5. Key Findings

The East-West Passenger Rail Study began the conceptual planning process by evaluating many of the elements that are expected to form the basis of providing passenger rail service across the 151-mile corridor between Pittsfield and Boston. These elements included analysis of the physical characteristics of the route, representative services delivered by the train operations, and potential ridership and travel characteristics. While the Study began by considering a wide range of alternatives and developed six in some detail, this final report has focused on three alternatives, the selection of which reflected guidance from the Advisory Committee. Those three Final Alternatives were analyzed in greater detail.

Key findings from that analysis include:

- A rreduction in travel times by as much as one hour over currently feasible times could be possible with new investment in the rail infrastructure between Pittsfield and Boston.
- Those travel time reductions reflect an increasingly higher level of investment made in new infrastructure.
- The potential total travel time from Pittsfield to Boston ranges from an average of 3 hours and 9 minutes to 2 hours and 49 minutes, while the total travel time between Springfield and Boston could be between 1 hour and 57 minutes and 1 hour and 37 minutes.
- Commuter, business, and recreational travel markets are present to varying degrees along the corridor. The study did not examine the possible long-term impacts of the COVID-19 pandemic on travel patterns or demographics.
- On average, roughly 62% of the estimated ridership is expected to be trips between Springfield and Boston.
- East-West train service can operate compatibly with MBTA Worcester/Framingham Line service when the currently planned infrastructure improvements between Worcester and Boston are in place. Fully discussed in Chapter 2, these improvements include completed or ongoing projects (e.g., Worcester Line Positive Train Control Upgrades) and some that have been assumed for the purpose of analysis but for which funding has not yet been identified (e.g., South Station Expansion).
- Passenger rail and CSX operations within an enhanced shared-track environment would require careful coordination of services and clear operational criteria, as well as an agreement with CSX as owner of the line west of Worcester.
- Passenger rail service operated between Springfield and Worcester over an independent alignment adjacent to CSX track(s) appears to be feasible, could eliminate most of the interference between the two types of operations (passenger and freight) in this segment, and could reduce travel time in the segment by 10 minutes. However, building this independent alignment to adhere to CSX requirements for passenger service on their right-of-way adds significant cost and complexity. The estimated capital cost of complying with CSX design criteria is approximately $1.5 billion. Additional alignment improvements that are expected to save an additional 10 minutes are projected to cost $765.4 million.
- Development of an independent passenger alignment adjacent to CSX track(s) between Springfield and Pittsfield was not found to be feasible due to its topography and large areas of environmentally protected lands. An enhanced shared track is the only option identified for this portion of the corridor.
- Each alternative offers a set of positive (Pro) and negative (Con) attributes that must be considered to make an informed decision on the overall benefits provided by the alternative. The principal pros and cons of each of the final Alternatives are described in section 5.1.

- **Fewer grade-crossing impacts:** Grade crossings present safety concerns for rail since conflicts with cars and/or pedestrians cannot be totally eliminated – only warned against and made less likely. However, compared to the other alternatives, the probability of grade crossing incidents is reduced by the projected slower speeds and lower train frequencies.

- **Cons**
  - **Longest travel times / slowest speeds:** Operations within the existing shared track environment must conform to CSX freight design criteria with slower maximum, curve, and average speeds (51 mph Springfield-Worcester). The average scheduled travel time between Pittsfield and Boston would be 3 hours and 9 minutes; between Springfield and Boston it would be 1 hour and 57 minutes. West of Worcester, the Springfield to Worcester segment would operate at an average speed of approximately 50 mph, and the Pittsfield to Springfield segment would operate at an average speed of 44 mph.
  - **Lowest ridership:** Ridership forecasts for all three Final Alternatives are based on the demographic profiles used by the Regional Planning Agencies for all transportation projects, combined with the projections derived from the two proxy rail services. Train operations are the key variable affecting ridership differences between the Final Alternatives. Forecasted ridership for Final Alternative 3 is the lowest among the three Final Alternatives. The longer travel times dampen ridership demand, although passengers would be able to work and move about on-board so the service would still have some competitive advantages.
  - **Greatest passenger / freight interference:** CSX and East-West trains would operate in a shared track environment for 105 miles between Pittsfield and Worcester. This would require operational cooperation between CSX and the passenger service along the entire route. The substantial volume of freight traffic, differential in operating profiles (speeds/unscheduled operations) and required switching operations all increase the probability of delays, adversely impacting reliability, due to train-to-train conflicts.

Alternative 4

Alternative 4 would provide direct passenger rail service between Pittsfield and Springfield along a shared track in the 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 9 new roundtrips were evaluated.

- **Pros**
  - **Convenient and comfortable travel:** With up to nine additional round trips each day, service would be more frequent. To the extent that capacity is available east of Worcester, peak hour service would be provided in addition to off-peak service. This combination would appeal to the mixture of trip purposes assumed for the corridor – business trips, commuting, and recreation. Given the total travel time, it is assumed that intercity coaches (or equivalent) would be used. This would offer a higher degree of comfort than typical commuter equipment.
  - **Reduced travel times / faster speeds:** Travel time to Boston would be reduced by approximately 10 minutes compared to Alternative 3 – trips from Springfield would take 1 hour and 47 minutes and would take 2 hours and 59 minutes from Pittsfield. Operations within the Pittsfield to Springfield section would have to conform to freight design limitations with safety concerns dictating slower maximum speeds and slower speeds through curves. However, operations along the

parallel independent passenger track between Springfield and Worcester would be able to achieve higher maximum speeds, curve speeds, and average speeds (60 mph Springfield-Worcester).

