Preparing a Benefit-Cost Analysis

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U.S. Department of Transportation
Federal Railroad Administration

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Today's presenters:

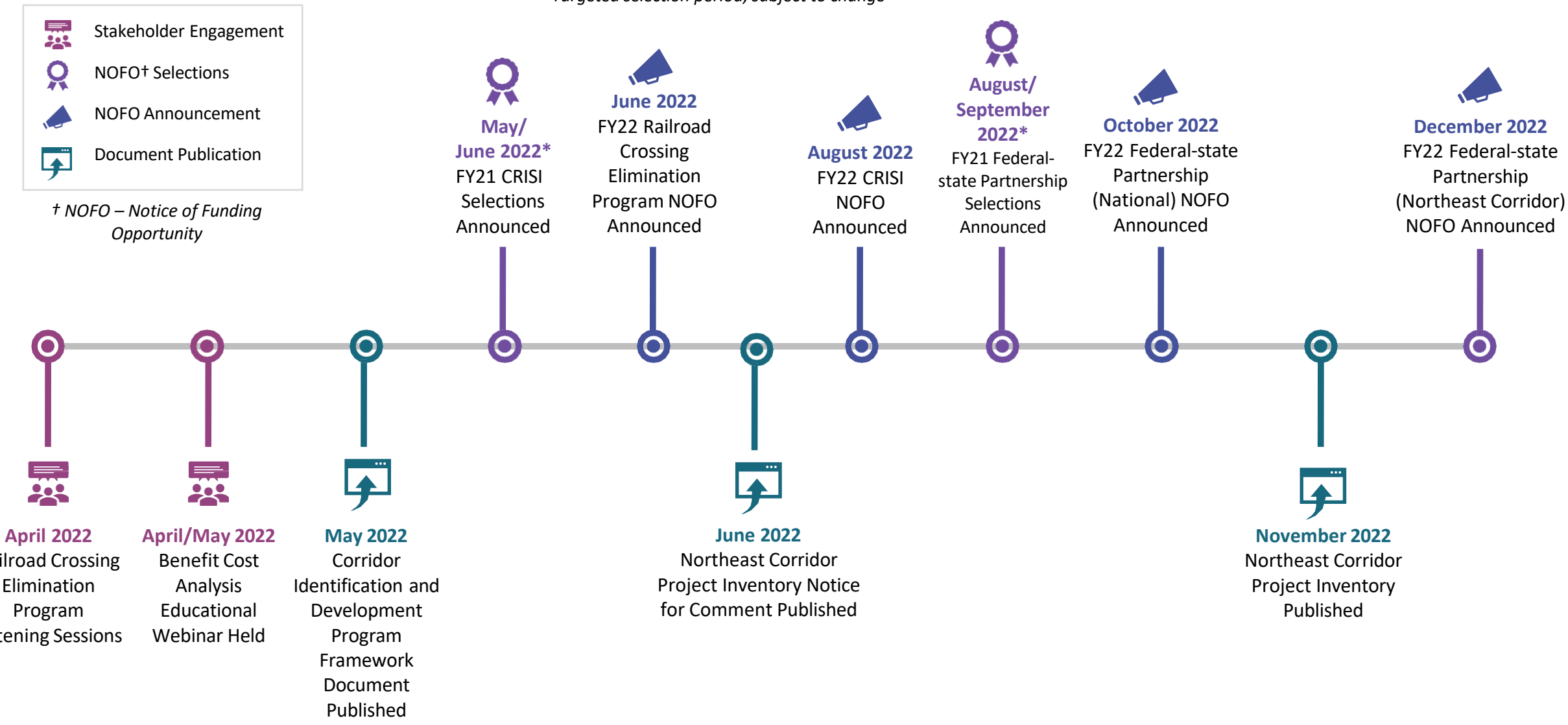
Darren Timothy, Chief Economist, Department of Transportation (DOT)

Jordan Riesenberg, Economist, Office of the Secretary of Transportation (OST)

Michael Johnson, Industry Economist, Federal Railroad Administration (FRA)

Calendar of Upcoming FRA Publications

** Targeted selection period, subject to change*

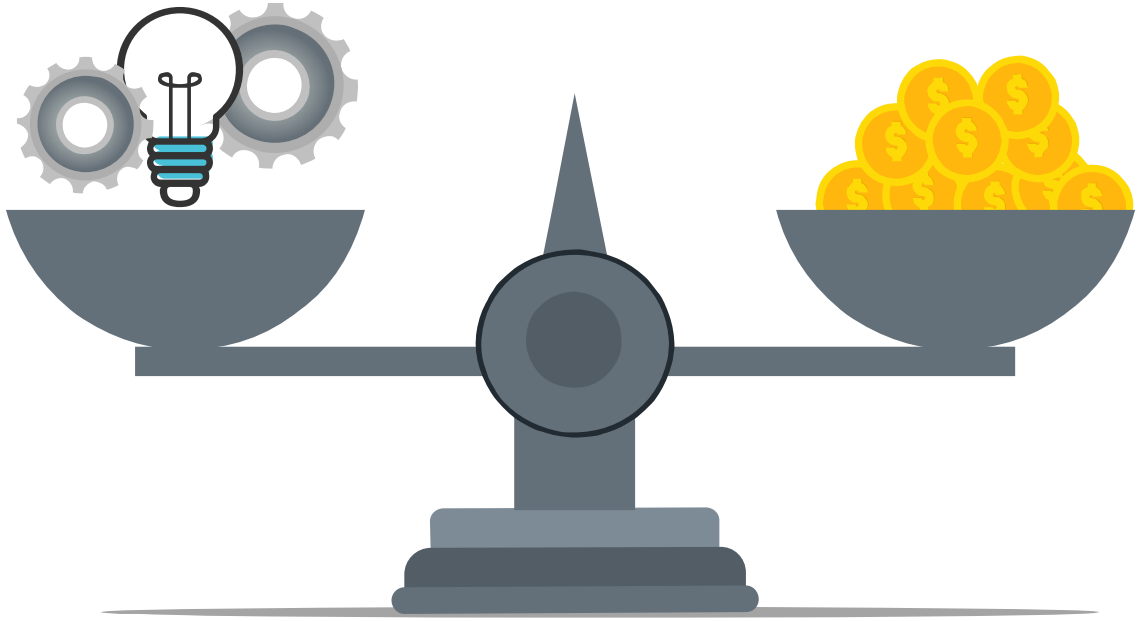


BCA and FRA Grant Programs

Programs	Purpose	Funds Available in FY22	Upcoming Key Milestones	BCA Required?
Consolidated Rail Infrastructure and Safety Improvements (CRISI)	To fund projects that improve the safety, efficiency, or reliability of intercity passenger and freight rail.	$1.6 Billion	Notice of Funding Opportunity expected in August 2022	**Yes**
Railroad Crossing Elimination (New)	To promote highway rail or pathway-rail grade crossing improvement projects that focus on improving the safety and mobility of people and goods.	$600 Million	Notice of Funding Opportunity expected in expected in June 2022	**No**
Federal-State Partnership for Intercity Passenger Rail (Significantly Changed)	To fund capital projects that reduce the state of good repair backlog, improve performance, or expand or establish new intercity passenger rail service, including privately operated intercity passenger rail service if an eligible applicant is involved.	$7.2 billion	National Fed State- Notice of Funding Opportunity expected in expected in October 2022 Northeast Corridor Fed State- Notice of Funding Opportunity expected in expected in December 2022	**National Fed State - Economic Analysis Required** **Northeast Corridor Fed State - No**
Restoration & Enhancement	To provide operating assistance to initiate, restore, or enhance intercity passenger rail service.	$50 million	Notice of Funding Opportunity expected later this year	**Yes**
Interstate Rail Compacts (New)	This program will provide funding for interstate rail compacts' administrative costs and to conduct railroad systems planning, promotion of intercity passenger rail operations, and the preparation of grant applications.	$15 million ($3 million annually)	Notice of Funding Opportunity expected later this year	**No**

