San Joaquin Joint Powers Authority

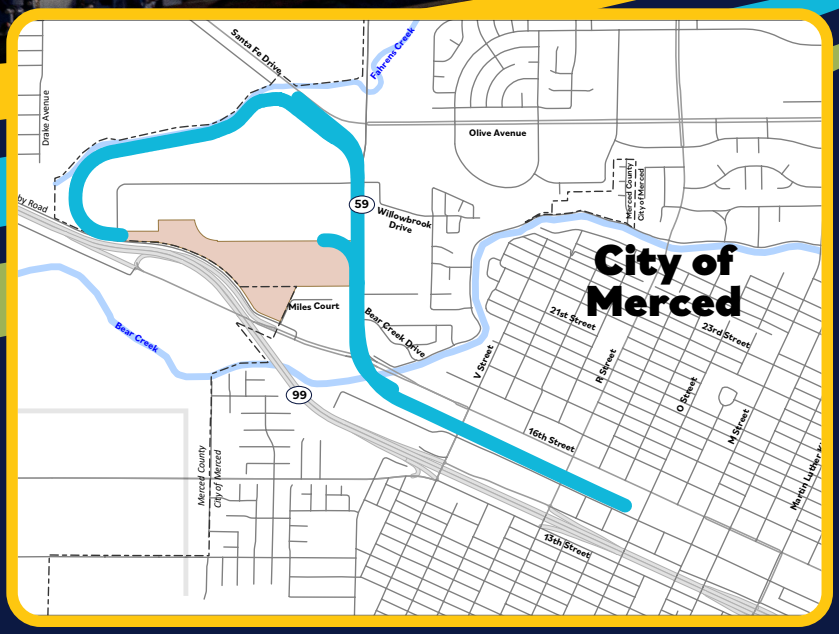
MITC
Merced Intermodal Track Connection

Appendix 2.0-5:

Merced Intermodal Track Connection Operations and Maintenance Cost Technical Memorandum

July 2024

SCH # 2023010061



Memorandum

To:	Dan Leavitt, San Joaquin Joint Powers Authority Andy Cook, San Joaquin Joint Powers Authority
From:	Daniel Hartman, AECOM
Cc:	David DeRosa, AECOM Jason Green, AECOM Peng Zhao, AECOM
Date:	June 12, 2024
Re:	**Merced Intermodal Track Connection Project – Operations and Maintenance Cost Technical Memorandum**

This memorandum provides a summary of the operations and maintenance cost estimate prepared for the San Joaquin Joint Powers Authority's (SJJPA) Merced Intermodal Track Connection (MITC) Project (Project). This document summarizes the costs from the 2024 15 percent preliminary engineering design for the improvements associated with the Project. The Project includes main rail improvements, aerial guideway, modifications to Union Pacific Railroad (UPRR) industrial tracks, stations, and modifications to the layover and maintenance facility.

Overview of the Project

The Project is proposed by the SJJPA to provide a critical element for SJJPA's passenger rail services vision.

The Project would include a new track connection from the Burlington Northern Santa Fe (BNSF) corridor to the proposed integrated Merced High-Speed Rail (HSR) Station in downtown Merced between O and R Streets, in addition to a new platform that would allow for cross-platform transfer between the San Joaquins passenger rail and HSR. The Project only includes the construction of the track connection; it does not include the construction of the proposed integrated Merced HSR Station.

The Project would consist of the following:

- New passenger rail connection for the San Joaquins from BNSF north of SR 59, running along the SR 59 corridor and immediately west of the ACE UPRR corridor, to the southern terminus at the proposed integrated Merced HSR Station.
- Shifting the ACE UPRR spur track that accesses industrial area north of SR 59.
- New access to the approved ACE Merced Layover and Maintenance Facility for San Joaquins trains.

- Modification of the approved ACE Merced Layover and Maintenance Facility to include new and upgraded tracks for San Joaquins, joint use of the facility by both ACE and San Joaquins trains for maintenance activities and required equipment and parking for SJJPA maintenance staff. The footprint of the facility would not be expanded.
- New aerial guideway on the west side of the ACE/UPRR corridor that would connect into the east side of the HSR platform (which would be shared with the San Joaquins) at the proposed integrated Merced HSR Station, creating an elevated integrated platform with HSR.

