EAST-WEST PASSENGER RAIL STUDY

Advisory Committee Meeting #5

June 10, 2020

Meeting Agenda

- Welcome by Secretary Pollack
- Summary of Public Feedback
- Review of Cost Estimates
- Examination and Refinement of Ridership Modeling
- Advisory Committee Discussion and Selection of 3 Final Alternatives
- Next Steps

Advisory Committee and Public Comments

- Capital cost estimates differ from the Northern New England Intercity Rail Initiative (NNEIRI) Study's cost estimates

- Ridership forecasts differ from the NNEIRI Study's ridership forecasts

- 20-mile radius around stations for potential riders is too small
  - Those in rural areas would drive farther to use potential service
  - Ridership doesn't accurately reflect existing demand, such as student populations in the 5 College areas (ie Amherst, Northampton, etc.)

- Ridership forecasts do not include induced demand
  - Potential for new commuters
  - New business, personal, recreational travel

- The following slides will discuss the work done to address the feedback received

Cost Estimates Examined

Conceptual Cost Estimates Developed for 6 Preliminary Alternatives Include the Following Primary Assumptions:

- Followed federal guidelines for cost estimation
- "Quantities" (i.e. amount of demolition, construction, railroad line, support facilities, etc.) developed based on high-level GIS-based rail alignments and alternatives development
- Unit costs based on actual expenditures on recent construction projects in Massachusetts and New England
- **Study process assumes there will be revised estimates for 3 Final Alternatives**

Geographic Differences Impact Costs

East-West Includes:

52 miles of CSX route (in mountainous terrain) between Pittsfield and Springfield
- With 22 bridge crossings of the Westfield River

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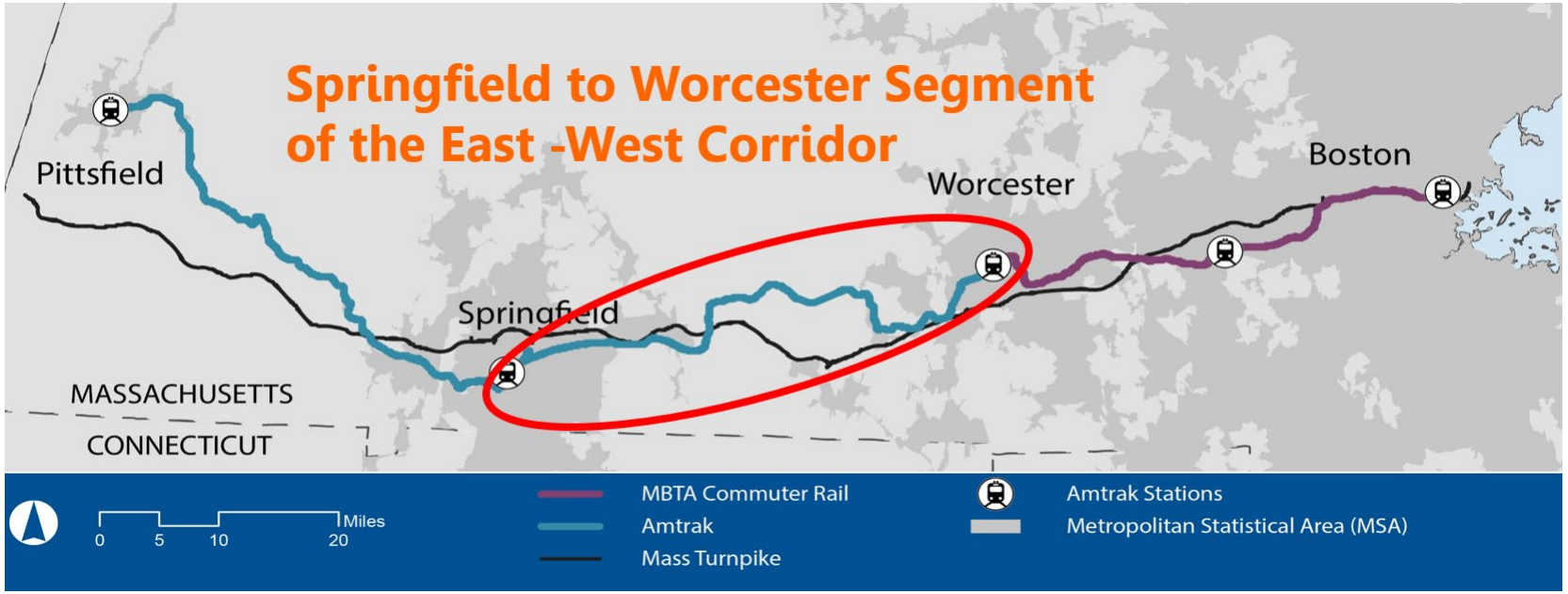