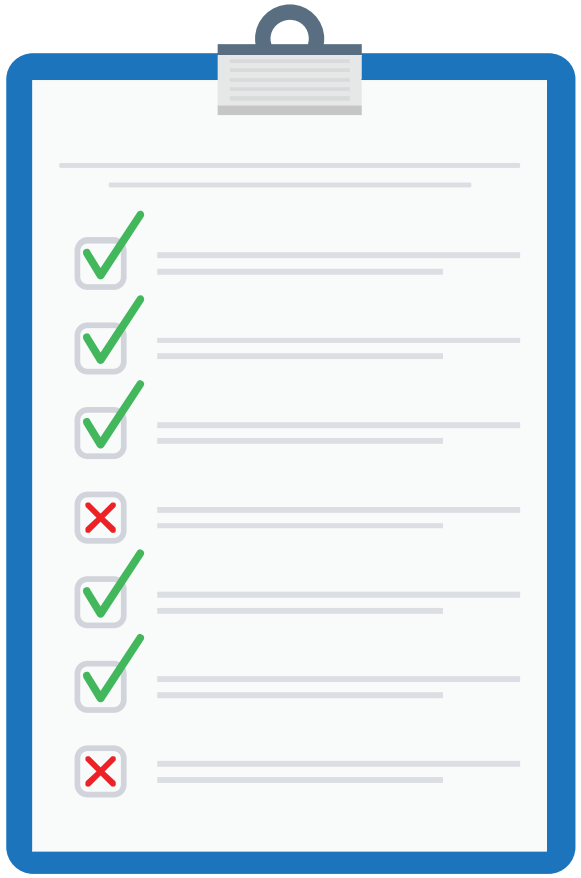
What is a BCA?

Benefit-cost analysis (BCA) is a systematic process for identifying, quantifying, and comparing expected economic benefits and costs of a proposed infrastructure project.



Why do we do a BCA?

- Provides a useful benchmark from which to evaluate and compare potential transportation investments
- Adds a degree of rigor to the project evaluation process



What do I need to do a BCA?

- Clear understanding of the problem the project is intended to solve (baseline conditions) and how the project addresses the problem (measures of effectiveness).
- Well-defined project scope and cost estimate.
- Monetization factors for key project benefits.

What do I need to do a BCA?

- Sources of information may include:
  - Project planning and engineering documents.
  - Industry technical references and analytical tools.
  - DOT BCA Guidance.

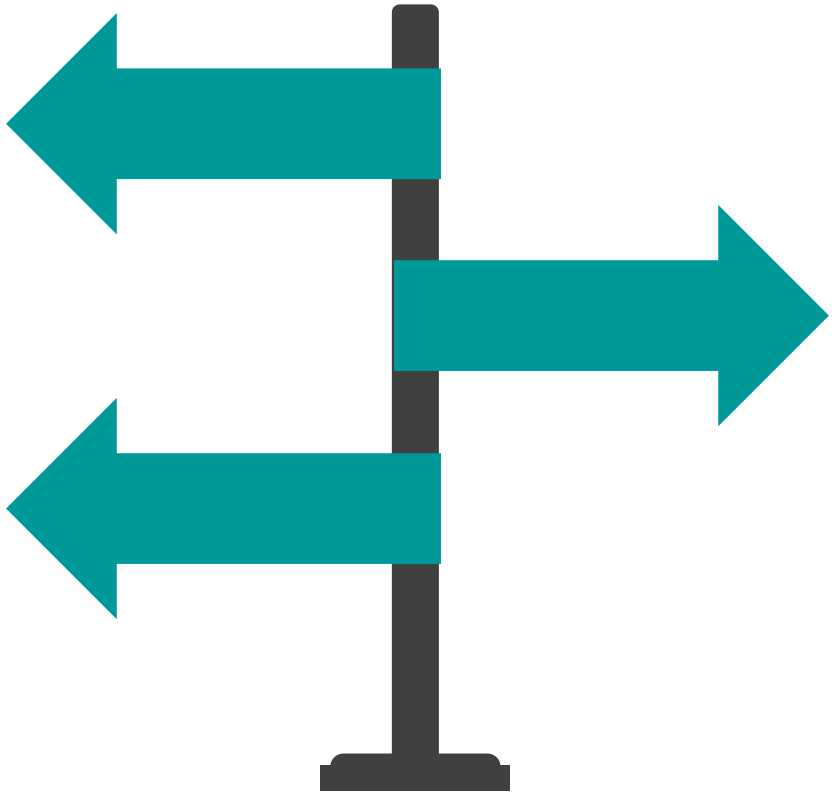
USDOT BCA Review

USDOT economists will review the applicant's BCA:

- Examine key assumptions
- Correct for any technical errors
- Perform sensitivity analysis on key inputs
- Consider any unquantified benefits

USDOT BCA Guidance

- Covers all USDOT discretionary grant programs
- Updated March 2022
- Available at https://www.transportation.gov/office-policy/transportation-policy/benefit-cost-analysis-guidance-discretionary-grant-programs-0



What's New?

New and updated monetization values.

Additional guidance and new examples on:

- Valuing pedestrian, cycling, and transit infrastructure improvements
- Valuing the benefits of improved health from active transportation and reduced crowding on transit

Additional guidance on benefits from reduction in stormwater runoff and wildlife impacts.

Transparent & Reproducible Analysis

BCAs should provide enough information for a reviewer to follow the logic and reproduce the results.

- Spreadsheet or database files showing the calculations.
- Technical memos describing the analysis and documenting sources of information used (assumptions and inputs).
- Present annual benefit and cost streams by type (not just summary output).

Baselines

Should measure costs and benefits of a proposed project against a baseline alternative ("base" or "no build"):

- **"Do's"**
  - Factor in any projected changes (e.g., increased freight or passenger volumes) that would occur even in the absence of the requested project.
  - Factor in ongoing routine maintenance.
  - Consider the full long-term impacts of the no build (e.g. facility closure, weight restrictions).
  - Explain and provide support for the chosen baseline.
- **"Don't's"**
  - Assume that the same (or similar) improvement will be implemented later.
  - Use unrealistic assumptions about alternative traffic flows.

Demand Forecasts

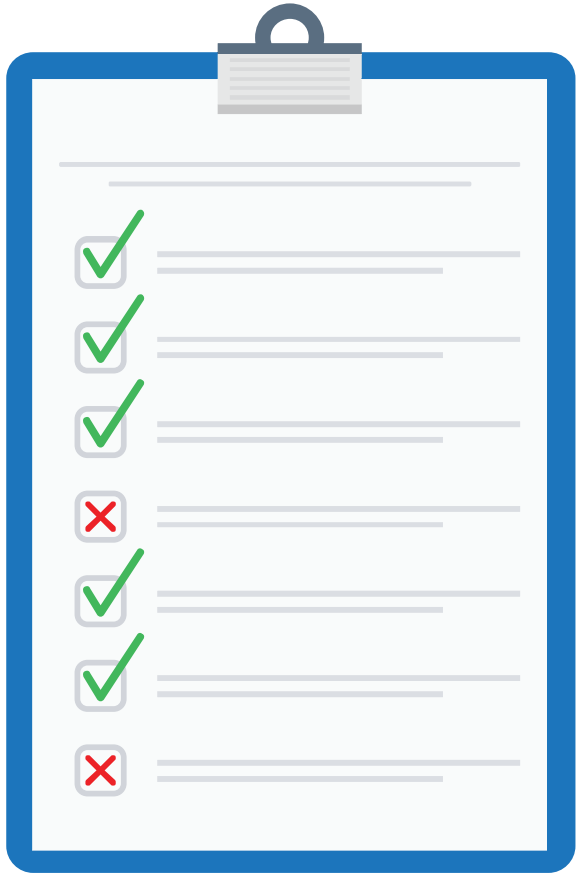
- **Most benefit estimates depend on ridership or usage estimates.**
- **Provide supporting info on forecasts.**
  - Geographic scope, assumptions, data sources, methodology.
- **Provide forecasts for intermediate years.**
  - Or at least interpolate; don’t apply forecast year impacts to interim years.
- **Exercise caution about long-term growth assumptions.**
  - Consider underlying capacity limits of the facility.

Analysis Period

- **Should cover both initial development and construction and a subsequent operational period.**
- **Generally tied to the expected service life of the improvement or asset.**
  - Such as the number of years until you would anticipate having to take the same action again.
  - Lesser improvements should have shorter service lives.
  - Recommend 20 years maximum for capacity expansion or other operational improvements.
- **Avoid excessively long analysis periods (more than 30 years of operations).**
  - Use residual value to cover out-years of remaining service life for long-lived improvements.

