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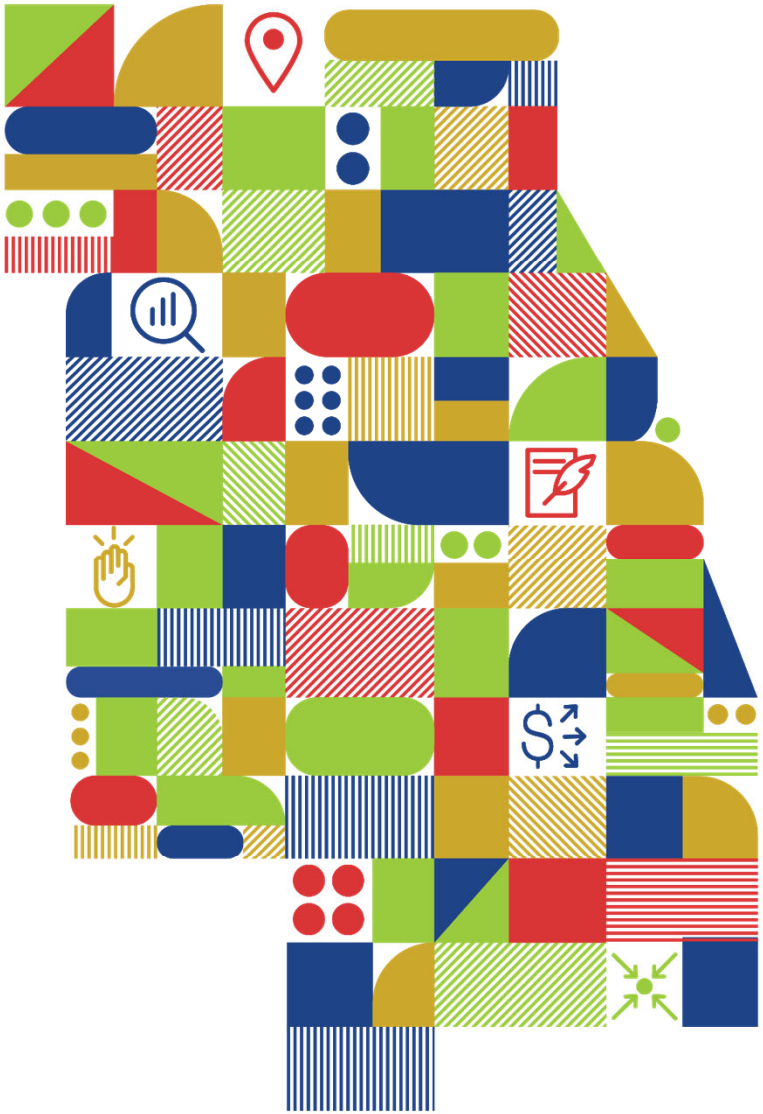
Bridge and Truck Route scores; Freight planning factor; Planning factor weights

August 6, 2020



Overview

Staff proposal for revised transportation impact scoring: bridge rehab/replace and truck route improvements

