **SideWalk = 3.625 ft**

6. **Bridge width with curb to curb = 43.450 ft**

7. **Bridge width with curb to curb = 43.450 ft**

8. **Bridge width with curb to curb = 43.450 ft**

9. **Bridge width with curb to curb = 43.450 ft**

10. **Bridge width with curb to curb = 43.450 ft**

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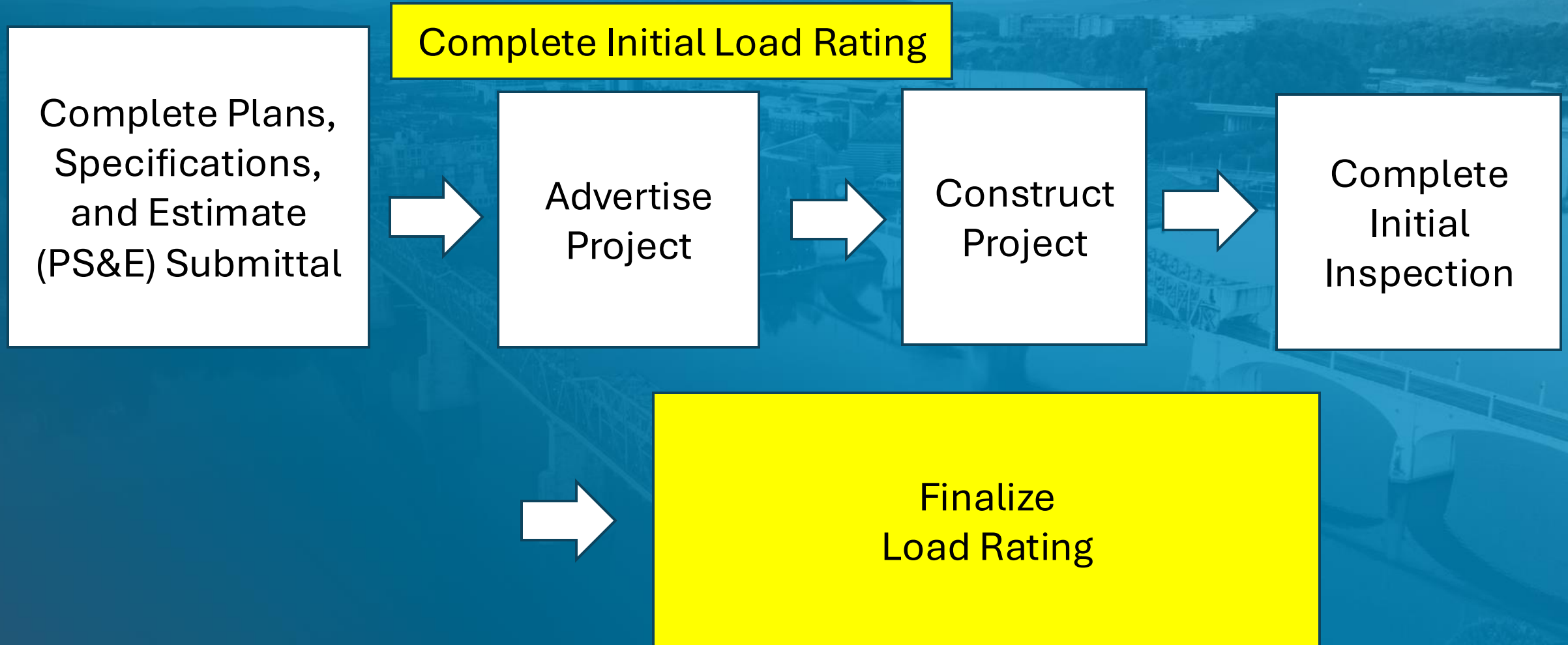
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ITD Past Practice



ITD Past Practice Design

Designer Completes Design Using Program / Spreadsheet of Choice

Checker Completes
Design Check Using
Program / Spreadsheet
of Choice

Senior Independent Reviewer Checks Design / Plans for Accuracy and Constructability