Inflation and Discounting

- **Inflation Adjustments:**
  - Recommend using a 2020 base year for all cost and benefit data.
  - Index values for the GDP Deflator included in the BCA Guidance.
- **Discounting:**
  - Use a 7 percent discount rate for all benefits and costs (except CO2).
  - Recommend using a 2020 base year for discounting.



Scope of the Analysis

- **Project scope included in estimated costs and benefits must match.**
  - Don’t claim benefits from an entire project. Only count costs from the grant-funded portion.
- **Scope should cover a project that has independent utility.**
  - May need to incorporate costs for related investments necessary to achieve the projected benefits.
- **Project elements with independent utility should be individually evaluated in the BCA.**
  - BCA evaluation will cover both independent elements and the submitted project as a whole.

Benefits

- **Should be presented on an annual basis**
  - Don’t assume constant annual benefits without a good reason to do so.
- **Negative outcomes should be counted as “disbenefits.”**
  - E.g., work zone impacts.
- **Avoid double-counting benefits.**

Safety Benefits

- **Typically associated with reducing fatalities, injuries, and property damage.**
- **Projected improvements in safety outcomes should be explained and documented.**
  - Justify assumptions about expected reductions in crashes, injuries, and/or fatalities (and document any CMF used).
  - Show clear linkage between project and improved outcomes.
  - Use facility-specific data history for baseline where possible.
- **Crash-related injury and fatality data may be available in different forms.**
  - KABCO injury scales.
  - Fatal/Injury crashes vs. fatalities/injuries.
  - BCA Guidance provides values covering all of these.

Travel Time Savings

- **Recommended values found in BCA Guidance.**
  - See footnotes for discussion of non-vehicle time, long-distance travel, business travel.
- **Consider vehicle occupancy where appropriate.**
  - Local/facility-specific values preferred.
  - National-level values provided in BCA Guidance.
- **If valuing travel time reliability:**
  - Carefully document methodology and tools used.
  - Show how valuation parameters are distinct from general travel time savings.

Operating Cost Savings

- **Avoid double counting operating savings and other impacts.**
  - E.g., truck travel time savings, fuel consumption reductions.
- **Localized, specific data preferred.**
  - Standard per-mile values for light duty vehicles and commercial trucks provided in DOT BCA Guidance.

Emissions Reduction Benefits

- **For infrastructure improvements, emissions reductions will typically be a function of reduced fuel consumption.**
- **Recommended year by year unit values for CO_2, SO_x, NO_x, and $PM_{2.5}$ found in BCA guidance.**
  - Be careful about the measurement units being applied.
- **Reductions in CO_2 emissions should be discounted at 3 percent, while all others should be discounted at 7 percent.**

Amenity Benefits

- **Pedestrian, cycling, and transit facility/vehicle improvements can improve the quality or comfort of journeys.**
- **Recommended values for different types of improvements found in BCA Guidance.**
    - Pay attention to whether value is on a “per-trip” or “per-person-mile” basis.
- **Carefully document baseline amenities, as well as specifically how the proposed project will add any amenity benefit category being claimed.**

Health Benefits

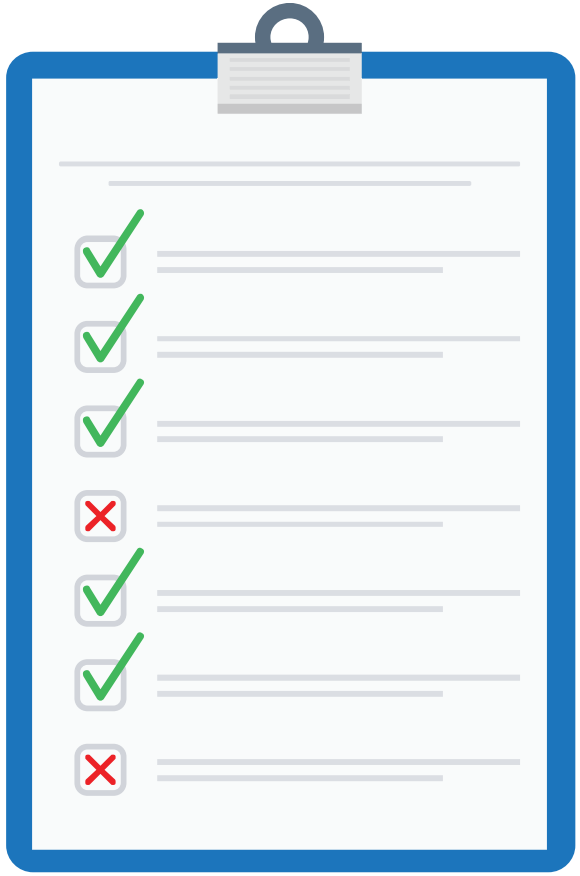
- **Trips diverted to active transportation (walking and cycling) from other modes may yield health benefits to users.**
- **Recommended monetization values, on a per trip basis, are found in the BCA Guidance.**
- **Absent local data on existing mode share and estimates age profiles of users, applicants may apply national averages included in the BCA Guidance.**

Benefits to Existing and Additional Users

- **Primary benefits typically experienced directly by users of the improved facility.**
- **Includes both "existing" users (under baseline) and "additional" users attracted to the facility as a result of the improvement.**
  - Standard practice in BCA would value benefits to additional users less than those for existing users (see BCA guidance).

Modal Diversion

- **Projected magnitude.**
  - Should be based on careful analysis of the market and potential for diversion from other modes that might be attributable to the project.
- **Benefits estimates should not be based on comparing user costs of "old" and "new" mode.**
  - Would be reflected in benefits to additional users.
- **Reductions in external costs would be relevant.**
  - E.g., emissions costs, pavement damage.
  - Values for noise and congestion costs included in the BCA Guidance.



Other Benefits

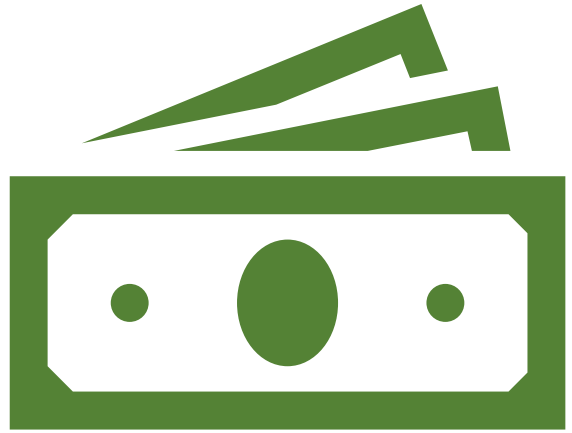
- **Agglomeration Economies.**
- **Noise, Stormwater Runoff, and Wildlife Impact Reduction.**
- **Emergency Response.**
- **State of Good Repair.**
- **Resilience.**
  - Consider expected frequency of events and their consequences.
- **Property Value Increases.**
  - Is a measure rather than a benefit—avoid double-counting.

Unquantified Benefits

- **Should quantify magnitudes/timing of the impacts wherever possible.**
- **Should clearly link specific project outcomes to any claimed unquantified benefits.**

Capital Costs

- **Include all costs of implementing the project:**
  - E.g., design, ROW acquisition, construction.
  - Regardless of funding source.
  - Include previously incurred costs.
- **Three forms of capital costs:**
  - Nominal dollars (project budget).
  - Real dollars (base year).
  - Discounted Real dollars (use in the BCA).