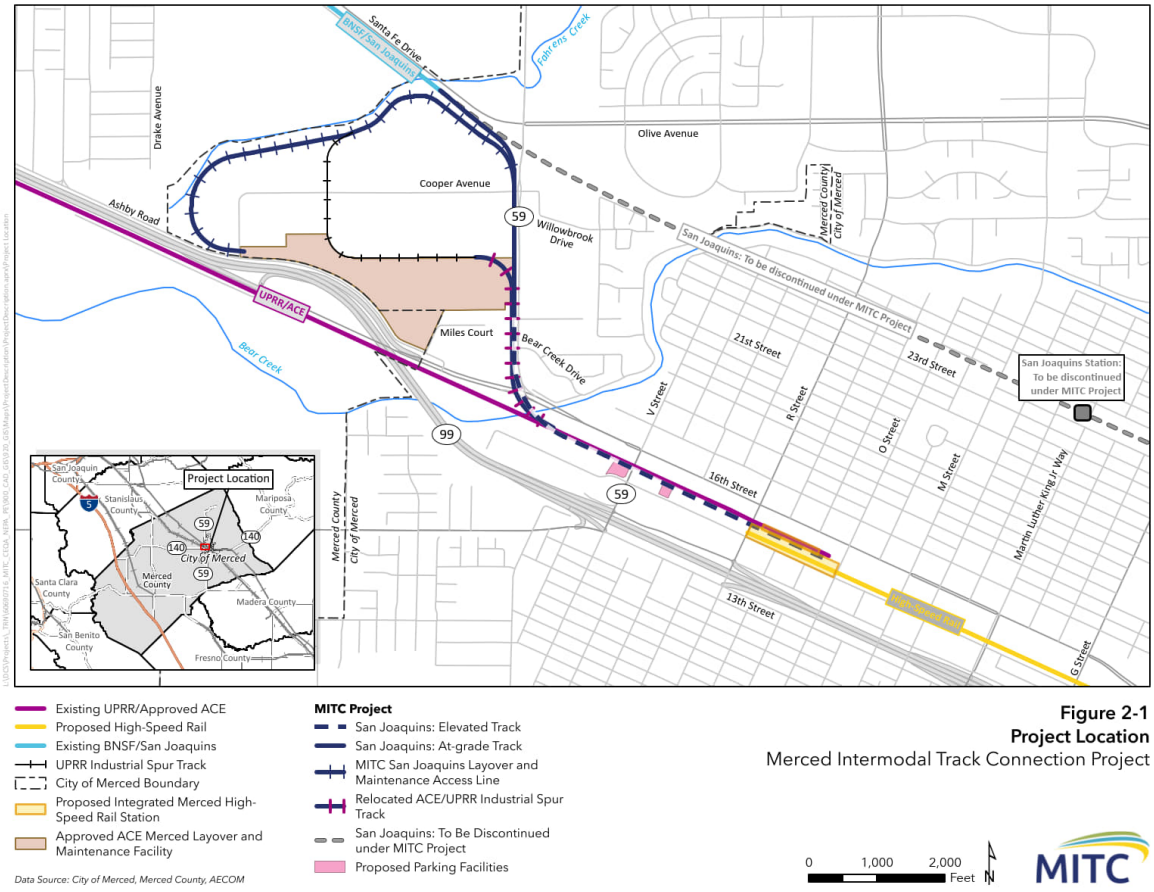


Figure 2-1
Project Location
Merced Intermodal Track Connection Project

Figure 1. Project Location

Development of Operations and Maintenance Cost Estimate

The development of this operations and maintenance estimate was coordinated between the AECOM Technical Services, Inc. (AECOM) team and SJPPA staff.

Methodology

The estimate was developed by utilizing the existing San Joaquins service costs and projecting costs for the MITC Project based on the changes to the service. Below is a summary of the changes:

- Train service is truncated at Merced, removing the section between Merced and Bakersfield, resulting in shorter trips.
- Addition of one new trip from Merced to Natomas for the Project scenario.
- Addition of five new trips, one from Merced to Oakland, one from Merced to Chico, and three from Merced to Natomas.
- Addition of costs for the Merced Layover and Maintenance Facility for the Project and No Project.
- Addition of cost for maintenance of the MITC alignment and aerial guideway for the Project.

Operating Scenarios

Below are summaries of the operating scenarios evaluated for the MITC Project:

No-Project (Service to the existing Merced Station)

Table 1. San Joaquins Service under No-Project Scenario (Everyday)

Trip	One-way Distance (Miles)	Number of Round Trips	Annual Miles
Merced to Oakland	144.3	5	526,618
Merced to Sacramento Valley	110.7	2	161,577
Merced to Natomas	115.2	1	84,081
		Total	772,276