[illegible][illegible][illegible]

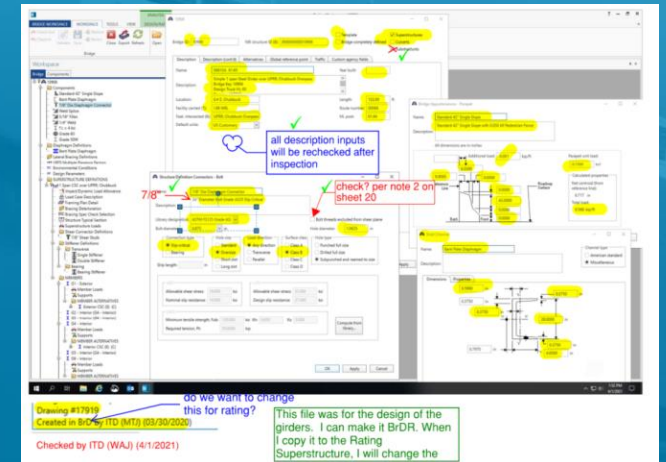
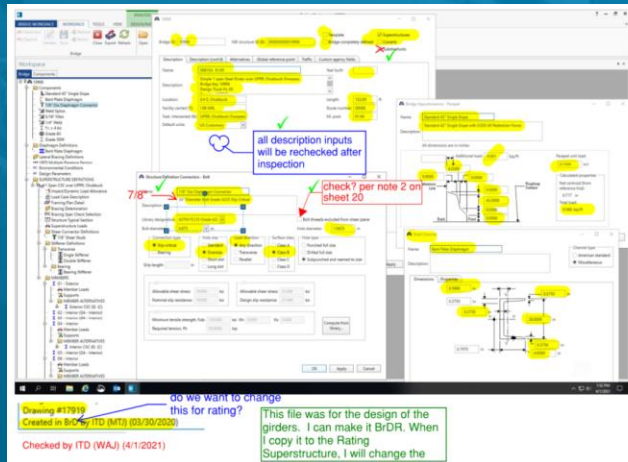
ITD Past Practice

Load Rating

Rater Completes
Load Rating Using
BrDR

Checker Completes Line
By Line Check of BrDR
Documented on
Screen Shots

S.I.R. Completes Line
By Line Review of Key
Items of Load Rating
Documented on
Screen Shots



