



# [DRAFT] East – West Passenger Rail Study Final Report

MassDOT Office of Transportation

Planning

October 2020



## 1. Executive Summary

The Massachusetts Department of Transportation (MassDOT) launched the East – West Passenger Rail Study to examine the potential benefits, costs, and investments necessary to implement new passenger rail service connecting western Massachusetts communities with central and eastern Massachusetts (Figure 1-1). The 2018 *Massachusetts State Rail Plan* included a recommendation to evaluate a “Western Massachusetts to Boston Passenger Rail Service Study,” and community leaders, stakeholders, and residents have expressed a desire for such a passenger rail link to enhance multi-modal transportation options available for Massachusetts communities west of Worcester.

*Figure 1-1 – Study's Central Question*

The East – West Passenger Rail Study is intended to answer the central question:

How can we connect people in western Massachusetts with central and eastern Massachusetts using a passenger rail service that provides fast, frequent, attractive service in a cost-effective and achievable manner?

The East-West Passenger Rail Study:

- Identifies transportation corridors that provide new passenger rail connections between Pittsfield, Springfield, Worcester, Boston, and intermediate communities.
- Assesses the geographic, infrastructure, and demographic conditions in the East – West rail corridor.
- Evaluates potential improvement alternatives for enhancing passenger rail connections among the corridor communities.
- Summarizes the projected benefits, costs, impacts, and trade-offs of the improvement alternatives.

Critically, the study has entailed a comprehensive civic engagement process involving residents, businesses, elected officials, and other stakeholders in a series of meetings and through online interaction. This included cooperative development of the following goals for the project:

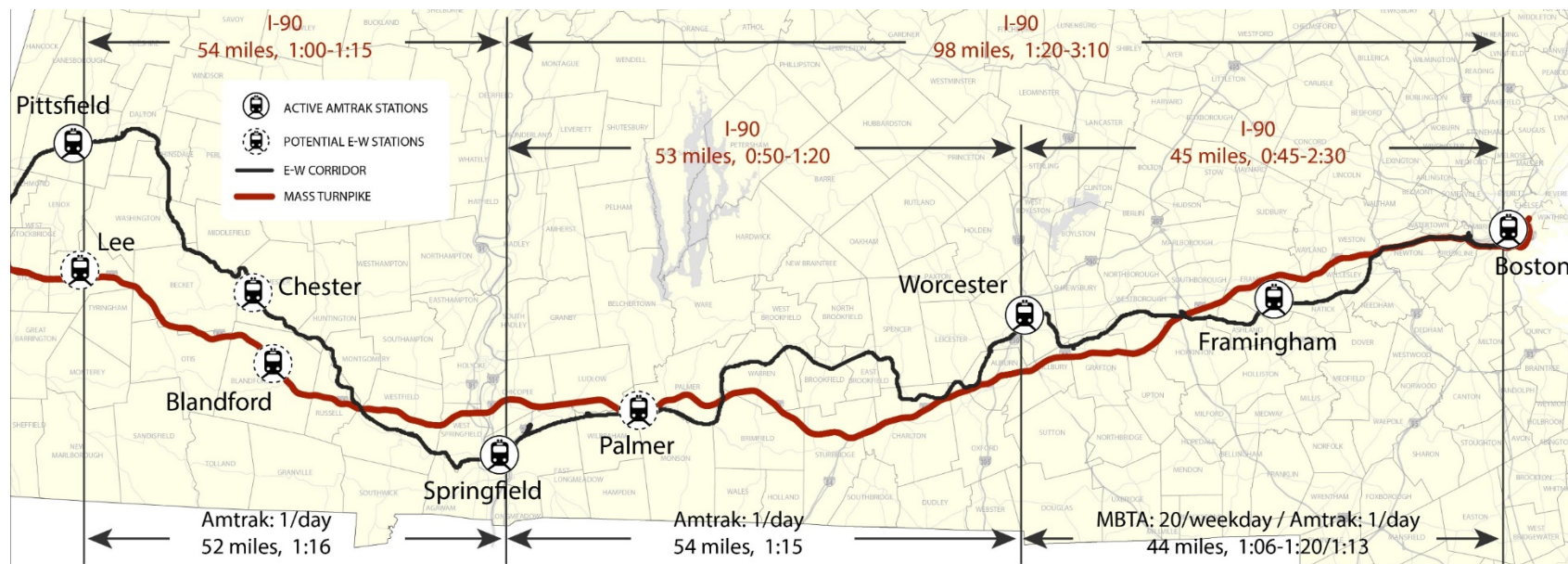
- Provide better **transportation options** to and from Western Massachusetts
- Support **economic development** throughout the East – West rail corridor
- Improve the attractiveness of Western Massachusetts as **an affordable place to live**
- Reduce the number of **automobile trips** along the corridor
- Reduce **greenhouse gas emissions** and **air quality impacts** from transportation