Staff proposal for revised freight planning factor scoring methodology

Staff proposal for revised planning factor weights

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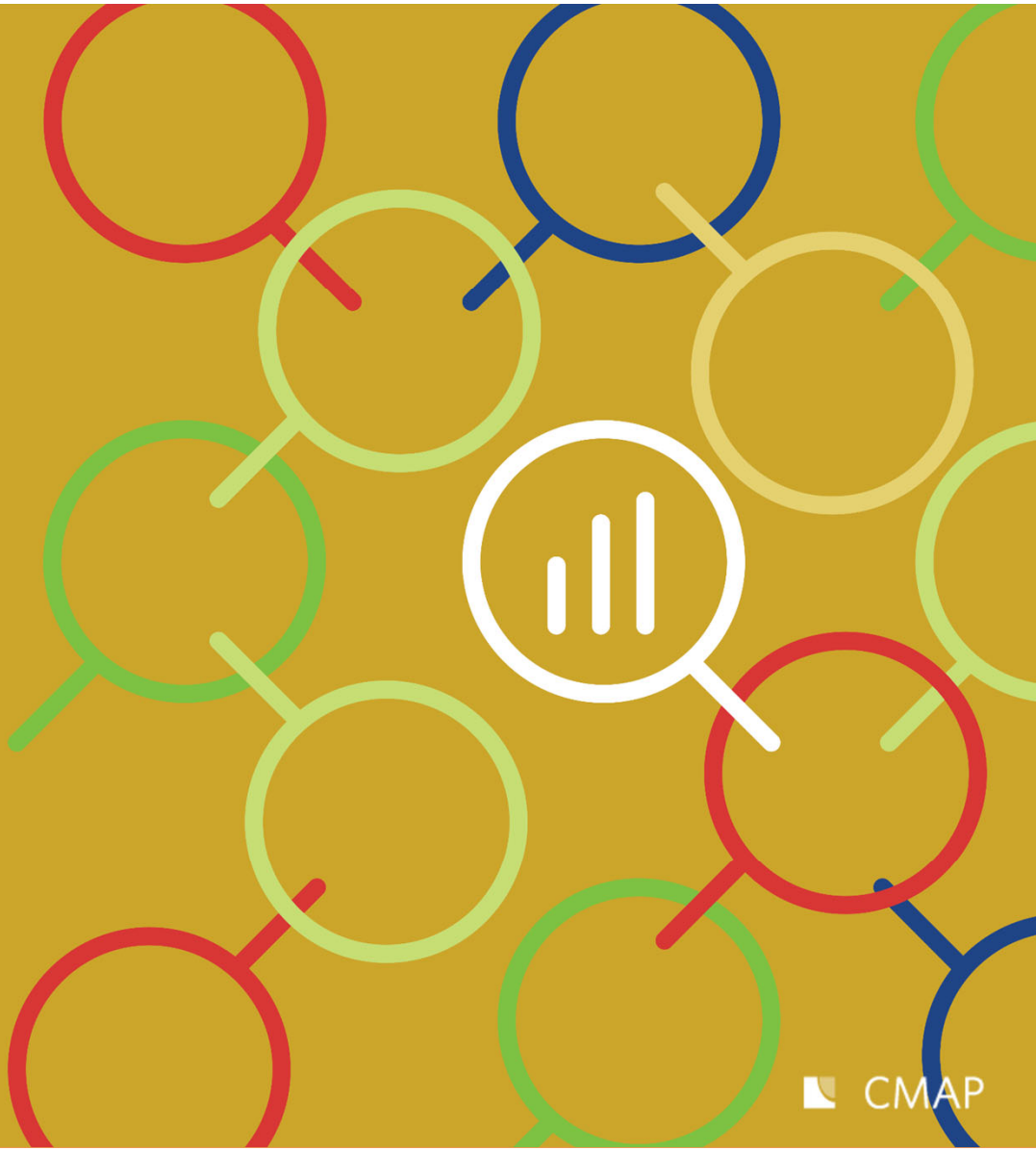
Bridge rehabilitation and reconstruction projects



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Current methodology

Existing Condition

National Bridge Inventory (NBI) sufficiency rating subtracted from 100

Improvement (cost effectiveness of)

Sufficiency rating adjusted based on type of work and the functional classification of the road using IDOT's major bridge program factors

For projects involving multiple individual structures, the structure with the worst rating is deemed the "critical structure" and both scores are based on this critical structure.

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Comments and staff findings

Adjustment factors disadvantage constrained urban bridges by using unachievable standards

Adjustment factors may not capture the full scope of improvements when work is on multiple parts (deck, superstructure, substructure) of the bridge

Proposed methodology changes

Existing Condition

NBI sufficiency rating subtracted from 100 (No change)

Proposed methodology changes

Improvement (cost effectiveness of)

The potential impact of the project scope on:

- Deck Condition Rating (NBI Item 58)
- Superstructure Condition Rating (NBI Item 59)
- Substructure Condition Rating (NBI Item 60)
- Bridge Posting Code (NBI Item 70)

Additional points if the project corrects (or a design exception is issued for):

- Insufficient lane width (NBI Item 51 / NBI 28A)
- Traffic safety features (NBI Item 36) do not meet currently acceptable standards (bridge railings, transitions, approach guardrail, and/or bridge guardrail ends)

Proposed total improvement score

Sum of the deck, superstructure, substructure, bridge posting, insufficient lanes, and safety features scores