Differences in Adherence to CSX Guidance Impacts Costs

- NNEIRI did not assume CSX guidance for physical separation of shared freight/passenger rail service
  - For this reason, NNEIRI assumed **rehabilitation of bridges** on restored double-track sections, and no relocation of tracks or utilities

- East-West followed CSX guidance for physical separation of shared freight/passenger rail service
  - This adherence is assumed to require **reconstruction of bridges and associated relocation of track and utilities** on restored double track sections

Preliminary Alternatives – Comparison Project

Corridor Type	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – New Separate Track	Shared Corridor – New Separate Track	Separate Corridor – I-90
Alternative	1 – WOR-SPG, Upgraded	2 – BOS-SPG, Upgraded	3 – BOS-PIT, Upgraded + Realignment	4 – BOS-PIT, New Track	5 – BOS-SPG, New Track + Realignment	6 – BOS-PIT, High Speed Rail
Rail Distance (Miles)	98	98	151	151	98	144
Construction-Only Cost ($M)	$1,011.2	$1,011.2	$1,579.9	$2,027.0	$2,615.6	$12,651.0
Cost per Mile	$10,318,367	$10,318,367	$10,462,914	$13,423,841	$26,689,796	$87,854,167

- **The length of the project directly impacts the overall cost (ex: Phase 1 of South Coast Rail is 36 miles and $1.047B)**
- The following slides will discuss the new ridership methodologies examined
- **Study process assumes there will be revised estimates for the 3 Final Alternatives**

Preliminary Ridership Forecasts Comparable to NNEIRI's

- **East–West used the same model as NNEIRI**

- **NNEIRI ridership in the Springfield to Boston segment is comparable to East-West's preliminary ridership forecasts for that same segment**
  - Annual riders traveling ONLY within the Springfield – Boston segment
    - NNEIRI Preferred Alternative = 50,186 annual riders
    - Alternative 3 (most like NNEIRI) = 47,500 annual riders

In Response to Feedback, MassDOT Has Examined the Following Ridership Forecasting Refinements for Analysis of the 3 Final Alternatives:

- Update the 'Proxy' rail service used for forecasting
  - Due to limited existing rail service along the East West corridor, a comparative rail service is used as a so-called 'proxy' to calculate potential ridership
- Expand or modify station catchment areas
  - Catchment area is a defined geography, or buffer, around a rail station that is used to estimate potential ridership
- Explore % increase of ridership to account for Induced Demand
  - Induced demand is defined as new riders above forecasted ridership that may be attracted to the service
- The next slides present two new ridership scenarios that were built from these refinements and that will be used for the final 3 Alternatives selected for further study

Base Proxy Services Examined

- **Original – Hartford Line Proxy**
  - Based on NNEIRI model and used to forecast ridership for the 6 Preliminary Alternatives
  - Similar geographic area as East-West
- **New – 'Enhanced' Hartford Line Proxy**
  - Expanded Hartford Line Proxy to include **New Haven*** as a larger market/station pair
  - Additional refinements to travel markets, market competition, trip distance, and market types
- **New – *Downeaster* Proxy**
  - Change proxy to *Downeaster* service (runs between Brunswick, Portland, and Boston) because of similar Boston market and trip distance as East-West service
  - Additional refinements made to market competition and market types

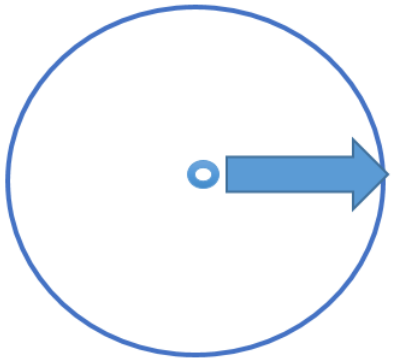
	CTRail Hartford Line	Downeaster
Service Length	62 miles	145 miles
Stations	Springfield Windsor Locks Windsor Hartford Berlin Meriden Wallingford State Street New Haven*	Brunswick Freeport Portland Old Orchard Saco Wells Dover Durham Exeter Haverhill Woburn Boston