MassDOT recognizes that a robust transportation system is essential to providing residents, businesses, and visitors with mobility to satisfy their economic, personal, and recreational needs. Passenger rail transportation can be an important component of a multi-modal transportation system that increases travel options and reduces greenhouse gas emissions. Fast and frequent passenger rail service in the East-West Rail Corridor would enhance mobility and connectivity for Corridor communities, provide residents and stakeholders with additional travel options, and catalyze new economic opportunities, such as development around stations. Improved connectivity among job centers and better mobility for potential workers could increase employment opportunities for workers and expand the talent pool available to employers by better linking the western, central, and eastern regions of the Commonwealth with each other and with a broader travel market.

### 1.1. East – West Study Corridor

Providing an East – West Passenger Rail service requires a continuous transportation corridor that connects the Corridor communities to be served, including existing or new stations; an alignment that is straight enough to support passenger rail speeds that will offer riders attractive travel times; wide enough for necessary railroad infrastructure (existing, upgraded, or new); and a service provider. The study reviewed the potential for such corridors throughout Massachusetts, and identified two feasible study corridors, the Boston – Albany railroad mainline and the Interstate 90/Massachusetts Turnpike corridor. Figure 1-2 shows these two corridors, along with the distances and travel time for the three main corridor segments: Pittsfield – Springfield, Springfield – Worcester, and Worcester – Boston. The following is a summary of these corridors and some of their key issues and opportunities.

Figure 1-2 – Boston – Albany Rail Line and I-90 Corridor – Corridor Length and Travel Time





## Boston – Albany Rail Mainline

The Boston – Albany rail mainline connects existing railroad stations in Pittsfield, Springfield, Worcester, and Boston. The corridor currently serves both freight and passenger rail operations, and has existing railroad track, signal, and other ancillary infrastructure.

- **Corridor Ownership, Control, and Operations.** West of Worcester, this rail line is owned and operated by CSX Transportation, the third largest freight railroad in North America. CSX operates freight service to major terminals in West Springfield and Worcester, along with smaller railyards and freight customers. Between Worcester and Boston, the rail line is owned by the Commonwealth of Massachusetts, and used principally for frequent commuter rail service on the MBTA Framingham/Worcester Line, which provides 20 weekday round trips between Worcester and Boston. Amtrak generally operates one daily round trip passenger train on the *Lake Shore Limited* between Boston and Chicago with service to the East – West corridor communities; however, decreased travel demand during the COVID-19 pandemic has led Amtrak to reduce frequency to three round trips per week on all long-distance routes, including the *Lake Shore Limited*.
- **Physical Characteristics.** The Boston – Albany rail mainline spans 151 miles between Pittsfield and Boston, with a corridor width that goes from as much as 150 feet near the western end to as narrow as 50 feet in the heavily-developed eastern end toward Boston. At one time, the line had two or more main tracks for the entire length, but sections west of Worcester were reduced to a single track to reduce operations and maintenance costs. The maximum speeds increase as one moves west to east, with steeper grades and tighter curves predominating along the western end of the corridor.

## Interstate 90/Massachusetts Turnpike

The second potential corridor for East – West passenger rail service is the Interstate 90/Massachusetts Turnpike (I-90) corridor.

- **Corridor Ownership, Control, and Operations.** The I-90 corridor is owned and operated by MassDOT as an express interstate highway. I-90 is the principal means of passenger travel among the communities of the East – West corridor; it carries large volumes of automobile and truck traffic, and it has high levels of congestion, especially in the eastern segment of the corridor between Worcester and Boston.
- **Physical Characteristics.** The I-90 corridor is generally wider and straighter than the Boston – Albany rail mainline, which could enable the creation of a lower-curvature, higher-speed rail line.

## 1.2. Preliminary Alternatives Analysis

The East – West Passenger Rail Study conducted an alternatives analysis in order to identify the best solution to the study “problem” – How to connect people in western Massachusetts with central and eastern Massachusetts using a passenger rail service that provides fast, frequent, attractive service in a cost-effective and achievable manner?

To answer this question, the alternatives analysis process developed a set of potential solutions, and evaluated how well each one balances these key considerations:

- Benefits: Maximize travel speeds, frequency, and service quality to attract the most riders
- Costs: Minimize capital, operations & maintenance costs
- Impacts: Minimize impacts to property, buildings, open space, and wetlands

To enable MassDOT, the Advisory Committee, residents, and other stakeholders to understand the full range of potential solutions and their trade-offs, six Preliminary Alternatives were developed from a broad set of potential concepts. These Preliminary Alternatives took different approaches to providing improvements, and achieved different levels of speed increase, travel time, frequency, service quality, cost, and impacts. The following are the key factors that were considered in assembling the Preliminary Alternatives.