Assumptions – structural elements

Full replacement of the structure or a component(s) of the structure results in maximum condition ratings for the replaced components

Partial replacement or rehabilitation of a component(s) results in a “satisfactory” rating for the replaced/rehabbed component(s)

Repairs to a component not being replaced/rehabbed result in a one category improvement in the component’s rating

The region’s historic and/or movable bridges face significant restrictions to full replacement

Scoring – structural elements

Deck Improvement Score (0 – 9 points)

Scope of Work	Score
Full deck replacement	9 – (current deck condition rating)
Partial deck replacement or deck rehabilitation*	6 – (current deck condition rating)
Deck repair (including joint sealing or joint repairs)	1 point

Superstructure Improvement Score (0 – 9 points)

Scope of Work	Score
Full superstructure replacement	9 – (current superstructure condition rating)
Partial superstructure replacement or superstructure rehabilitation (including girders, stringers, trusses, arches, pin & hangers, etc.)*	6 – (current superstructure condition rating)

Substructure Improvement Score (0 – 9 points)

Scope of Work	Score
Full substructure replacement	9 – (current substructure condition rating)
Partial substructure replacement or substructure rehabilitation (including abutments, piers, columns, caps, piles, walls, footings, etc.)*	6 – (current substructure condition rating)

*Multiplier may apply for historic or movable structures

Deck (NBI Item 58), superstructure (NBI Item 59), substructure (NBI Item 60), and culvert condition(NBI Item 62) ratings are:

9 – Excellent
8 – Very Good
7 – Good
6 – Satisfactory
5 – Fair
4 – Poor
3 – Serious
2 – Critical
1 – Imminent Failure
0 – Failed

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Historic and/or movable structures

Full replacement is not feasible and/or is cost prohibitive due in part to SHPO requirements

In recognition that these structures likely cannot achieve a condition rating of “9”, a multiplier of 1.5 will be applied to the element improvement score for partial replacement or rehabilitation of that element

Historical Significance (NBI Item 37):

1 – On National Register
2 – National Register Eligible
3 – May be National Register Eligible
4 – Unknown Historical Significance
5 – Not National Register Eligible

Structure Type, Main (NBI Item 43B):

15 – Movable – Lift
16 – Movable – Bascule
17 – Movable - Swing

Bold: Multiplier will be applied; *Italic: Multiplier may be applied, pending additional information*

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Assumptions & scoring – load posting

Full replacement results in the removal of any existing load postings

Partial replacement or rehabilitation may result in additional load capacity; the project sponsor must provide an estimate of the expected new load rating that will result from the project.

Improvement to bridge posting (0 – 5 points)

Scope of Work	Score
Full replacement	5 – (current bridge posting code)
Partial replacement or rehabilitation of deck, superstructure, substructure, and/or bearings and/or installation of temporary or permanent strengthening measures	(bridge loading code based on estimated load rating) – (current bridge posting code)

Bridge posting codes (NBI Item 70) are:

5 – Equal to or above legal loads
4 – 0.1 – 9.9% below legal loads
3 – 10.0 – 19.9% below legal loads
2 – 20.0 – 29.9% below legal loads
1 – 30.0 – 39.9% below legal loads
0 – > 39.9% below legal loads

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Scoring – lane width & safety

Improvement to insufficient lane width (0 – 1 point)

If the average lane width prior to the project is less than shown below, based on the number of lanes carried, 1 point will be awarded if the project replaces or widens the deck or the entire structure and/or removes a lane(s) in order to exceed the minimum, or if a design exception is documented.

# of lanes	Average width*
1	14 ft
2	16 ft
3	15 ft
4	14 ft
5+	12 ft

*Source: Thresholds for "Width of Roadway Insufficiency" component of the sufficiency rating formula

Improvement to safety features (0 – 2 points)

If any of the following safety features are currently rated "0", 0.5 points will be awarded for each feature that will be brought up to standard by the project, or for each feature for which a design exception is documented:

- Bridge railings (NBI Item 36A)
- Transitions (NBI Item 36B)
- Approach guardrail (NBI Item 36C)
- Bridge guardrail ends (NBI Item 36D)

Questions?