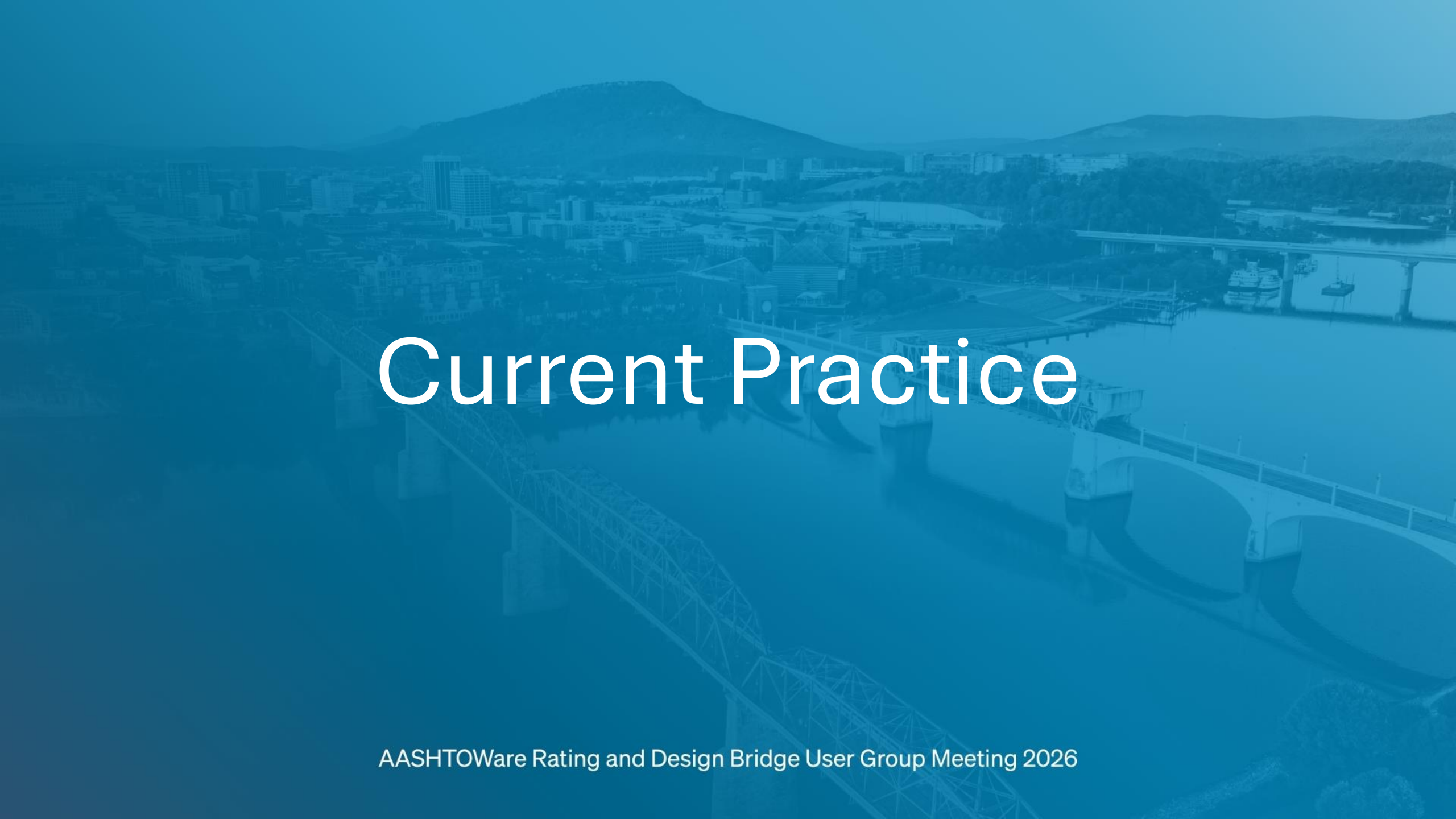
ITD Past Practice

Advantages

- Load Rating Gave A Second Check

Disadvantages

- Extra Effort
- Rating Finds Issues After Design Documents Are Completed
- Inconsistent Design Programs / Spreadsheets
- Maintaining Multiple Spreadsheets
- Difficult To Check
- Coordination NOT Consistent / Untimely Load Rating Completion

An aerial photograph of a city, likely Pittsburgh, featuring a river with several bridges. A large mountain is visible in the background. The entire image is covered with a semi-transparent blue filter. The title 'Current Practice' is centered in white text.

Current Practice

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ITD Current Practice

The design checker's primary responsibilities include:

- Verifying the design theory and correct interpretation of the design code to the level of accepting responsibility for stamping the record design calculations if needed.
- Accuracy and completeness of the design calculations to confirm the structural adequacy of the components
- Design check using the BrDR software
- Independent check of all geometry and elevations
- Verifying the accuracy and completeness of the load rating
- Stamping the contract plan sheets if the designer is not a licensed professional engineer or if the design engineer is not available.