EAST WEST

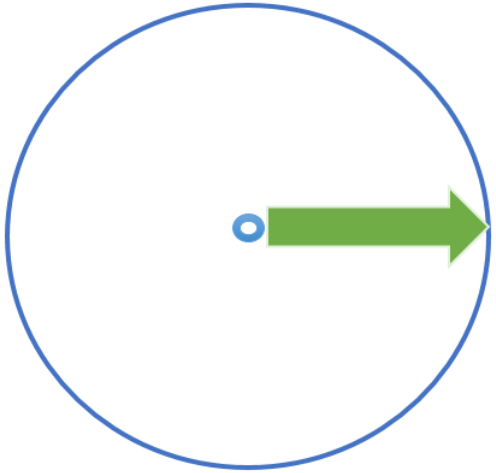
massDOT Massachusetts Department of Transportation Rail & Transit Division

How are Straight-Line Station Catchment Areas for Potential Riders Defined?

- Straight line is extended for a given distance and then a circle is drawn around each station stop, and then adjusted/modified to avoid overlap
- Driving distance differs from straight-line buffer (40-mile straight-line buffer results in greater than 40-mile driving distance)



~40-mile driving distance

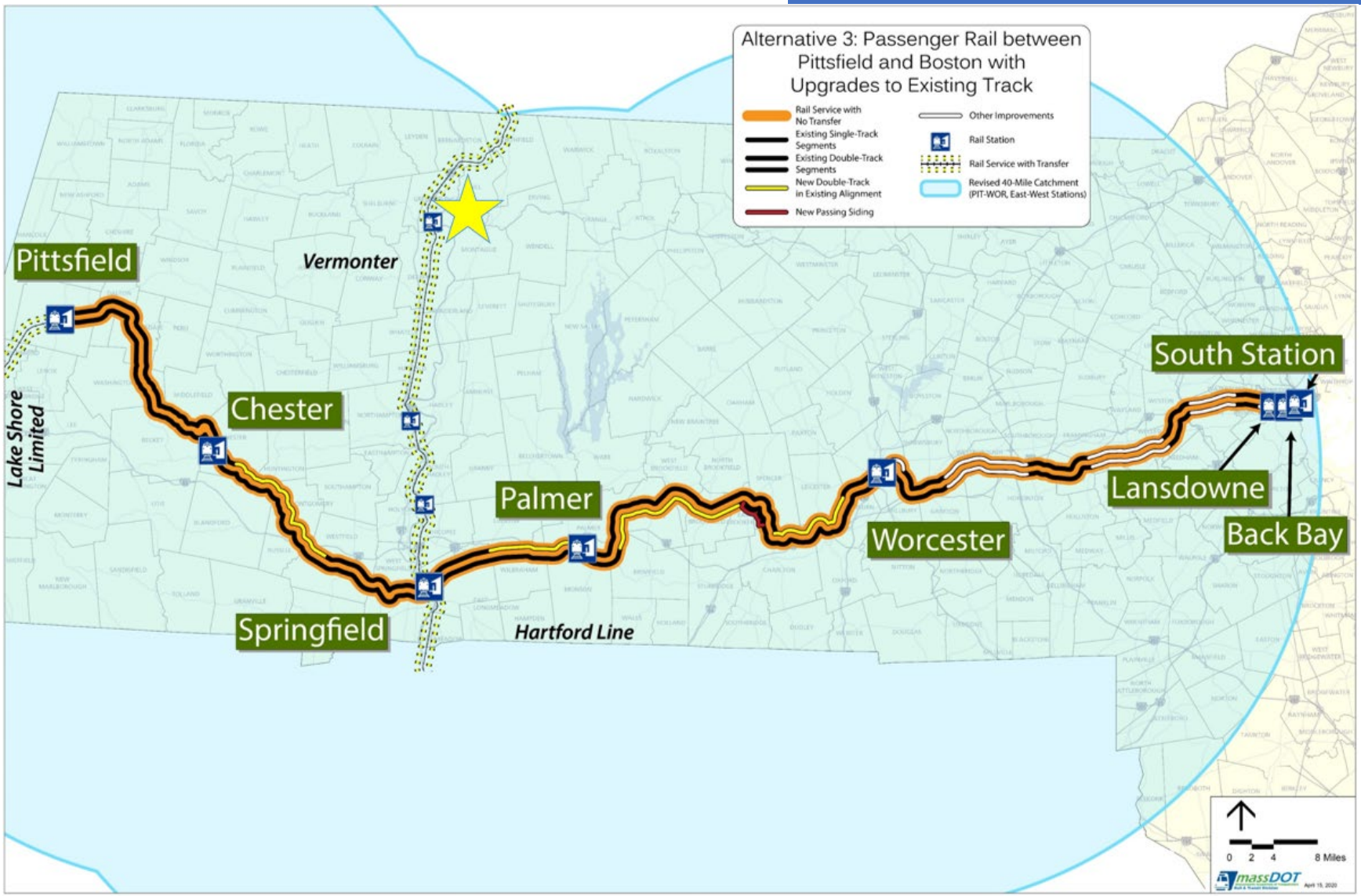


~40-mile straight-line distance

MassDOT Has Examined 3 Potential Station Catchment Zones

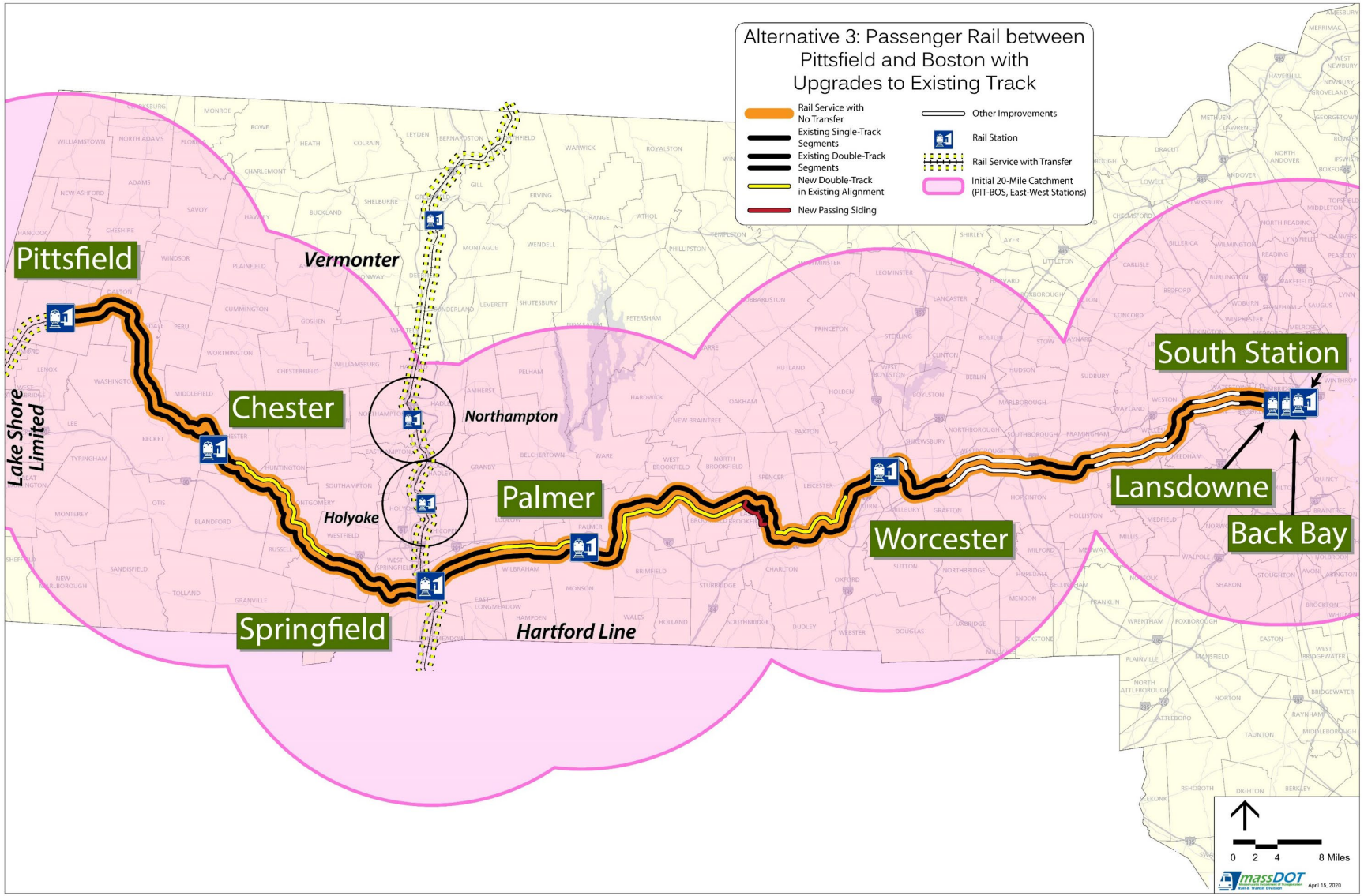
- 20-mile catchment area – Used in preliminary ridership forecasts
  - Requires station transfers with connecting rail service
- 40-mile catchment area – Captures greater rural population
  - May overestimate ridership due to driving distances greater than 40 miles
- 20-mile catchment area – With Springfield station catchment area adjustments
  - Revised model assumptions "release" constraint of neighboring Hartford Line and *Vermonter* stations
  - Allows riders to drive directly to Springfield to catch East – West service instead of requiring a transfer from less frequent/convenient Hartford Line/*Vermonter* service (even if it is a closer station)
  - Better accounts for student populations in Amherst and surrounding area