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Truck route improvement projects

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Current methodology

Existing Condition

Pavement condition, safety, reliability, mobility, and truck volumes (equally weighted)

Improvement (cost effectiveness of)

Improved mobility (50%) and inclusion of listed systematic or incident detection, response, and recovery strategies in the project scope (50%)

Comments and staff findings

Scoring does not consider geometric deficiencies that inhibit efficient truck movement

No consideration is given to negative impacts of truck traffic on surrounding communities

All projects were assumed to result in a mobility improvement

Proposed methodology changes

Existing Condition

- Retain condition, safety, reliability, mobility, and truck volume
- Add geometric deficiencies
- Adjust relative weighting

Improvement

- Retain mobility and systematic improvements
- Add geometric improvements
- Add mitigation of negative impacts
- Adjust relative weighting

Proposed existing condition score

Weighting:

Factor	Weight
Condition (length weighted average)	10%
Safety (worst segment/point)	10%
Reliability (length weighted average)	20%
Mobility (length weighted average)	20%
Truck Volume (length weighted average)	20%
Geometry (% deficient)	20%

Geometric deficiencies

Presence of a weight-restricted bridge(s) within project limits

Presence of vertical clearance restrictions within project limits

% of project length with insufficient outer lane width for the design vehicle

% of intersections within project limits with insufficient turn radii and/or insufficient queue storage for the design vehicle

Proposed improvement score
(cost effectiveness of)

Four equally weighted factors:

- Improvement to mobility
- Reduction in geometric deficiencies
- Inclusion of systematic improvements
- Mitigation of negative impacts of trucks

Systematic improvements

Systematic Improvements	Score*
Truck travel information systems	5
Adaptive signal control	4
Integrated Corridor Management	3
Traffic signal interconnect	3
Dynamic message signs	2
Truck route signing	1

*Scores may be combined, to a maximum of 5 points

Mitigation of negative impacts

Mitigation Strategy	Score*
Project reroutes trucks away from sensitive land uses (e.g. hospitals, cemeteries, schools, parks, low income communities, downtown areas, agricultural areas, natural areas, etc.)	5
Project includes electrification infrastructure	4
Project includes noise mitigation (sound walls, berms)	3
Presence of off-street freight loading zones within project limits	3
Loading/delivery time restrictions are imposed in project area	2

*Scores may be combined, to a maximum of 5 points

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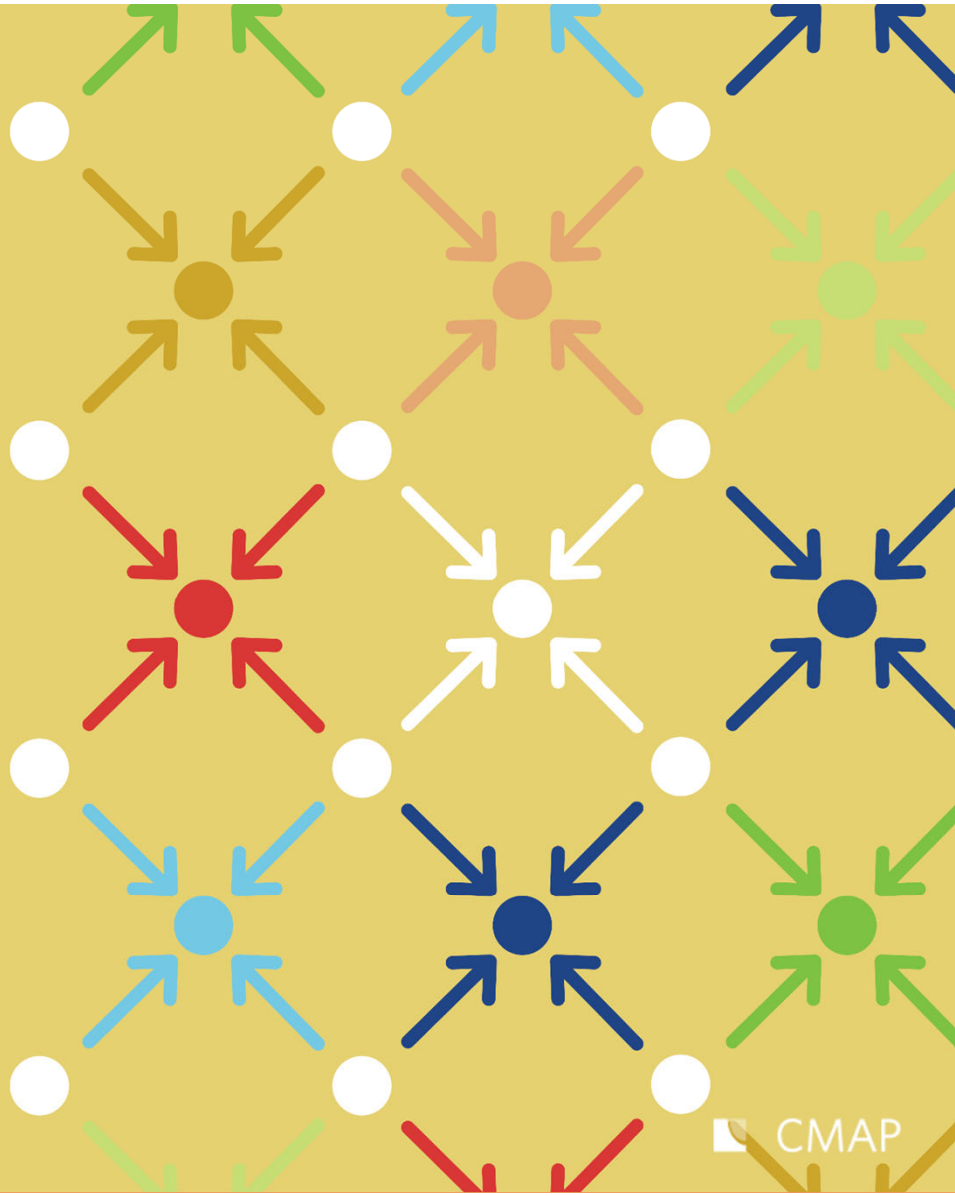
Freight planning factor