Maintenance Costs

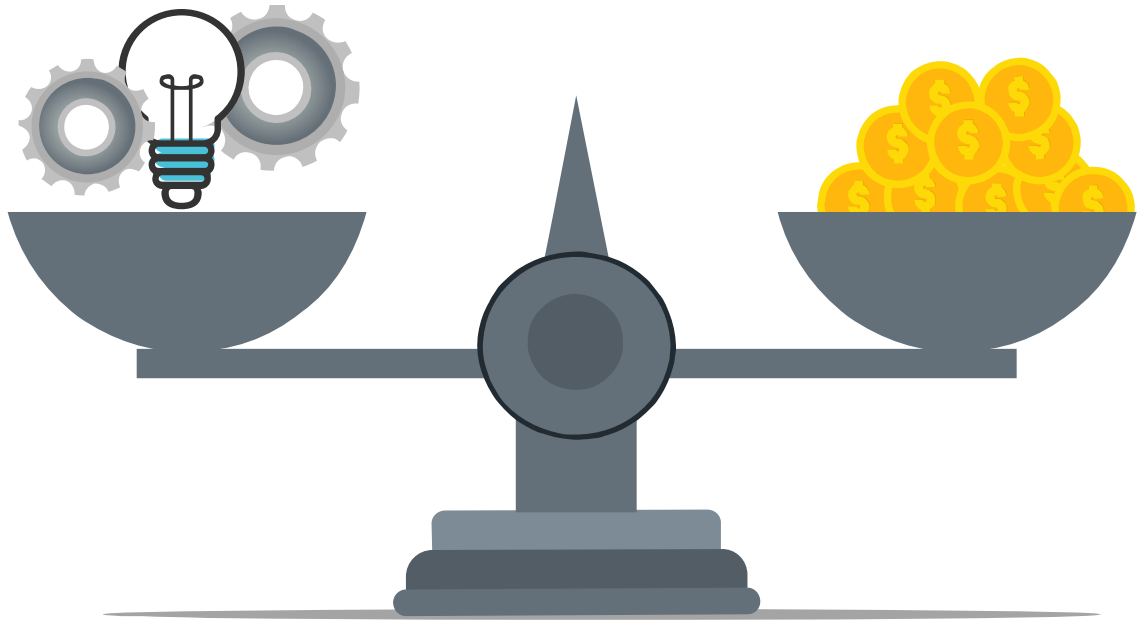
- **Net maintenance costs may be positive or negative:**
  - New facilities would incur ongoing maintenance costs over the life of the project.
  - Rehabilitated/reconstructed facilities may result in net savings in maintenance costs between the build/no-build.

Residual Value

- **For assets with remaining service life at the end of the analysis period, may calculate a "residual value" for the project.**
  - Recall that service life does not necessarily match the physical life of the asset.
- **Simple approach: assume linear depreciation.**
- **Be sure to properly apply discounting.**

Comparing Benefits to Costs

- **Net Present Value (Benefits – Costs).**
- **Benefit-Cost Ratio (Benefits / Costs).**
  - Denominator should only include capital costs (i.e., net maintenance costs and residual value should be in the numerator).



Other Types of Economic Analysis

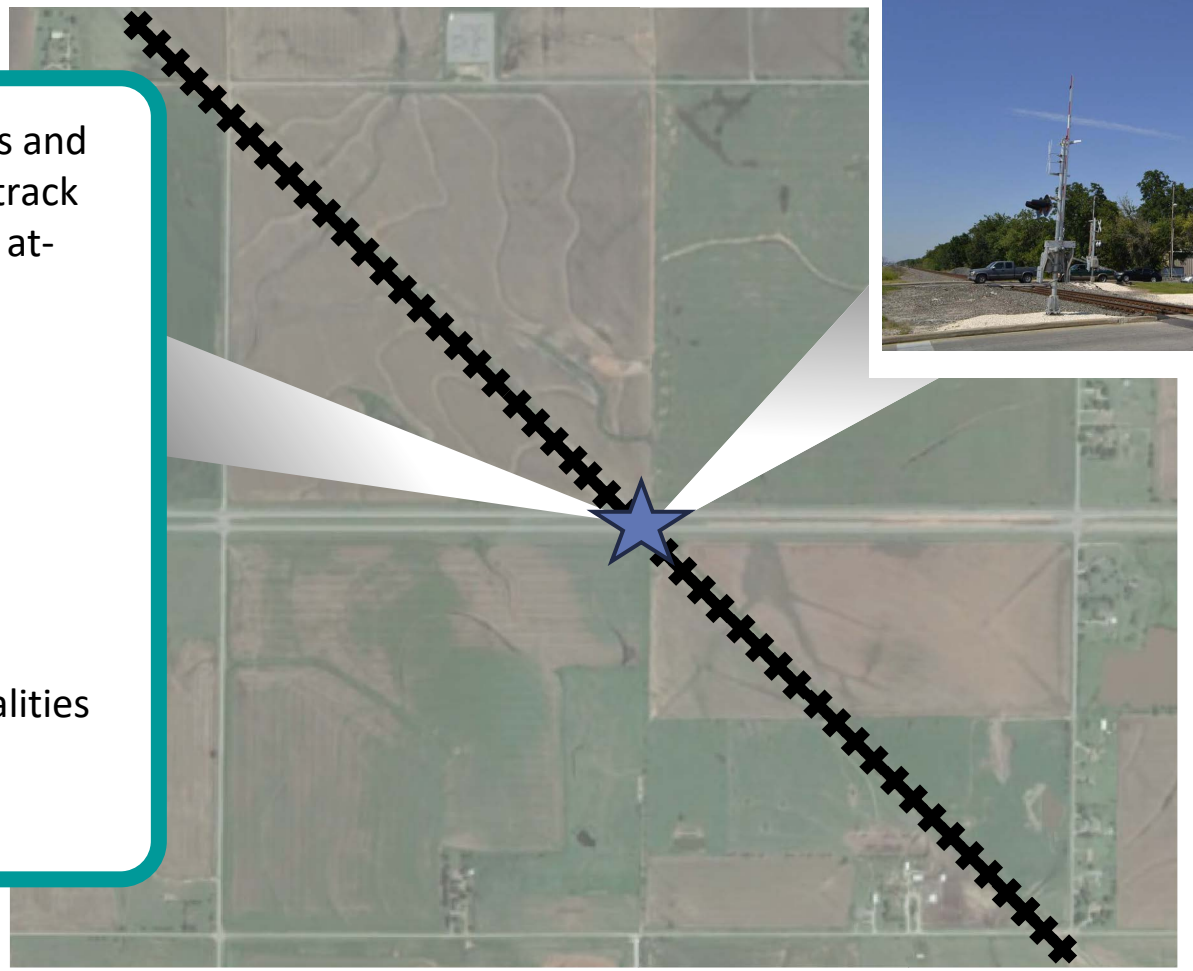
- **Examples:**
  - Economic Impact Analysis.
  - Financial Impacts.
  - Distributional Effects.
- **Issues:**
  - Use different approaches and answer different questions than does BCA.
  - Do not represent additional benefits to include in BCA.

Hypothetical BCA Example #1

Proposed Project: Improve track class and state of good repair on two miles of track and grade-separate one highway-rail at-grade crossing.
Project Cost: $50.0 million

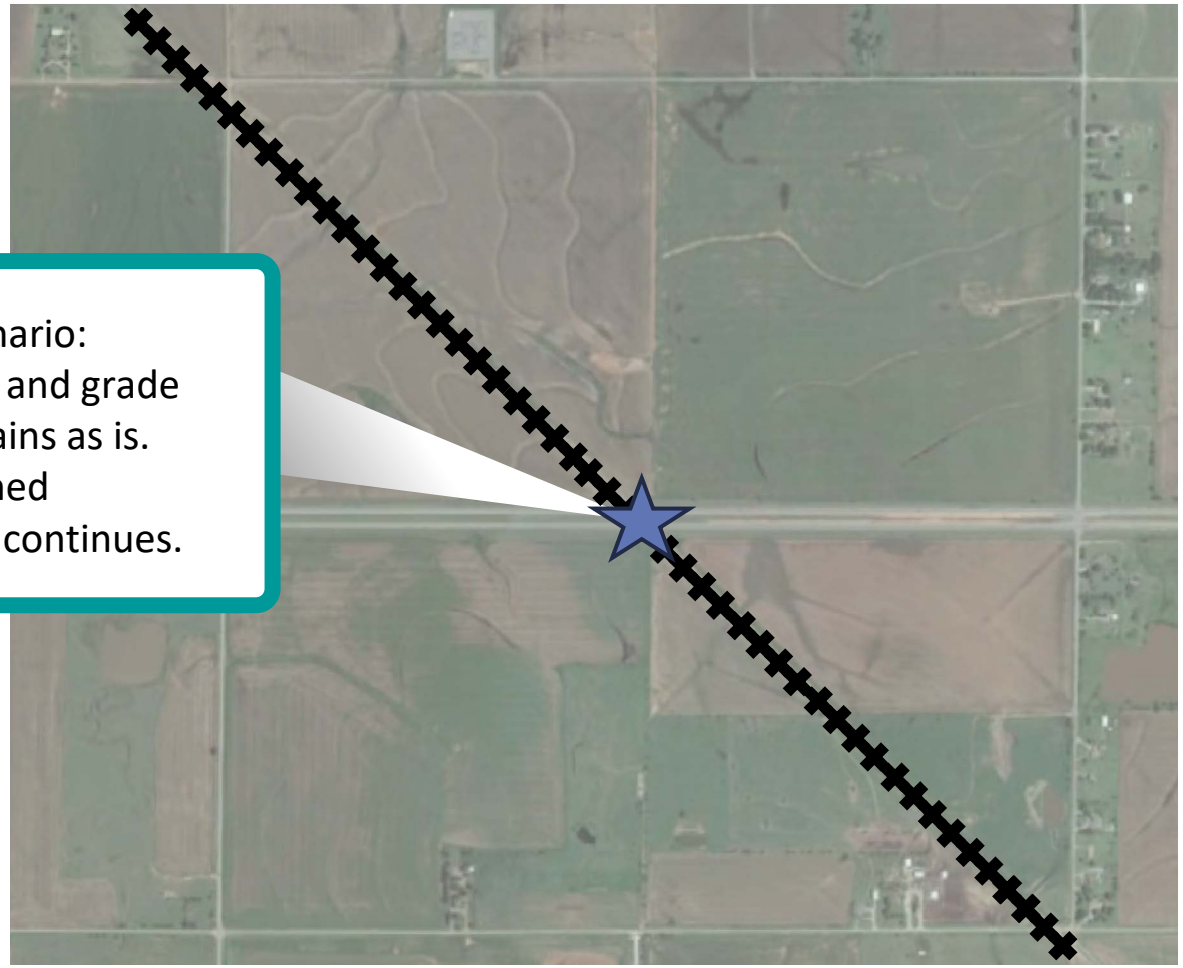
2022
AADT: 1,000 Cars Delayed per Day
Avg. Delay: Two minutes
Source: Observed at Crossing