- **Infrastructure Investments and Speed Improvements.** These investments correspond to the general approach to providing a new or improved rail line, the type and degree of physical improvements to the rail infrastructure, and the degree to which passenger and freight traffic can be separated. It is these investments that determine one of the most important characteristics of the East – West passenger rail service, the travel speed. The greater the level of infrastructure improvement and separation of passenger and freight operations, the higher the speed of service.
  - Shared Track in Existing Rail Corridor – Passenger rail service on the existing rail line, with restoration of full double-track railroad and upgrades to rail and signal infrastructure, but no separation of passenger and freight operations. The steep terrain of the Pittsfield – Springfield segment of the railroad line means that this segment is limited to this level of improvements.
  - Separate Track in Existing Rail Corridor – Passenger rail service on new railroad tracks separated from the existing freight tracks, but mostly within the existing corridor property. This approach can be implemented in the Springfield – Worcester segment of the railroad line, which has flatter, more open terrain than the Pittsfield – Springfield segment.
  - New Track in a Separate Corridor. Passenger rail service on a new, double-track high-speed rail line. Implementing this fully-separated, high-speed passenger rail line requires the use of the I-90 corridor.
- **Service Elements.** The following are service quality characteristics that were assigned to the Preliminary Alternatives to enable a full assessment of their benefits and impacts.
  - Frequency – The frequency of East – West passenger rail service varies across the Preliminary Alternatives, and generally increases with the degree of infrastructure investment.
  - Extent of Rail Service – Some of the Preliminary Alternatives entail passenger rail service to Pittsfield, while some extend rail service to Springfield, with a bus connection to Pittsfield.
  - Stations Served – All Preliminary Alternatives serve the major corridor cities of Pittsfield, Springfield, Worcester, and Boston, while some also serve intermediate towns.

Table 1-1 provides a summary of the six Preliminary Alternatives and their key characteristics:

- The maximum speed increases steadily across the alternatives, and the travel time steadily decreases.
  - Compared to the existing Lake Shore Limited service, Alternative 3, which provides a one-seat ride between Pittsfield and Boston, cuts roughly 30 – 45 minutes off the trip between Pittsfield and Boston, and roughly 25 – 40 minutes off the trip between Springfield and Boston.

- NOTE: These 15 minute ranges represent the travel times calculated for the different “runs” of each alternative in a detailed service plan that reflects maximum speeds for the track geometry and the coordination of the East-West “runs” with other passenger and freight trains operating within the corridor. For example, a detailed service schedule was developed for Alternative 3, and all 16 trips (8 round trips) fit into this range: 3:05 to 3:20 for Pittsfield – Boston and 1:50 to 2:05 for Springfield – Boston. The range provides a means of describing variations in travel times for each alternative, depending upon the specific level of infrastructure improvements.
  - By providing a dedicated passenger-only track parallel to the existing CSX rail line between Springfield and Worcester, Alternative 4 saves an additional 10 minutes compared to Alternative 3.
  - Several “shortcut” realignments in Alternative 5 between Springfield and Worcester save an additional 10 minutes versus Alternative 4.
  - By building a completely new, separated rail alignment in the straighter I-90 corridor, Alternative 6 provides the fastest travel time of all the alternatives: 2:15 to 2:30 for Pittsfield – Boston travel, and 1:15 to 1:30 for Springfield – Boston travel. However, the cost of implementing a totally new railroad line is much higher than the other alternatives.
- Alternatives 1, 2, and 5 would provide bus service between Pittsfield and Springfield, and would require a transfer to the rail service. This has significant negative impacts on travel time and attractiveness of the service.