Current methodology

Points awarded based on the highest truck percentage within the project location

Applies to road expansions, road reconstructions, bridge rehab/reconstructions, and corridor/small area safety project types

Comments and staff findings

Scoring does not consider the project's role in the regional movement of goods

Scoring does not consider planning/policy recommendations of ON TO 2050

Consider negative points for negative impacts of increase in heavy vehicles

Proposed methodology

Project located on the National Highway Freight Network, a designated Class I or Class II truck route, or a National Highway System Intermodal Freight Connector	3 points
Project sponsor has adopted policies or procedures to improve truck routing and permitting and/or delivery management strategies to reduce negative impacts of freight	2 points

Freight policies

Project sponsor has adopted policies or procedures to improve truck routing and permitting and/or delivery management strategies to reduce negative impacts of freight — 2 points

Freight policy or procedure	Score*
Sponsor has an online truck permitting program	1
Sponsor has one or more delivery management policies	1
Sponsor has completed/participated in a truck routing study	1
Sponsor has completed a systematic review of truck restrictions within their jurisdiction	1
The project is identified in a local, county, or regional freight mobility plan	1

*Scores may be combined, to a maximum of 2 points

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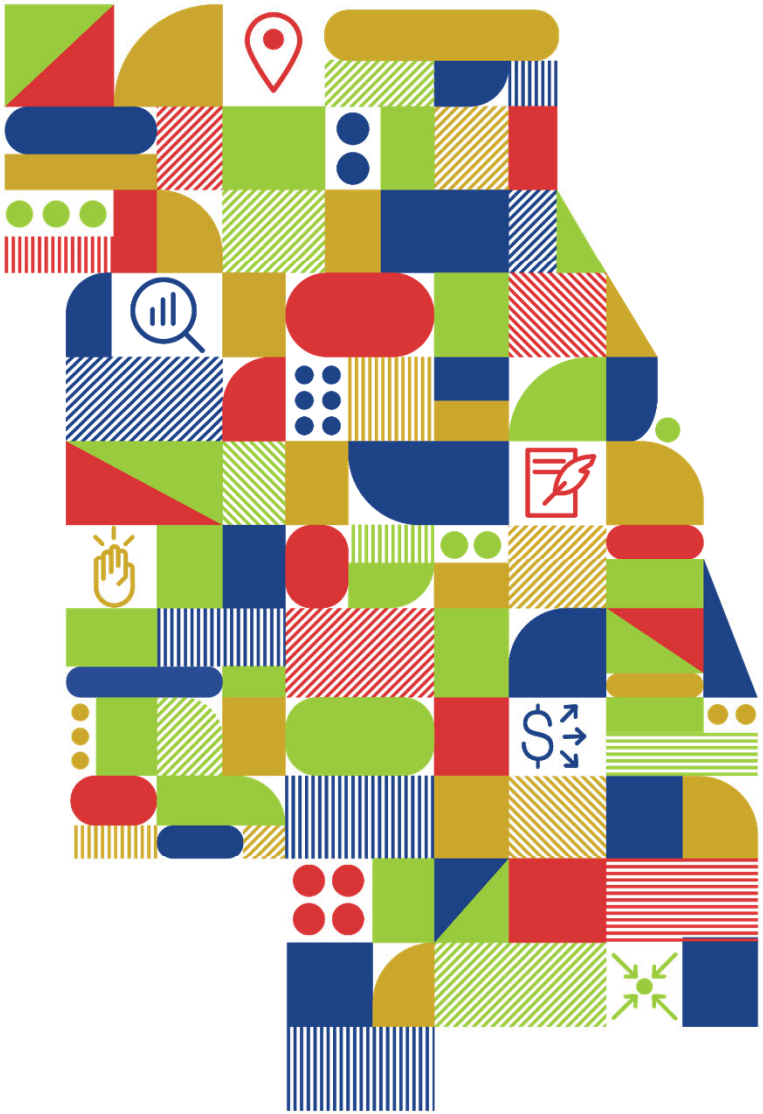
Planning factor weighting



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Planning factors

The intent of planning factors is to set projects up for success by encouraging supportive policies and to account for additional project benefits not captured through the transportation impact analysis

Current scoring

Project Type	Inclusive Growth	Complete Streets		Green Infrastructure		Freight	Transit supportive density		Total