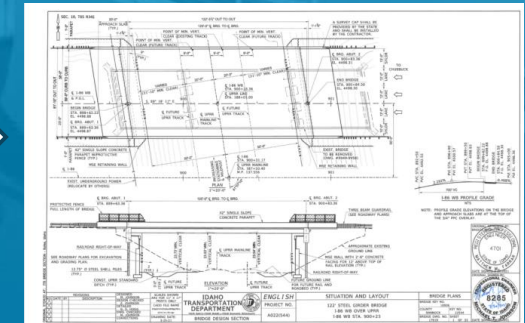
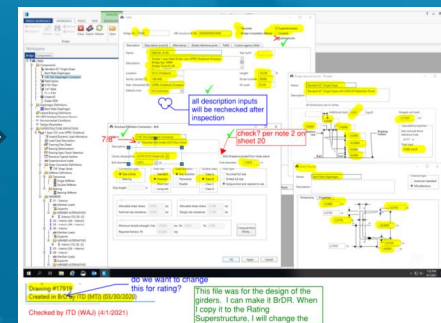
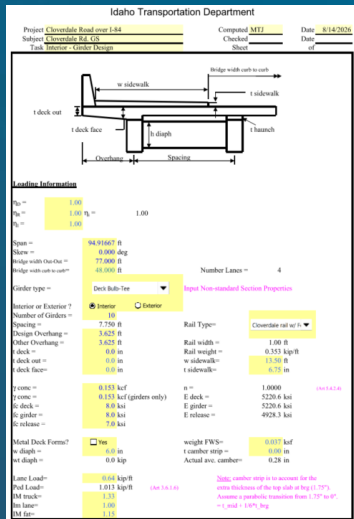
ITD Current Practice

Designer
Completes
Design Using
Program /
Spreadsheet of
Choice

Checker
Completes
Independent
Check Using
BrDR

Checker
Completes Line
By Line Check
of BrDR
Documented on
Screen Shots

Senior
Independent
Reviewer Checks
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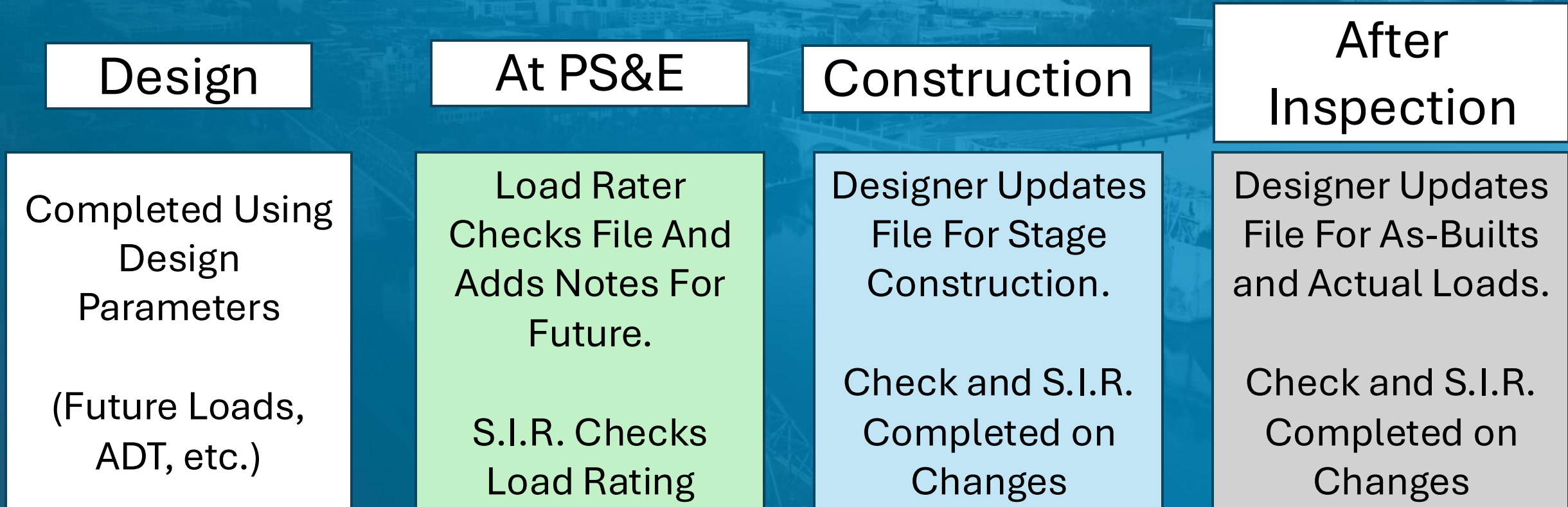