*Table 1-1 – Passenger Rail Service Characteristics – Preliminary Alternatives*

METRIC /	ALTERNATIVE	NO-BUILD	1	2	3	4	5	6
CORRIDOR TYPE +	ALIGNMENT	SHARED + EXISTING	SHARED + EXISTING	SHARED + EXISTING	SHARED + EXISTING	SHARED + SEPARATE	SHARED + SEPARATE	SEPARATE + NEW
FREQUENCY	RAIL ROUND TRIPS	1	5	7	8	10	10	18
SPEEDS	MAX. PERMITTED (MPH)	80	80	80	90	110	110	150
TRAVEL TIMES RANGE	PITTSFIELD – BOSTON	3:50	3:55 – 4:10	3:35 – 3:50	3:05 – 3:20	2:55 – 3:10	2:55 – 3:10	2:15 – 2:30
TRAVEL TIMES RANGE	SPRINGFIELD – BOSTON	2:28	2:40 – 2:55	2:10 – 2:25	1:50 – 2:05	1:40 – 1:55	1:30 – 1:45	1:15 – 1:30
EAST-WEST STATIONS	PITTSFIELD	✓	(Bus)	(Bus)	✓	✓	(Bus)	✓
EAST-WEST STATIONS	LEE	-	(Bus)	(Bus)	-	-	(Bus)	✓
EAST-WEST STATIONS	CHESTER	-	-	-	✓	✓	-	-
EAST-WEST STATIONS	BLANDFORD	-	(Bus)	(Bus)	-	-	(Bus)	✓
EAST-WEST STATIONS	SPRINGFIELD	✓	✓	✓	✓	✓	✓	✓
EAST-WEST STATIONS	PALMER	-	✓	✓	✓	✓	-	✓
EAST-WEST STATIONS	WORCESTER	✓	✓	✓	✓	✓	✓	✓
EAST-WEST STATIONS	LANSDOWNE	✓	✓	✓	✓	✓	✓	✓
EAST-WEST STATIONS	BACK BAY	✓	✓	✓	✓	✓	✓	✓
EAST-WEST STATIONS	SOUTH STATION	✓	✓	✓	✓	✓	✓	✓

### 1.3. Final Alternatives Analysis

Based on the results of the Preliminary Alternatives analysis and feedback from the Advisory Committee, stakeholders, and members of the public, the alternatives were narrowed to a set of three Final Alternatives that all include the following preferred characteristics:

- Rail operations for the full East – West Corridor, from Pittsfield to Boston, via the Boston – Albany railroad mainline.
- Service to all stations in the Corridor, including in smaller intermediate communities: Pittsfield, Chester, Springfield, Palmer, Worcester, Lansdowne, Back Bay, and South Station.
- Passenger rail service in the existing rail corridor; the cost of building a new railroad line in the I-90 corridor (in Alternative 6) was judged to be not worth the incremental travel time savings.

Therefore, the three Final Alternatives comprise the following:

- **Alternative 3** (same as Preliminary Alternative 3) would provide direct passenger rail service between Pittsfield and Boston along a shared track / shared CSX and MBTA corridor. Up to 8 round trips would be provided, with an average travel time of 3:09 between Pittsfield and Boston, and 1:57 between Springfield and Boston. Shown in Figure 1-3. The figures for the Final Alternatives show the alignment of the alternative; the stations served; and the improvements proposed for the alignment (e.g. double-tracking, new rail alignment, etc.). The figures also show a diagram of the rail line with the “Speed Operated:” this is the calculated speed for each segment of the corridor, based on the detailed train performance calculations and resultant service schedule.
- **Alternative 4** (same as Preliminary Alternative 4) would provide direct passenger rail service between Pittsfield and Springfield along a shared track / shared CSX corridor, along an independent passenger track between Springfield and Worcester, and along a shared track/shared MBTA corridor between Worcester and Boston. Up to 10 round trips would be provided, with an average travel time of 2:59 between Pittsfield and Boston, and 1:47 between Springfield and Boston. Shown in Figure 1-4.
- **Hybrid Alternative 4/5** (combines elements of Preliminary Alternatives 4 and 5) would provide direct passenger rail service between Pittsfield and Springfield along a shared track / shared CSX corridor, along an independent passenger track with high-speed shortcuts between Springfield and Worcester, and along a shared track/shared MBTA corridor between Worcester and Boston. Up to 10 round trips would be provided, with an average travel time of 2:49 between Pittsfield and Boston, and 1:37 between Springfield and Boston. Shown in Figure 1-5.

Table 1-2 shows the key metrics that have been evaluated for the alternatives analysis:

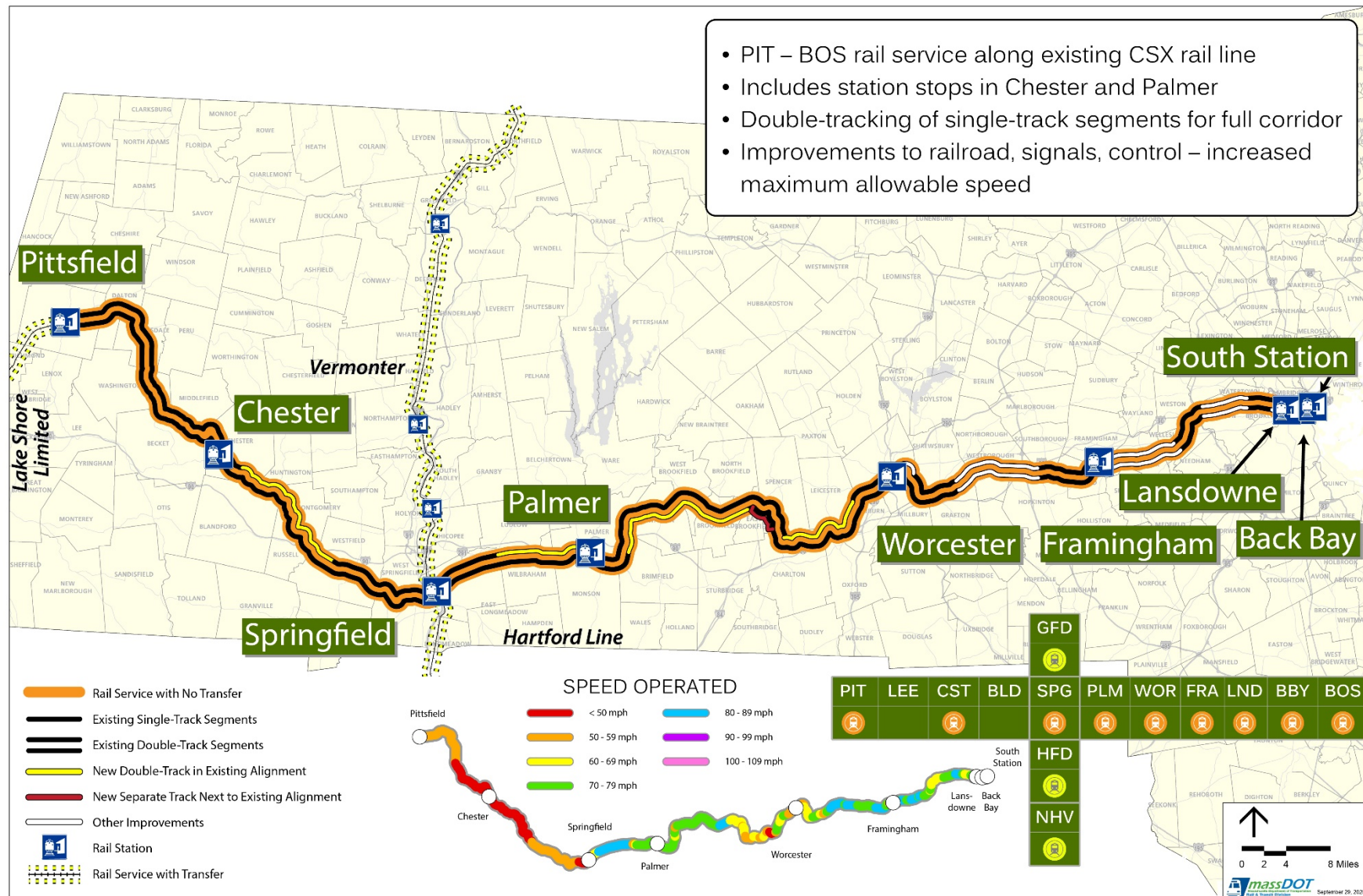
- **Ridership.** The ridership forecasts for the alternatives are a critical metric of the overall attractiveness of the proposed alternatives for travelers; it is determined by a combination of demographics (residents and jobs) surrounding the stations and the service quality (travel time and frequency to the traveler’s destination). Ridership is the basis for determining project benefits relative to travel time savings, motor vehicles taken off the highways, air quality improvements, and other measures of project benefit. The total annual trips shown in Table 1-2 are the trips that are projected on the East – West passenger trains for a mature service in the year 2040. These numbers represent “boardings,” i.e. each time a

passenger gets onto a train is a boarding (so a round trip, e.g. Springfield to Boston and the return trip, would count as two). The ridership range was produced by two independent forecasts, with different assumptions, that used two different rail corridors as the starting point.

- Alternative 3 is projected to be used by 922 to 1,188 passengers per weekday.
- Alternative 4 is projected to be used by 1,157 to 1,379 passengers per weekday.
- Hybrid Alternative 4/5 is projected to be used by 1,296 to 1,554 passengers per weekday.
- **Capital Costs.** The capital cost estimate is a key determinant of the challenge of implementation for a given alternative. The capital cost estimates reflect one-time investments in new infrastructure, e.g. new/upgraded stations, track, bridges, yards, utility relocation, signals, property acquisition, vehicle procurement, and professional services. The total also includes a series of contingencies in accordance with standard practices for a cost estimate developed during the planning phase. These capital costs, expressed in 2020 dollars, range from \$2.4 billion for Alternative 3 to \$3.9 billion for Alternative 4 and \$4.6 billion for Hybrid Alternative 4/5.
- **Operations & Maintenance Costs.** These are the annual costs associated with operating and maintaining the service, including labor, fuel, upkeep of facilities and vehicles, and administration.
- **Environmental and Community Impacts.** These include impacts to public and private property, open space, and environmental resources such as open water and wetlands. Grade crossings are included as a safety-related impact.