Average Annual Fatalities: Seven Fatalities in Previous 10 Years
Source: FRA Crossing Inventory



Hypothetical BCA Example #1

No-Build Scenario:
Current track and grade crossing remains as is. Regular planned maintenance continues.



Hypothetical BCA Example #1

No-Build Scenario:
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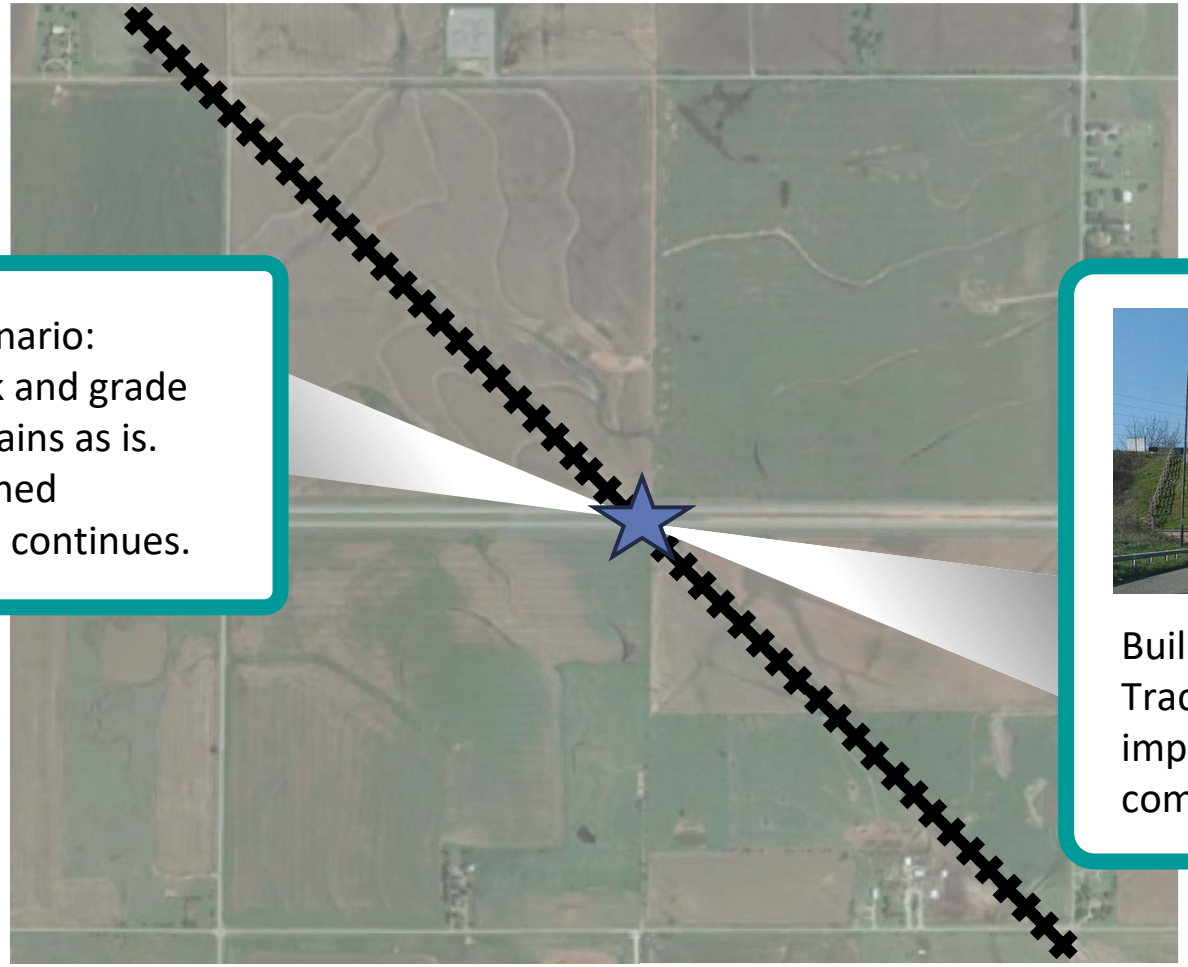


Build Scenario:
Track class and state of good repair improved; grade-separation completed.

Approach

- **We want to compare the state of the world with and without the proposed project improvement.**
  - No-Build Scenario: Current track and grade crossing remains as is and regular planned maintenance continues.
  - Build Scenario: Track class and state of good repair improved; grade-separation completed.
- **Two expected major benefit categories in this case would be travel time savings and safety benefits from the grade-separation component.**
- **There are more potential benefits of this project, to be discussed later.**

Travel Time Savings

- **For simplicity, let's assume no heavy trucks and no traffic growth:**

Annual Vehicle Travel Time Savings*	=	Avg. Delay Time	x	AADT Delayed	x	Hourly Value of Time	x	Vehicle Occupancy	x	Annualization Factor

*Undiscounted.

Travel Time Savings

- **For simplicity, let's assume no heavy trucks and no traffic growth:**

Annual Vehicle Travel Time Savings* = Avg. Delay Time x AADT Delayed x Hourly Value of Time x Vehicle Occupancy x Annualization Factor

Annual Vehicle Travel Time Savings* = $\frac{2 \text{ mins}}{60}$ x

Observed train gate downtime is four minutes, thus delay time for an automobile that must stop is two minutes, on average.

*Undiscounted.

Travel Time Savings

- **For simplicity, let's assume no heavy trucks and no traffic growth:**

Annual Vehicle Travel Time Savings* = Avg. Delay Time x AADT Delayed x Hourly Value of Time x Vehicle Occupancy x Annualization Factor

Annual Vehicle Travel Time Savings* = $\frac{2 \text{ mins}}{60}$ x 1,000 x

Recent traffic observations.

*Undiscounted.

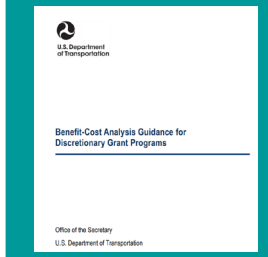
Travel Time Savings

- **For simplicity, let's assume no heavy trucks and no traffic growth:**

Annual Vehicle Travel Time Savings* = Avg. Delay Time x AADT Delayed x Hourly Value of Time x Vehicle Occupancy x Annualization Factor

Annual Vehicle Travel Time Savings* = $\frac{2 \text{ mins}}{60}$ x 1,000 x $17.80 x

USDOT BCA Guidance



(Appendix A)

*Undiscounted.