Examination and Refinement of Ridership Modeling



40-mile Station Catchment Area – Not Proposed

Examination and Refinement of Ridership Modeling



20-mile Station Catchment Area - Proposed with Springfield Station Adjustments

Induced Demand for East–West Proxy Forecasts

Hartford Line service – Appropriate to include induced demand in proxy

- New CTRail service (initiated in 2018) and still growing
- Amtrak Hartford Line service (New Haven–Springfield Shuttle) increased in 2018 and continues
- Proposed induced demand ranges from 5% (rural to rural) to 15% (urban to urban)
  - NEC Future Preferred Alternative included induced demand ranges from 2% (total study area) to 10% (urban areas)

Downeaster service – Not appropriate to include induced demand in proxy

- Established, mature service – initiated in 2001, then expanded and enhanced
- Induced demand on this mature service has already happened and is implicit in the existing ridership

Two New Ridership Forecast Scenarios Were Tested on Alternative 3 and are Proposed for Use on the Final 3 Alternatives

	Scenario 1	Scenario 2
Description	'Enhanced' Hartford Line Proxy	Downeaster Proxy
Station Catchment Area	20-mile	20-mile
Induced Demand	Yes	No
Springfield Station Buffer Adjustment	Yes	Yes

How Will We Use What We Learned?

How Did the Ridership Forecasts Change?

Forecast Scenario	Daily Ridership	Annual Ridership
Original Forecast – Preliminary Hartford Line Proxy	238	72,250
Scenario 1 – 'Enhanced' Hartford Line Proxy	922	278,300
Scenario 2 – Downeaster Proxy	1,181	358,500

- New scenarios increased ridership estimates by a factor of 3.85 to 4.96
- Forecasts represent likely ridership assumptions given available data and tools
- What does this mean for the next phase of the study?
  - MassDOT will use these two new scenarios to create a range of ridership estimates for each of the final 3 alternatives studied

What Do These Ridership Estimates Mean for Construction Cost per Rider?

- Construction Cost per Rider is projected to be high compared to South Coast Rail (SCR)
  - SCR is the costliest state-funded transit project to date
  - Example: Construction Cost per Rider for Alternative 3

Project	East-West Alternative 3 New 'Enhanced' Hartford Line Proxy	East-West Alternative 3 New Downeaster Proxy	South Coast Rail (Phase 1)
Construction Cost per Rider	$5,678	$4,407	$684

Note: Preliminary construction costs were used in the calculations for the East-West alternatives. Cost estimates will be finalized for the final 3 alternatives.