Figure 1-3 – Final Alternative 3 – Passenger Rail, Pittsfield – Boston, on Upgraded Existing Railroad Tracks



- PIT – BOS rail service along existing CSX rail line
- Includes station stops in Chester and Palmer
- Double-tracking of single-track segments for full corridor
- Improvements to railroad, signals, control – increased maximum allowable speed

Figure 1-4 – Final Alternative 4 – Passenger Rail, Pittsfield – Boston: Upgraded Existing Rail (PIT – SPG), New Rail in CSX Corridor (SPG – WOR)





Figure 1-5 – Final Alternative 4/5 Hybrid – Passenger Rail, Pittsfield – Boston: Upgraded Existing Rail (PIT – SPG), New Rail with Priority Realignments (SPG – WOR)

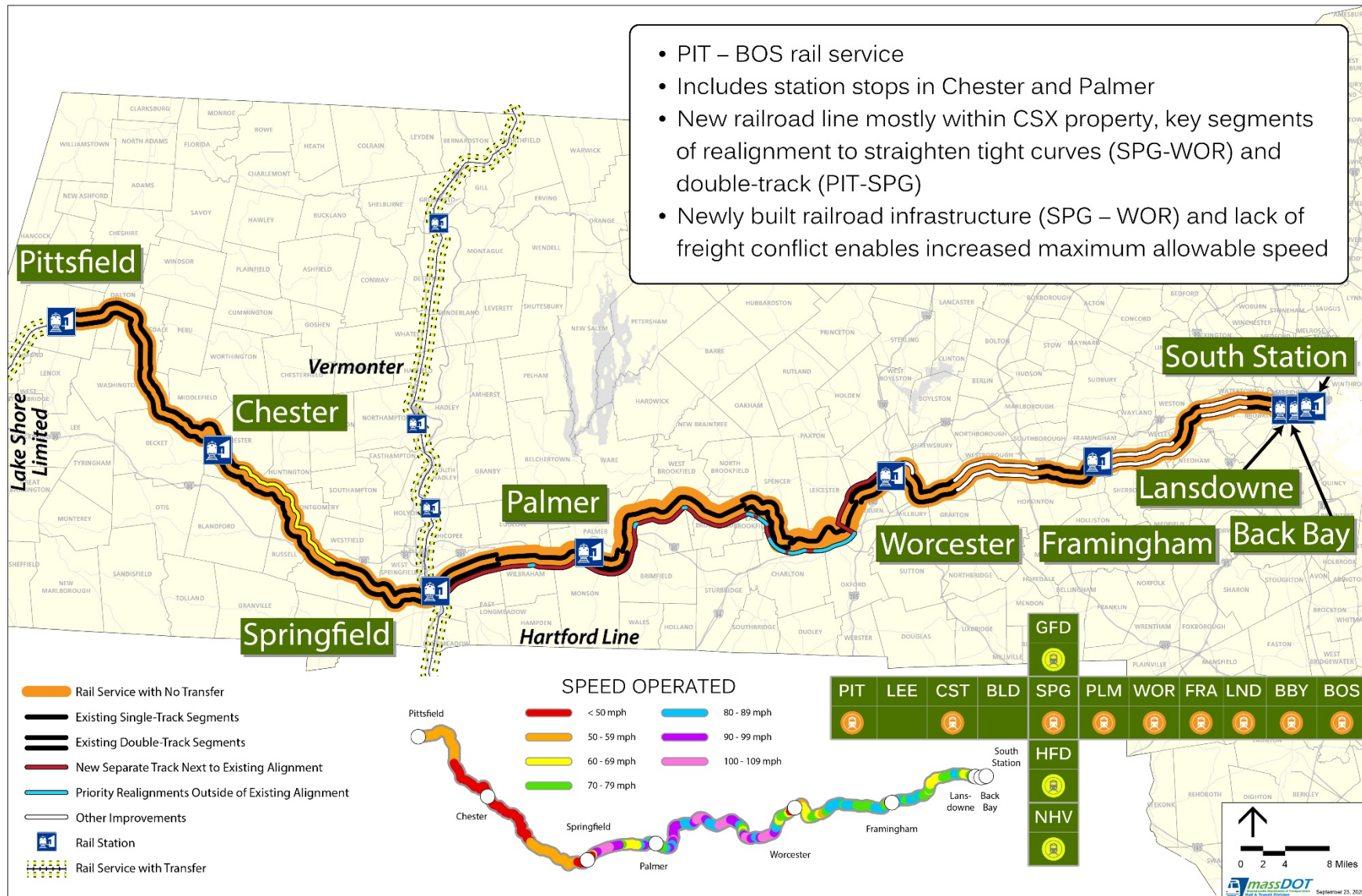


Table 1-2 – Alternatives Analysis Results for Final Alternatives

ALTERNATIVE	3	3	4	4	4/5 HYBRID	4/5 HYBRID
<b>RIDERSHIP FORECASTS</b>	-	-	-	-	-	-
STATION / FORECAST SCENARIO	“ENHANCED” HARTFORD LINE	DOWNEASTER	“ENHANCED” HARTFORD LINE	DOWNEASTER	“ENHANCED” HARTFORD LINE	DOWNEASTER
PITTSFIELD	11,400	27,650	13,650	31,500	14,650	33,400
CHESTER	1,400	4,200	1,700	4,700	1,850	5,000
SPRINGFIELD	105,700	116,750	135,700	140,600	152,400	159,500
SPRINGFIELD (Transfers)	10,250	22,200	10,500	21,150	11,250	23,600
PALMER	4,950	6,550	6,050	7,100	6,500	8,000
WORCESTER	19,300	35,250	23,250	39,500	25,500	43,250
WORCESTER (Transfers)	6,400	9,450	7,250	9,550	8,100	11,350
FRAMINGHAM	1,550	650	1,550	450	1,750	800
BOSTON (South Station, Back Bay, Lansdowne)	117,350	135,550	149,700	161,500	169,200	184,100
TOTAL BOARDINGS	278,300	358,250	349,350	416,050	391,200	469,000
<b>COSTS</b>	-	-	-	-	-	-
CAPITAL COSTS (2020 \$million)	\$2,414	\$2,414	\$3,860	\$3,860	\$4,625	\$4,625
OPERATIONS & MAINTENANCE (2020 \$million)	\$27.9	\$27.9	\$34.1	\$34.1	\$33.9	\$33.9
<b>ENVIRONMENTAL &amp; COMMUNITY IMPACTS</b>	-	-	-	-	-	-
WETLANDS IMPACTS (Acres)	0.45	0.45	7.73	7.73	8.87	8.87
OPEN WATER IMPACTS (Acres)	0.93	0.93	4.02	4.02	4.91	4.91