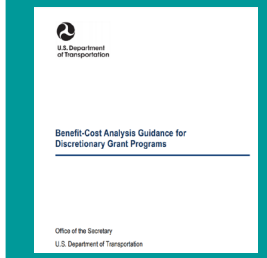
Travel Time Savings

- **For simplicity, let's assume no heavy trucks and no traffic growth:**

Annual Vehicle Travel Time Savings* = Avg. Delay Time x AADT Delayed x Hourly Value of Time x Vehicle Occupancy x Annualization Factor

Annual Vehicle Travel Time Savings* = $\frac{2 \text{ mins}}{60}$ x 1,000 x $17.80 x 1.67 x

USDOT BCA Guidance



(Appendix A)

*Undiscounted.

Travel Time Savings

- **For simplicity, let's assume no heavy trucks and no traffic growth:**

Annual Vehicle Travel Time Savings*	=	Avg. Delay Time	x	AADT Delayed	x	Hourly Value of Time	x	Vehicle Occupancy	x	Annualization Factor
Annual Vehicle Travel Time Savings*	=	$\frac{2 \text{ mins}}{60}$	x	1,000	x	$17.80	x	1.67	x	365

We expect this project to have an impact each day (not just weekdays, for example).

*Undiscounted.

Travel Time Savings

- **For simplicity, let's assume no heavy trucks and no traffic growth:**

Annual Vehicle Travel Time Savings* = Avg. Delay Time x AADT Delayed x Hourly Value of Time x Vehicle Occupancy x Annualization Factor

Annual Vehicle Travel Time Savings* = $\frac{\text{2 mins}}{60}$ x 1,000 x $17.80 x 1.67 x 365

= $361,666 Per Year

*Undiscounted.

Safety Benefits

- **Assume the grade separation project mitigates all future fatalities at the crossing:**

Annual Safety Benefits*	=	Average Annual Fatalities	x	Value of Statistical Life

*Undiscounted.

Safety Benefits

- **Assume the grade separation project mitigates all future fatalities at the crossing:**

$$\text{Annual Safety Benefits*} = \text{Average Annual Fatalities} \times \text{Value of Statistical Life}$$

$$\text{Annual Safety Benefits*} = \frac{\text{7 Fatalities}}{\text{10 Years}} \times$$

FRA Grade Crossing Accident Database

*Undiscounted.

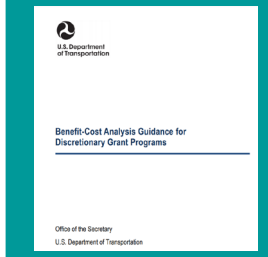
Safety Benefits

- **Assume the grade separation project mitigates all future fatalities at the crossing:**

Annual Safety Benefits* = Average Annual Fatalities x Value of Statistical Life

Annual Safety Benefits* = $\frac{\text{7 Fatalities}}{\text{10 Years}}$ x $11,600,000

USDOT BCA Guidance



(Appendix A)

*Undiscounted.

Safety Benefits

- **Assume the grade separation project mitigates all future fatalities at the crossing:**

Annual Safety Benefits* = Average Annual Fatalities x Value of Statistical Life

Annual Safety Benefits* = $\frac{\text{7 Fatalities}}{\text{10 Years}}$ x $11,600,000

= $8,120,000 Per Year

*Undiscounted.

Hypothetical BCA Example #1

- **Assume construction in 2022, 10 years of project operations and no change in net maintenance costs between the scenarios:**

Year	Capital Cost	Discounted Costs	Safety Benefits	Vehicle Travel Time Savings	Discounted Benefits
2022	$50,000,000		$0	$0	
2023	$0		$8,120,000	$361,666	
2024	$0		$8,120,000	$361,666	
2025	$0		$8,120,000	$361,666	
2026	$0		$8,120,000	$361,666	
2027	$0		$8,120,000	$361,666	
2028	$0		$8,120,000	$361,666	
2029	$0		$8,120,000	$361,666	
2030	$0		$8,120,000	$361,666	
2031	$0		$8,120,000	$361,666	
2032	$0		$8,120,000	$361,666	

Hypothetical BCA Example #1

- **Next, we discount costs and benefits using a 7 percent discount rate:**

Discounted Value = Future Year Value / (1+Discount Rate)^(Future Year - Base Discounting Year)

Year	Capital Cost	Discounted Costs	Safety Benefits	Vehicle Travel Time Savings	Discounted Benefits
2022	$50,000,000	**$43,671,936**	$0	$0	$0
[illegible]	[illegible]	$0	$8,120,000	$361,666	**$6,923,566**
[illegible]	[illegible]	$0	[illegible]	[illegible]	[illegible]470,623
2025	$0	$0	[illegible]	[illegible]	[illegible]047,311
2026	$0	$0	$8,120,000	$361,666	$5,651,692
2027	$0	$0	$8,120,000	$361,666	$5,281,956
2028	$0	$0	$8,120,000	$361,666	$4,936,407
2029	$0	$0	$8,120,000	$361,666	$4,613,465
2030	$0	$0	$8,120,000	$361,666	$4,311,649
2031	$0	$0	$8,120,000	$361,666	$4,029,579
2032	$0	$0	$8,120,000	$361,666	**$3,765,961**

$50,000,000 / (1+0.07)^(2022-2020)

(8,120,000+361,666) / (1+0.07)^(2023-2020)

(8,120,000+361,666) / (1+0.07)^(2032-2020)

Note: Totals may differ slightly due to rounding

Hypothetical BCA Example #1

- **Next, we sum the discounted benefits and costs to get total discounted benefits and total discounted costs:**

Year	Capital Cost	Discounted Costs	Safety Benefits	Vehicle Travel Time Savings	Discounted Benefits
2022	$50,000,000	$43,671,936	$0	$0	$0
2023	$0	$0	$8,120,000	$361,666	$6,923,566
2024	$0	$0	$8,120,000	$361,666	$6,470,623
2025	$0	$0	$8,120,000	$361,666	$6,047,311
2026	$0	$0	$8,120,000	$361,666	$5,651,692
2027	$0	$0	$8,120,000	$361,666	$5,281,956
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2030	$0	$0	$8,120,000	$361,666	$4,311,649
2031	$0	$0	$8,120,000	$361,666	$4,029,579
2032	$0	$0	$8,120,000	$361,666	$3,765,961
TOTAL		**$43,671,936**			**$52,032,208**

Note: Totals may differ slightly due to rounding

Results – The NPV and BCR

- **Lastly, we calculate the project's net present value (NPV) and benefit-cost ratio (BCR).**

$$\text{Net Present Value (NPV)} = \text{Total Discounted Benefits} - \text{Total Discounted Costs}$$

$$= \$52{,}032{,}208 - \$43{,}671{,}936$$

$$= \mathbf{\$8{,}360{,}272}$$

$$\text{Benefit-Cost Ratio (BCR)} = \frac{\text{Total Discounted Benefits}}{\text{Total Discounted Costs}}$$