- **Higher ridership:** Forecasted ridership is higher in Alternative 4 compared to Alternative 3 – up to 25% higher across the corridor. The reduced travel times increase forecasted demand, particularly between Springfield and Boston.
- **Reduced passenger / freight interference:** CSX and East-West trains would operate in a shared track environment for 51 miles only between Pittsfield and Springfield; a 51% reduction in shared track operations compared to Alternative 3. The probability of delay (and consequential schedule unreliability) due to train-to-train conflicts is reduced proportionately.

- **Cons**
  - **Higher capital cost:** The new independent passenger track between Springfield and Worcester would add substantial additional capital costs (estimated at $1.5B). This expenditure would be needed to meet CSX's criteria for a shared corridor and higher speeds. Construction of new maintenance and station facilities would also be needed.
  - **Greater land impacts:** Infrastructure improvements would remain mainly confined to the existing CSX Right of Way between Pittsfield and Springfield. However, the new independent passenger track between Springfield and Worcester would incur greater land impacts where its construction extends beyond the limits of the present alignment of the right-of-way. Moderate impacts remain with the planned Chester and Palmer stations.
  - **Higher grade-crossing impacts:** The faster speeds in the Springfield to Worcester section increase the risk of grade crossing incidents.

Hybrid Alternative 4/5

Hybrid Alternative 4/5 would provide direct passenger rail service between Pittsfield and Springfield along a shared track in the CSX corridor, along an independent passenger track with high-speed short cuts between Springfield and Worcester, and along a shared track/ shared MBTA corridor between Worcester and Boston. Up to 9 new roundtrips were evaluated.

- **Pros**
  - **Convenient and comfortable travel:** With up to nine additional round trips each day, service would be more frequent. To the extent that capacity is available east of Worcester, peak hour service would be provided in addition to off-peak service. This combination would appeal to the mixture of trip purposes assumed for the corridor – business trips, commuting, and recreation. Given the total travel time, it is assumed that intercity coaches (or equivalent) would be used. This would offer a higher degree of comfort than typical commuter equipment.
  - **Lowest travel times / fastest speeds:** This alternative provides the fastest speed and lowest overall travel time of the Final Alternatives. All three Final Alternatives have the same constraints, improvements, and speed for the Pittsfield – Springfield segment. However, between Springfield and Worcester Final Alternative 4/5 provides a parallel, independent, and higher-speed rail line with several strategic realignments to further straighten curves and increase speeds, to an average of 74 mph. This results in a travel time savings of 20 minutes compared to Alternative 3 and 10 minutes compared to Alternative 4, providing the fastest overall option.
  - **Highest ridership:** Forecasted ridership is the greatest of the three alternatives, up to 11% more than Alternative 4. The

substantially reduced travel times notably increased forecasted demand.

- **Reduced passenger / freight interference:** As with Alternative 4, passenger trains would operate on a separate track between Springfield and Worcester, thus reducing the likelihood of freight/passenger operating conflicts and increasing reliability. However, as with Alternative 3, CSX and East-West trains would operate in a shared track environment for 51 miles between Pittsfield and Springfield. The probability of delay due to train-to-train conflicts is reduced proportionately.
- **Fewer grade-crossing impacts**: Consolidating three at-grade crossings in the Town of Wilbraham into two overhead bridges (i.e., vehicles travel above the railroad, which remains at-grade) reduces the probability of at-grade crossing incidents in an area with two industrial parcels that feature parking lots for heavy vehicles adjacent to the railroad.

- **Cons**
  - **Highest capital cost:** The new independent passenger track plus high-speed short cuts between Springfield and Worcester would require the largest capital investment cost. The additional short cuts would save approximately 10 minutes in travel time beyond Alternative 4. Construction of new maintenance and station facilities would also still be needed.
  - Greatest land impacts: Infrastructure improvements would remain largely confined to the existing CSX Right of Way between Pittsfield and Springfield. However, construction of the new independent passenger track plus high-speed short cuts between Springfield and Worcester would mean going outside the existing right-of-way, resulting in the greatest land impacts. Moderate impacts remain with the planned Chester and Palmer stations.

This study has framed three potentially viable Alternatives that advance one or more of the goals established for passenger rail service between Pittsfield and Boston. The study's Key Findings and Trade-Offs provide a reasonable basis for assessing the pros and cons of each Alternative, particularly the ridership benefits and the capital costs of different project elements.

MassDOT acknowledges the preference of several Advisory Committee members to prioritize the 4/5 hybrid alternative, but at this stage MassDOT recommends keeping Alternatives 3 and 4 under consideration, as additional information may be worth considering before the focus is narrowed to one alternative. Moreover, the necessary next steps outlined in the following Chapter do not require the selection of one alternative.

There is additional work to be done to fully complete the conceptual planning stage for East-West rail. This work includes discussions with CSX about certain physical/operational elements and the development of a governance structure. These tasks and others would advance opportunities for turning East-West Passenger rail from a subject of study to a project that can be designed, permitted, funded, built, and operated.