BrDR Design File Is Initial Load Rating File

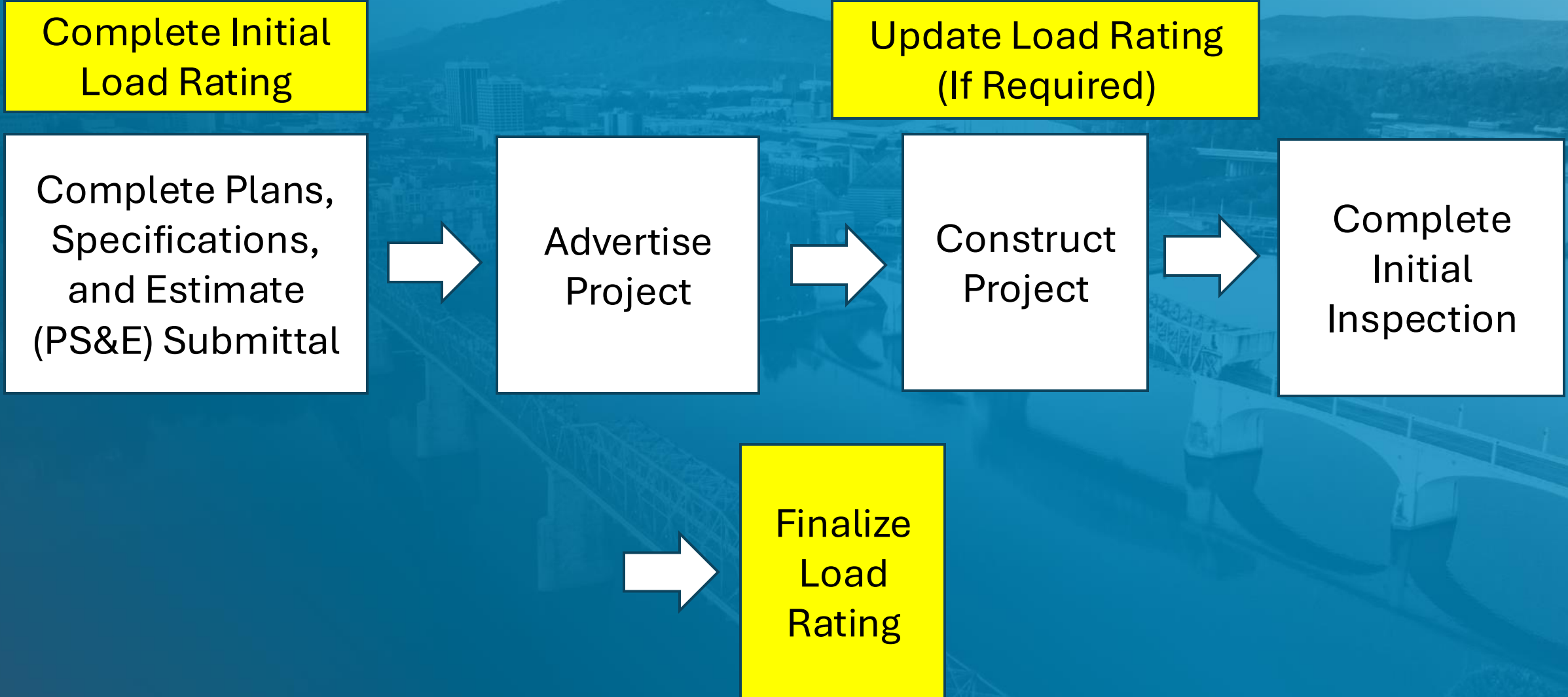
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ITD Current Practice

Progression of the Load Rating File



ITD Current Practice



ITD Current Practice

Advantages

- Saves Time and Effort
- Load Rating File Ready Prior To Final Plans
 - Load Rating For All Vehicles Completed at Final Plans
 - Reduced Risk of Design Vehicle < 1.0 For Load Rating
- Minimal Effort for Load Rating Staff For New Designs
- Minimal Effort for Completing Load Rating After Initial Inspection

Disadvantages

- Repeat Revisions of BrDR File