$$= \frac{\$52{,}032{,}208}{\$43{,}671{,}936}$$

$$= \mathbf{1.2}$$

Note: Totals may differ slightly due to rounding

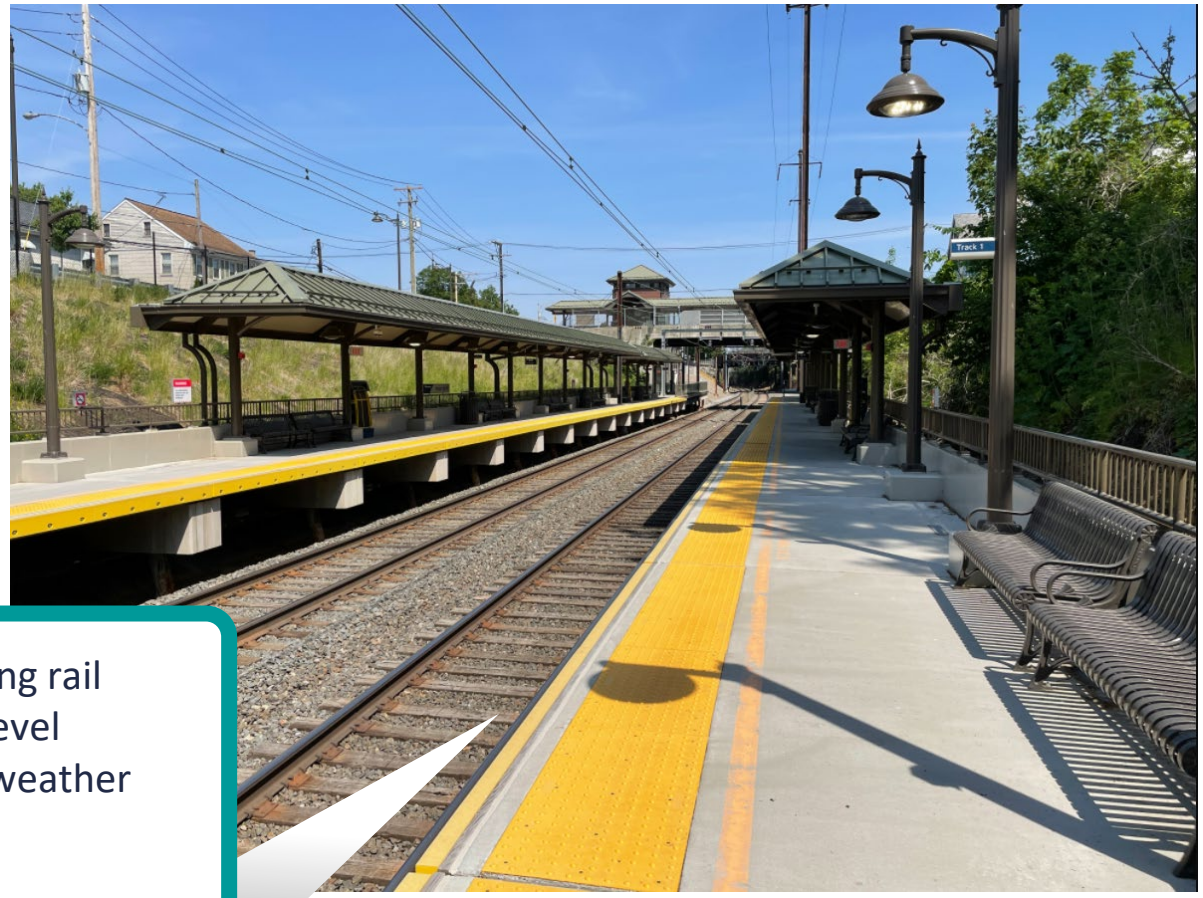
Hypothetical BCA Example #1

Other potential benefits such a project might have:

- Net maintenance cost savings from improved state of good repair.
  - Though these may be partially or fully offset by new maintenance costs for the new crossing.
- Reduced risk of derailment from improved state of good repair.
- Reduced emergency response delays.
- Reduced freight rail operating costs if track class upgrade allows for faster train movements or heavier trains .
  - Same freight movements with fewer train-car miles or fewer crew-hours.
  - Remember to cite sources and document assumptions such as crew per train and cost-per hour.

This is not meant to be an exhaustive list.

Hypothetical BCA Example #2



Proposed Project: Improve existing rail station by adding second track, level boarding, seating, and platform weather protection.

2022
Average Daily Station Users: 1,000 Passengers

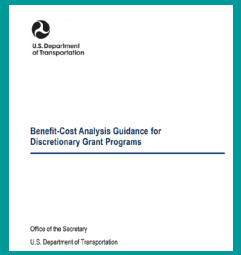
Approach

- We want to compare the state of the world with and without the proposed project improvement:
  - No-Build Scenario: Current track configuration remains, no station seating, no level boarding, and no platform weather protection.
  - Build Scenario: The rail station is expanded to two tracks, and level boarding, seating, and platform weather protection are added.
- Amenity benefits are the major expected benefit of this project.
- There could also be operation improvements for train traffic, to be discussed later.

Hypothetical BCA Example #2

- The project contains the following major amenity additions distinct from the no-build scenario:
  - Step-free Access to Train: $0.07 per Station User
  - Platform Seating Availability: $0.12 per Station User
  - Platform Weather Protection: $0.12 per Station User
  - Total: $0.31 per Station User

USDOT BCA Guidance



(Appendix A)

- Be sure to document that the claimed build-scenario amenities are not available under the no-build scenario.

Amenity Benefits

- **Calculations for the claimed amenity addition benefits would be as follows:**

Annual Amenity Benefits*	=	Benefit per Station User	x	Daily Station Users	x	Annualization Factor

*Undiscounted.

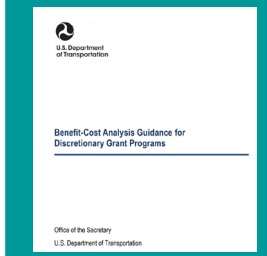
Amenity Benefits

- **Calculations for the claimed amenity addition benefits would be as follows:**

Annual Amenity Benefits*	=	Benefit per Station User	x	Daily Station Users	x	Annualization Factor

Annual Amenity Benefits*	=	$0.31	x

USDOT BCA Guidance



(Appendix A)

*Undiscounted.

Amenity Benefits

- **Calculations for the claimed amenity addition benefits would be as follows:**

Annual Amenity Benefits*	=	Benefit per Station User	x	Daily Station Users	x	Annualization Factor
Annual Amenity Benefits*	=	$0.31	x	1,000	x	

From ticketing records.

*Undiscounted.

Amenity Benefits

- **Calculations for the claimed amenity addition benefits would be as follows:**

Annual Amenity Benefits*	=	Benefit per Station User	x	Daily Station Users	x	Annualization Factor
Annual Amenity Benefits*	=	$0.31	x	1,000	x	365

Trains come each day of the week here.

*Undiscounted.

Amenity Benefits

- **Calculations for the claimed amenity addition benefits would be as follows:**

Annual Amenity Benefits*	=	Benefit per Station User	x	Daily Station Users	x	Annualization Factor
Annual Amenity Benefits*	=	$0.31	x	1,000	x	365
	=	$113,150 Per Year				

*Undiscounted.

Hypothetical BCA Example #2

- **We would then put this annual value into the table and apply discounting just like in the previous example:**

Year	Capital Cost	Discounted Costs		Station Amenity Benefits	Discounted Benefits
2022	$X,XXX,XXX			$0	$0
2023	$0			$113,150	$92,364
2024	$0			$113,150	$86,322
2025	$0			$113,150	$80,674
2026	$0			$113,150	$75,397
2027	$0			$113,150	$70,464
2028	$0			$113,150	$65,854
2029	$0			$113,150	$61,546
2030	$0			$113,150	$57,520
2031	$0			$113,150	$53,757
2032	$0			$113,150	$50,240

113,150 / (1+0.07)^(2032-2020)

Note: Totals may differ slightly due to rounding

Hypothetical BCA Example #2

Additionally, the second track and platform component of the project may improve operations for freight and passenger trains:

- Freight trains can now pass while one passenger train stops at the station
  - Freight train operating and crew-cost savings.
- Fewer delays to passenger trains if they arrive at the same time, as both can stop at the station simultaneously.
  - Passenger train operating and crew-cost savings.
  - Travel time savings for passengers on trains.
  - Refer to BCA Guidance Appendix A for local (e.g., commuter rail) and long-distance (e.g., Amtrak) values of travel time.
- Remember to document assumptions and sources for crew per train and cost per train-hour or crew-hour.

Hypothetical BCA Example #3

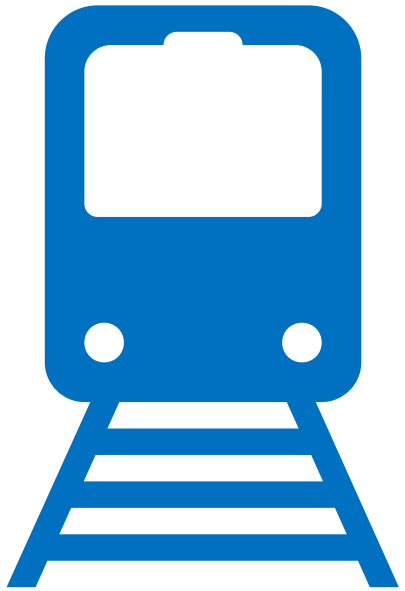
Proposed Project: Expand track capacity from two to four tracks to separate passengers and freight services

Approach

- **We want to compare the state of the world with and without the proposed project improvement:**
  - No-Build Scenario: Freight trains and passenger trains share two tracks, leading to significant delays and slowdowns.
  - Build Scenario: Passenger trains use two dedicated tracks, while freight trains use two other dedicated tracks, minimizing delays and conflicts between the two.
- **Two expected major benefit categories in this case would be travel time savings for train passengers and operating cost savings for freight and passenger railroads.**

Hypothetical BCA Example #3

- **Carefully document baseline delay data:**
  - How often are trains delayed?
  - How long are the delays on average?
  - How many passengers are on delayed trains, on average?
- **Carefully analyze what proportion of these delays would be mitigated by the proposed project improvements:**
  - Not all types of delays will likely be mitigated.
  - Carefully explain assumptions used.