What Do These Ridership Estimates Mean for Benefit–Cost Analysis (BCA)?

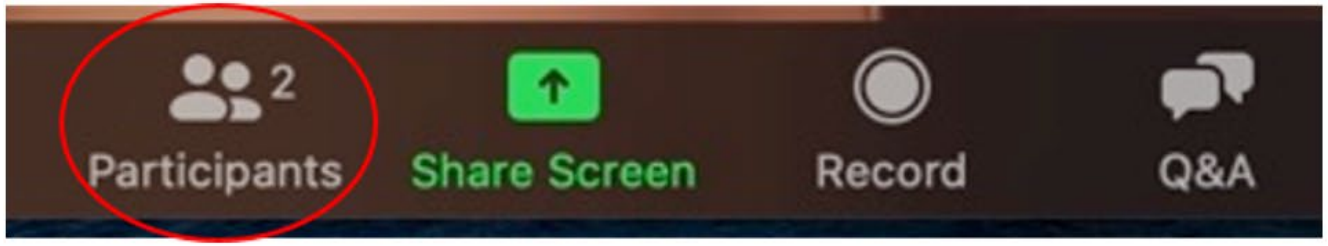
- Current Federal rules consider BCA as part of the evaluation criteria for project funding
  - BCA, expressed as a Benefit to Cost Ratio (BCR), is used to evaluate benefits versus costs of investment alternatives
  - **BCR of 1.0 or higher** makes a project more competitive for discretionary grants
- Example BCR calculation for Alternative 3
  - 'Enhanced' Hartford Line Proxy with 922 daily / 278,300 annual boardings would have a **BCR = 0.08**
  - Downeaster Proxy with 1,181 daily / 358,500 annual boardings would have a **BCR = 0.11**
  - Ridership would need to be 12,105 daily / 3,656,000 annual boardings for a **BCR = 1.0**
- Initial calculations using the new ridership methodology result in BCRs lower than 1.0
- Project evaluation criteria under recently proposed legislation from Senator Markey does not depend on BCA

Advisory Committee Comment

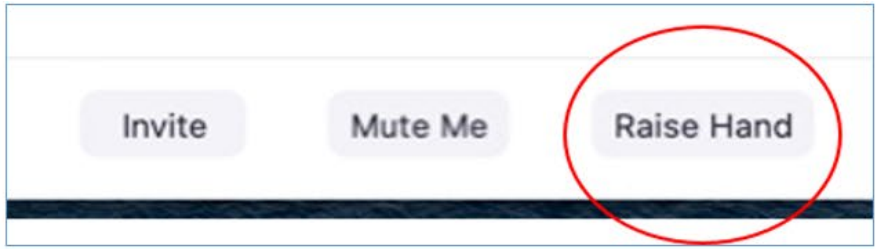
- Press the "**Raise Hand**" button. Please wait for the moderator to recognize and unmute you before speaking

- To access the Raise Hand button:

*1. Click on the **Participants** button*



*2. Click "**Raise Hand**"*



- *After you speak, we will lower your hand and you will be muted to allow the team to respond and provide opportunities for others to participate*

The Study Process Now Requires Narrowing the 6 Preliminary Alternatives Down to 3 Final Alternatives for Further Analysis

- **MassDOT considerations for this narrowing include, but are not limited to:**
  - Feasibility
  - Ridership
  - Cost Effectiveness
- **Advisory Committee and public feedback on priorities for East–West Service include:**
  - Rail service for full corridor – no bus connections to Pittsfield
  - Provide service to intermediate stops (e.g., Palmer, Chester)
  - Frequent service
  - Faster speeds/lower travel times
- **Ridership refinements will be applied to the final alternatives for further analysis**