FLOODPLAINS IMPACTS (Acres)	19.32	19.32	35.63	35.63	37.74	37.74
PRIORITY HABITAT (Acres)	35.79	35.79	58.57	58.57	59.01	59.01
HISTORIC PROPERTIES (Acres)	4.01	4.01	6.77	6.77	6.62	6.62
ARTICLE 97 LANDS (Acres)	3.03	3.03	9.87	9.87	14.57	14.57
NET CO <sub>2</sub> EMISSIONS (METRIC TONS)	8,433	7,023	14,497	13,273	13,544	12,147
IMPROVED AT-GRADE CROSSINGS	30	30	30	30	27	27
BUILDINGS IMPACTED	0	0	92	92	98	98



## Key Findings

Key findings from the Final Alternatives analysis include:

- A substantial reduction in travel times by as much as one hour over current times would be possible with significant new investment in rail corridor infrastructure.
- Passenger rail and CSX operations between Worcester and Pittsfield within an enhanced shared-track environment would require careful coordination of services and clear operational criteria.
- Passenger rail service operated between Worcester and Springfield over an independent alignment adjacent to CSX track(s) eliminates most of the interference between the two operations in this segment.

- Total forecasted ridership for the Final Alternatives indicates commuter, business and recreational travel markets are present to varying degrees along the East-West Corridor, including a pattern of very strong ridership between Springfield and Boston: roughly two-thirds of boardings for each alternative were attributable to Boston-bound trips from Springfield, or the corresponding return trip. Long term impacts of the COVID-19 pandemic on commuting patterns were not examined as part of this study.
- None of the alternatives achieve all identified objectives. Each contains a set of positive (Pro) and negative (Con) attributes that must be considered with respect to each other to make an informed decision on the overall benefits provided by the alternative.

Key tradeoffs among the Final Alternatives are shown in Table 1-3.