Hypothetical BCA Example #3

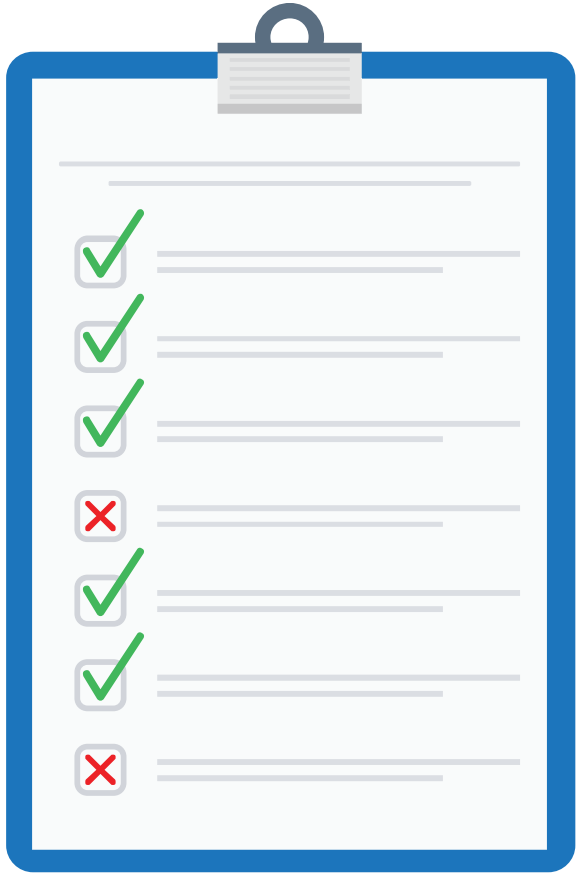
- **Travel time savings for train passengers:**
  - See BCA Guidance Appendix A for values to monetize travel time savings for local (e.g., commuter rail), long-distance (e.g. Amtrak), and high-speed rail (e.g. +125 mph).
- **Operating cost savings for freight and passenger railroads:**
  - Sources may include financial documents or other information from the railroads.
  - Carefully document sources and assumptions used.

Hypothetical BCA Example #3

- **Projects that improve the speed or reliability of train movements may also create induced demand and modal shift to rail:**
  - Remember to apply the rule-of-half to benefits to any users induced to the mode being improved, see the BCA Guidance for details and examples.
- **To the extent there are reductions in externalities due to modal shift, they should be quantified and monetized:**
  - Examples include emissions, congestion, noise, and the portion of pavement damage not covered by fuel taxes paid.
  - Be mindful of rural versus urban values for noise and congestion reduction.
  - See the BCA Guidance Appendix A for monetization values.

Avoiding Common Mistakes

- Make sure inputs and assumptions in the BCA are sourced and documented.
- Make sure the submitted BCA and claimed benefits match the project being proposed for grant funding.
- Show individual utility of different separable project components.
- Provide an unlocked BCA spreadsheet (rather than a PDF of a spreadsheet).



BCA and FRA Grant Programs

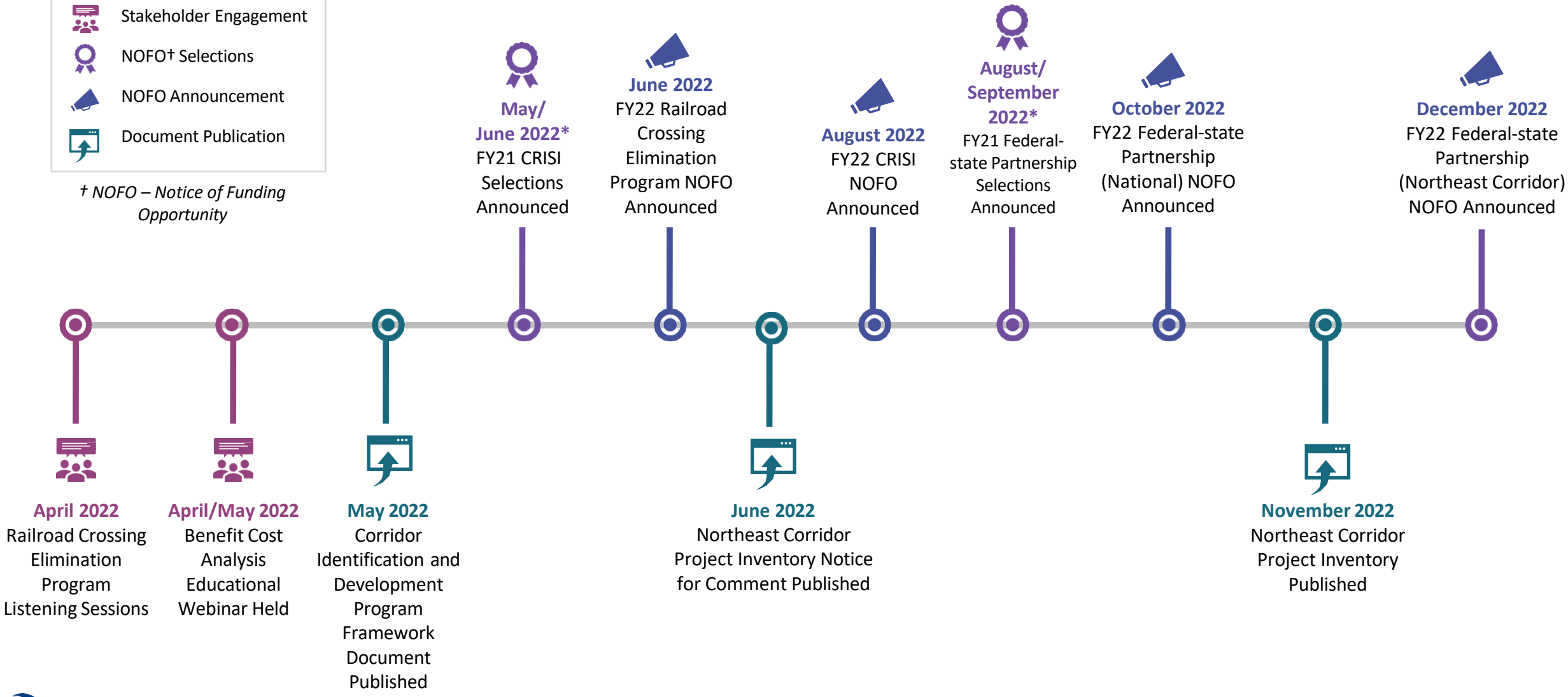
Programs	Purpose	Funds Available in FY22	Upcoming Key Milestones	BCA Required?
Consolidated Rail Infrastructure and Safety Improvements (CRISI)	To fund projects that improve the safety, efficiency, or reliability of intercity passenger and freight rail.	$1.6 Billion	Notice of Funding Opportunity expected in August 2022	**Yes**
Railroad Crossing Elimination (New)	To promote highway rail or pathway-rail grade crossing improvement projects that focus on improving the safety and mobility of people and goods.	$600 Million	Notice of Funding Opportunity expected in expected in June 2022	**No**
Federal-State Partnership for Intercity Passenger Rail (Significantly Changed)	To fund capital projects that reduce the state of good repair backlog, improve performance, or expand or establish new intercity passenger rail service, including privately operated intercity passenger rail service if an eligible applicant is involved.	$7.2 billion	National Fed State- Notice of Funding Opportunity expected in expected in October 2022 Northeast Corridor Fed State- Notice of Funding Opportunity expected in expected in December 2022	**National Fed State - Economic Analysis Required** **Northeast Corridor Fed State - No**
Restoration & Enhancement	To provide operating assistance to initiate, restore, or enhance intercity passenger rail service.	$50 million	Notice of Funding Opportunity expected later this year	**Yes**
Interstate Rail Compacts (New)	This program will provide funding for interstate rail compacts' administrative costs and to conduct railroad systems planning, promotion of intercity passenger rail operations, and the preparation of grant applications.	$15 million ($3 million annually)	Notice of Funding Opportunity expected later this year	**No**

Calendar of Upcoming FRA Publications

** Targeted selection period, subject to change*

Stakeholder Engagement
NOFO† Selections
NOFO Announcement
Document Publication

† NOFO – Notice of Funding Opportunity



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