		Policies	Elements	Policies	Elements		Density/Parking	Mixed Use	
Bridge Rehab/Reconstruction	10	5	5			5			25
Bus Speed Improvements	10	2.5	2.5				7	3	25
Corridor/Small Area Safety Improvements	10	5	5			5			25
Highway-Rail Grade Crossing Improvements	10	5	5	2.5	2.5				25
Road Expansion	10	2.5	2.5	2.5	2.5	5			25
Road Reconstruction	10	2.5	2.5	2.5	2.5	5			25
Transit Station Improvements	10	2.5	2.5				7	3	25
Truck Route Improvements	10	5	5	2.5	2.5				25

Comments received

All: More criteria should be considered for certain project types for a more holistic evaluation

Inclusive Growth: scores were lower than expected

Complete Streets: emphasis should be on elements in projects vs. policies

Freight: Negative impacts should be considered

Green Infrastructure and Transit Supportive Density: no specific comments received

Proposed changes

Increase the total weight of planning factors from 25% to 30%

Increase the points for Inclusive Growth (all project types) from 10 to 15

Change policy/elements weight for Complete Streets

Change Freight to network/policy evaluation

Remove Complete Streets from transit station projects; replace with Green Infrastructure

Apply factors to new bike/ped barrier projects

Proposed scoring

Project Type	Inclusive Growth	Complete Streets		Green Infrastructure		Freight		Transit supportive density		Total
		Policies	Elements	Policies	Elements	Policies	Network	Density/Parking	Mixed Use	
Bicycle/Pedestrian Barrier Elimination	15	10	*	2.5	2.5			*	*	30
Bridge Rehab/Reconstruction	15	4	6			2	3			30
Bus Speed Improvements	15	2	3					7	3	30
Corridor/Small Area Safety Improvements	15	4	6			2	3			30
Highway-Rail Grade Crossing Improvements	15	4	6	2.5	2.5	*	*			30
Road Expansion	15	2	3	2.5	2.5	2	3			30
Road Reconstruction	15	2	3	2.5	2.5	2	3			30
Transit Station Improvements	15		*	2.5	2.5			7	3	30
Truck Route Improvements	15	4	6	2.5	2.5	*	*			30

* This factor is included in the transportation impact evaluation for this project type

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