*Table 1-3 – Pros and Cons of Final Alternatives*

ALTERNATIVE	ALTERNATIVE 3	ALTERNATIVE 4	4/5 HYBRID
PROS	<ul style="list-style-type: none"> <li>• Lowest capital cost</li> <li>• Fewest land impacts</li> <li>• Fewer grade-crossing impacts</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced travel times / faster speeds</li> <li>• Higher ridership</li> <li>• Reduced passenger / freight interference</li> </ul>	<ul style="list-style-type: none"> <li>• Lowest travel times / fastest speeds</li> <li>• Highest ridership</li> <li>• Reduced passenger / freight interference</li> <li>• Fewer grade-crossing impacts</li> </ul>
CONS	<ul style="list-style-type: none"> <li>• Longest travel times / slowest speeds</li> <li>• Lowest ridership</li> <li>• Greatest passenger / freight interference</li> </ul>	<ul style="list-style-type: none"> <li>• Higher capital cost</li> <li>• Higher land impacts</li> <li>• Higher grade-crossing impacts</li> </ul>	<ul style="list-style-type: none"> <li>• Highest capital cost</li> <li>• Greatest land impacts</li> </ul>

## Recommendations

Based on the study's Key Findings and Trade-Offs, there is additional study that is needed to fully complete the Conceptual Planning stage for East-West rail, additional evaluation needed for certain physical/operational elements, and strategic decisions that need to be made in order to advance opportunities for turning East-West Passenger rail from a subject of study to a viable project that can be designed, permitted, funded, built, and operated.

While MassDOT acknowledges the preference of many Advisory Committee members to prioritize the 4/5 hybrid alternative, at this stage MassDOT recommends keeping Alternatives 3 and 4 under consideration until additional information becomes known. As such, MassDOT recommends deferring consideration of phasing until more is known about the project's elements.

The following four areas are recommended in order to continue advancing the project during the remaining conceptual planning phase for East West Passenger Rail.

#### **More Detailed Study of Economic and Community Benefits and Impacts**

- Conducting surveys of both businesses and residents to understand market conditions, e.g., likely riders and demographics, fare sensitivity, and other market conditions
- Working with the business community across the Commonwealth and conduct additional analysis to better understand and articulate the full range of potential economic benefits, including anticipating the benefits of how the combination of a post-COVID “new normal” and focused policies to promote affordable living in western Massachusetts affect residential locational choices and work-from-home policies and trends
- Working with local and regional governments and community members to facilitate land use decisions and new development that supports and is supported by rail transportation, and that can make travel without automobiles more viable
- Conducting neighborhood workshops on community impacts and service expectations
- Reviewing and updating cost and ridership estimates periodically to reflect significant new data
- Considering how a price on carbon and VMT fees could impact rail service

#### **Explore opportunities with rail partners**

CSX policy regarding accommodation of passenger rail service along its routes favors complete separation of the passenger operations from its own tracks whenever possible. Separation is required for any passenger rail operation where train speeds exceed 90 mph. Where shared track operations occur, CSX requires new and upgraded construction to meet its latest engineering-related policies concerning weight and clearance requirements as well as design standards. Track restoration elements found in the East-West Study assumed wider track centers (distance between two tracks) than historically found along the route as well as replacement of undergrade bridges to comply with the guidance.

Therefore, MassDOT should:

- Continue discussions with CSX to ascertain whether their support for an East-West passenger service is possible and, if not, what other options exist
- Undertake additional analysis such as rail capacity modeling and right-of-way condition
- Conduct a life-cycle cost analysis, if possible, to determine the full spectrum of costs associated with greater control over the right-of-way.
- Work with Amtrak to determine terms for increased right-of-way usage and the feasibility of service to Albany
- Secure independent appraisal of the current and prospective freight market

## Understand governance options for expanded passenger rail in western Massachusetts

MassDOT is not currently set up to operate as a railroad and the MBTA is limited to operations within its service areas. Therefore, state legislative changes will be needed to create a governance structure for passenger rail in the Commonwealth outside of the current MBTA service area. Such a governance structure would not only benefit an eventual East-West Passenger rail, but other services such as the Valley Flyer.

Therefore, MassDOT should develop a white paper to establish governance structure options for passenger rail outside the MBTA service district, considering:

- Structure of a public entity to provide management and oversight
  - Powers and authority
  - Eligibility to receive federal funds
  - Liability
  - Need for balance between operating independence and public control
  - Legal/regulatory, operational, and financial characteristics of intercity and commuter rail service
- Passenger rail operator
- Life cycle costs of acquiring and supporting public interest in the right-of-way and related infrastructure
- Funding sources
  - Development through construction
  - Operations (including any subsidy required for selected fare policy)
  - Maintenance and capital renewal

## Evaluate funding opportunities and obstacles

The East – West Passenger Rail project is a large and complex project that would require large capital investments to develop as well as ongoing operations and maintenance funding, likely necessitating a combination of many different funding sources and strategies. MassDOT will need to work with in coordination with state and federal elected officials and other key stakeholders to evaluate and identify funding obstacles and opportunities.

Therefore, MassDOT should:

- Continue to refine capital and operating cost estimates to set the parameters for future funding needs
- Develop a proposal for legislative changes to the federal benefit-cost analysis method based on outcomes from further study of economic and community impacts
- Based on findings from the governance white paper, catalogue existing funding sources and eligible recipients and possible future funding structures.