Summary of Preliminary Alternatives

Selection of 3 Final Alternatives

Service Characteristics

Corridor Type	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – New Separate Track	Shared Corridor – New Separate Track	Separate Corridor – I-90
Alternative	1 – WOR-SPG, Upgraded	2 – BOS-SPG, Upgraded	3 – BOS-PIT, Upgraded + Realignment	4 – BOS-PIT, New Track	5 – BOS-SPG, New Track + Realignment	6 – BOS-PIT, High Speed Rail
Frequency (Weekday Round-Trips)	4	6	7	9	9	17
Transfers -- Pittsfield	Bus Transfer at SPG	Bus Transfer at SPG	Direct Rail (no transfer)	Direct Rail (no transfer)	Bus Transfer at SPG	Direct Rail (no transfer)
Transfers -- Springfield	Rail Transfer at WOR	Direct Rail (no transfer)	Direct Rail (no transfer)	Direct Rail (no transfer)	Direct Rail (no transfer)	Direct Rail (no transfer)
Transfers -- CTRail & Vermonter	Rail Transfer at SPG	Rail Transfer at SPG	Rail Transfer at SPG	Rail Transfer at SPG	Rail Transfer at SPG	Rail Transfer at SPG
Rail Stations Served	Springfield, Palmer, Worcester, Lansdowne, Back Bay, Boston	SPG, PLM, WOR, LAN, BBY, BOS	PIT, CST (Chester), SPG, PLM, WOR, LAN, BBY, BOS	PIT, CST, SPG, PLM, WOR, LAN, BBY, BOS	SPG, WOR, LAN, BBY, BOS	PIT, LEE, BLD (Blandford), SPG, PLM, WOR, LAN, BBY, BOS

Summary of Preliminary Alternatives

Selection of 3 Final Alternatives

Travel Time to South Station*

Corridor Type	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – New Separate Track	Shared Corridor – New Separate Track	Separate Corridor – I-90
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Travel Time -- BOS-WOR	1:21	1:03	0:56	0:53	0:48	0:44
Travel Time -- BOS-SPG	2:46	2:14	1:55	1:47	1:34	1:19
Travel Time -- BOS-PIT	4:02	3:39	3:08	2:59	3:00	2:18
Max Speed (mph)	80 mph	80 mph	90 mph	110 mph	110 mph	150 mph

* Up to 5 minutes faster / 10 minutes slower depending on schedule

Summary of Preliminary Alternatives

Selection of 3 Final Alternatives

Initial 2040 Ridership (One-Way Boardings) & Costs (2020 Dollars)

Corridor Type	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – New Separate Track	Shared Corridor – New Separate Track	Separate Corridor – I-90
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Total Ridership – Daily	36	158	238	387	381	820
Total Ridership -- Annual	11,150	48,000	72,250	117,100	115,050	247,700
Capital Costs (Million)	$1,988.5	$2,122.1	$3,213.3	$4,130.5	$5,181.3	$24,942.5
Annual Operations & Maintenance Costs (Million)	$27.4	$41.8	$51.6	$65.7	$49.0	$86.1

Summary of Preliminary Alternatives

Selection of 3 Final Alternatives

Environmental Impacts (Square Feet)

Corridor Type	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – New Separate Track	Shared Corridor – New Separate Track	Separate Corridor – I-90
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Wetlands + Open Water	49,921	49,921	60,136	549,294	729,354	2,725,652
Article 97 Lands	2,514	2,514	136,511	554,765	510,854	2,715,672
Area of Critical Env. Concern	0	0	0	0	0	4,648,979

Summary of Preliminary Alternatives

Selection of 3 Final Alternatives

Community Impacts

Corridor Type	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – Existing Alignment	Shared Corridor – New Separate Track	Shared Corridor – New Separate Track	Separate Corridor – I-90
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Buildings – TOTAL	0	0	0	91	103	206
Non-Rail/ROW Land (SF)	337,233	337,233	717,303	3,718,432	4,235,386	9,393,342
Existing At-Grade Crossings	17	17	38	38	17	6
Improved At-Grade Crossings / New Grade-Separations	0	0	30	30	11	130

Which three alternatives should move forward for final analysis?

Which alternatives should we study further?

Alternative 1

Alternative 2

Alternative 3

Alternative 4

Alternative 5

Alternative 6

Should a hybrid be one of the 3 final alternatives?

If so, a hybrid of which two alternatives?

- Example:
  - Hybrid of 4 and 5 could include Pittsfield-Boston all rail elements from Alternative 4 and most promising speed enhancements from Alternative 5
  - Costs would be higher than Alternative 4, but travel time to Springfield would be somewhat lower than Alternative 5

Should one or more of the alternatives to be studied further be looked at as a phased project?

If so, which?

- Can impact metrics such as Benefit–Cost Analysis, as well as ridership and cost variables

Remaining Analysis of 3 Final Alternatives

- Final ridership forecasts (Using Both Refined Base Service Proxies)
- Rail Traffic Controller simulation modeling
- Final cost estimates
- Benefit–Cost Analysis
- Funding and revenue assessment

Present Analysis of 3 Final Alternatives For Feedback

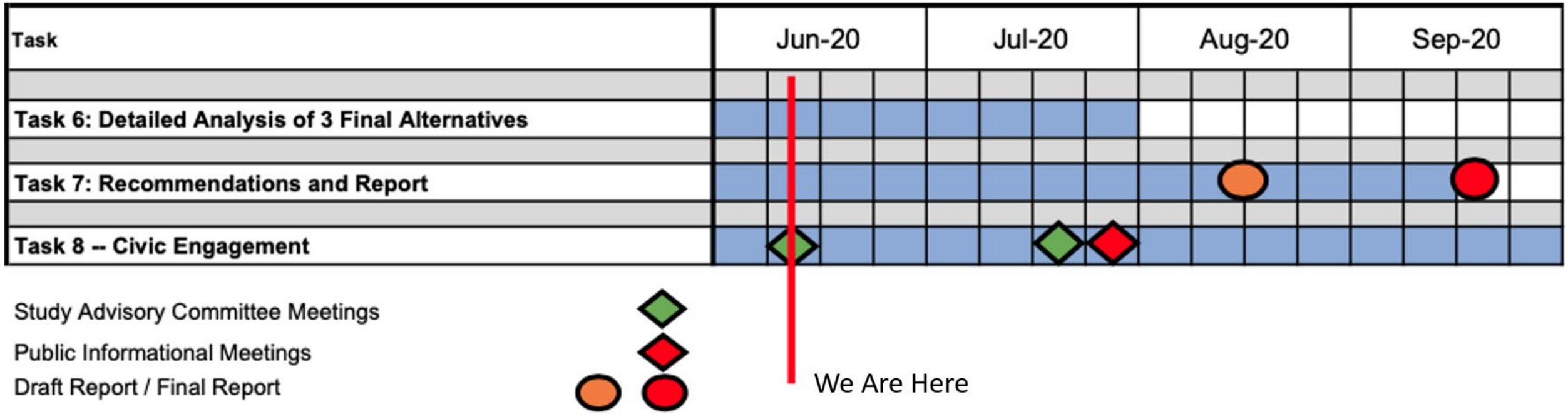
- Advisory Committee #6 and Public Meeting #3

Draft Report - Findings and Advisory Committee Recommendations

- 30-Day Public Comment Period

Final Report

Study Schedule



Public Comment

- Please share only one question or comment at a time
- Use the "**Q+A**" button to submit a typed question or comment
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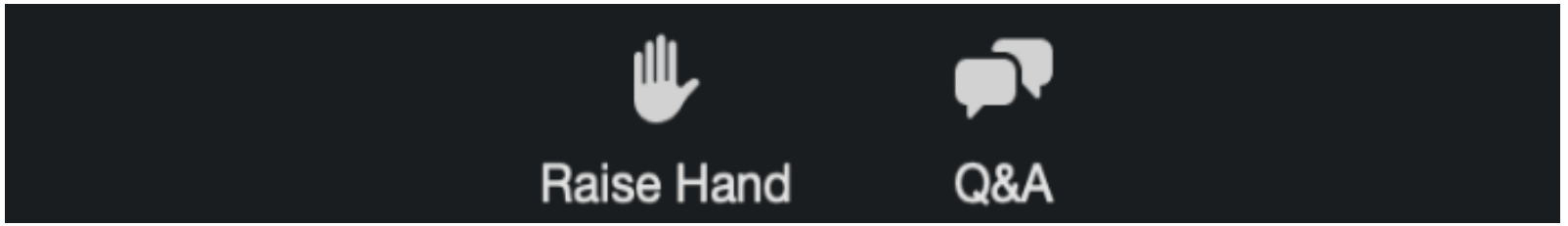

- Comments may also be sent to Makaela Niles, MassDOT Project Manager, at Makaela.Niles@dot.state.ma.us