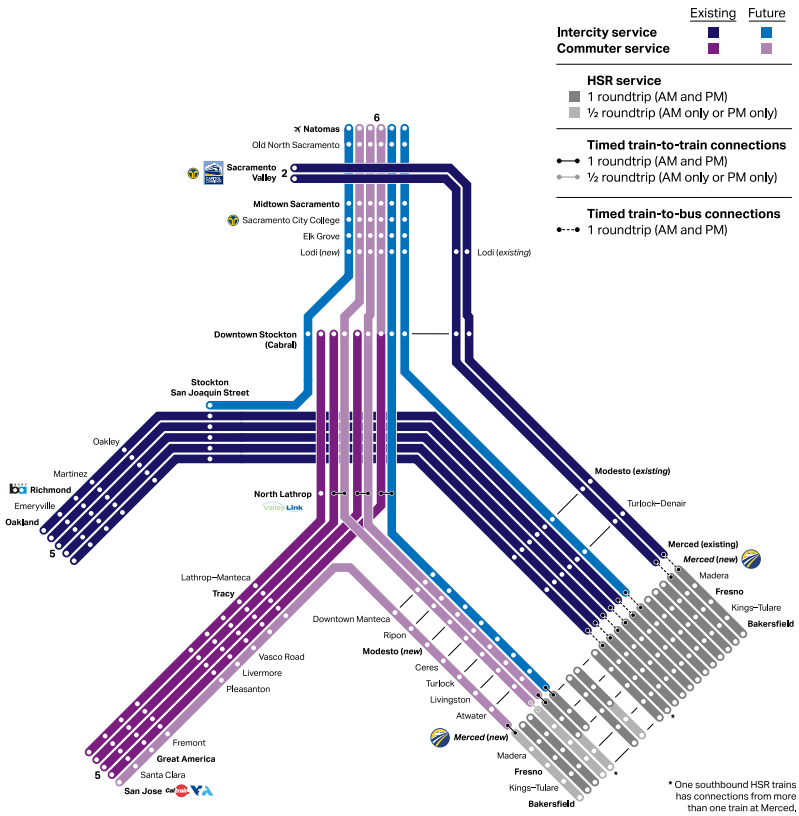


Figure 2. San Joaquins Service under No-Project Scenario (Everyday)

Project (Service to the proposed Merced High-Speed Rail Station)

Table 2. San Joaquins Service under Project Scenario (Everyday)

Trip	One-way Distance (Miles)	Number of Round Trips	Annual Miles
Merced to Oakland	144.3	5	526,618
Merced to Sacramento Valley	110.7	2	161,577
Merced to Natomas	115.2	1	84,081
		Total	772,276

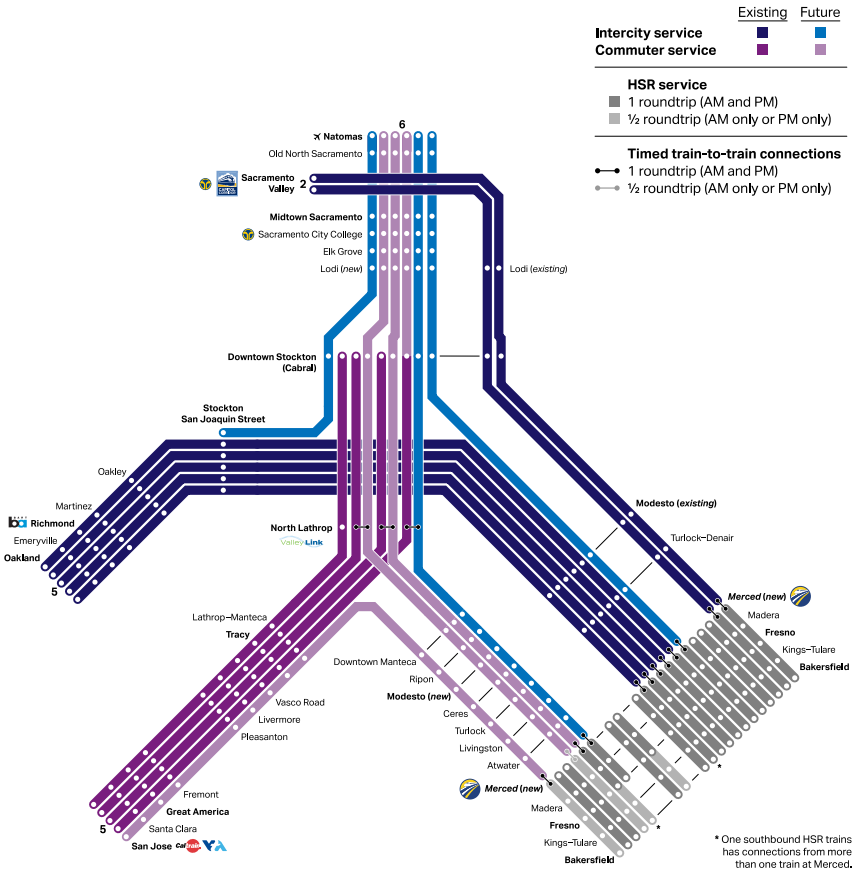


Figure 3. San Joaquins Service under Project Scenario (Everyday)

Cumulative No-Project (Service to the existing Merced Station)

Table 3. San Joaquins Service under Cumulative No-Project Scenario (Everyday)

Trip	One-way Distance (Miles)	Number of Round Trips	Annual Miles
Merced to Oakland	144.3	6	631,942
Merced to Sacramento Valley	110.7	2	161,577
Merced to Natomas	115.2	3	252,242
Merced to Chico	191.5	1	139,765
		Total	1,185,526

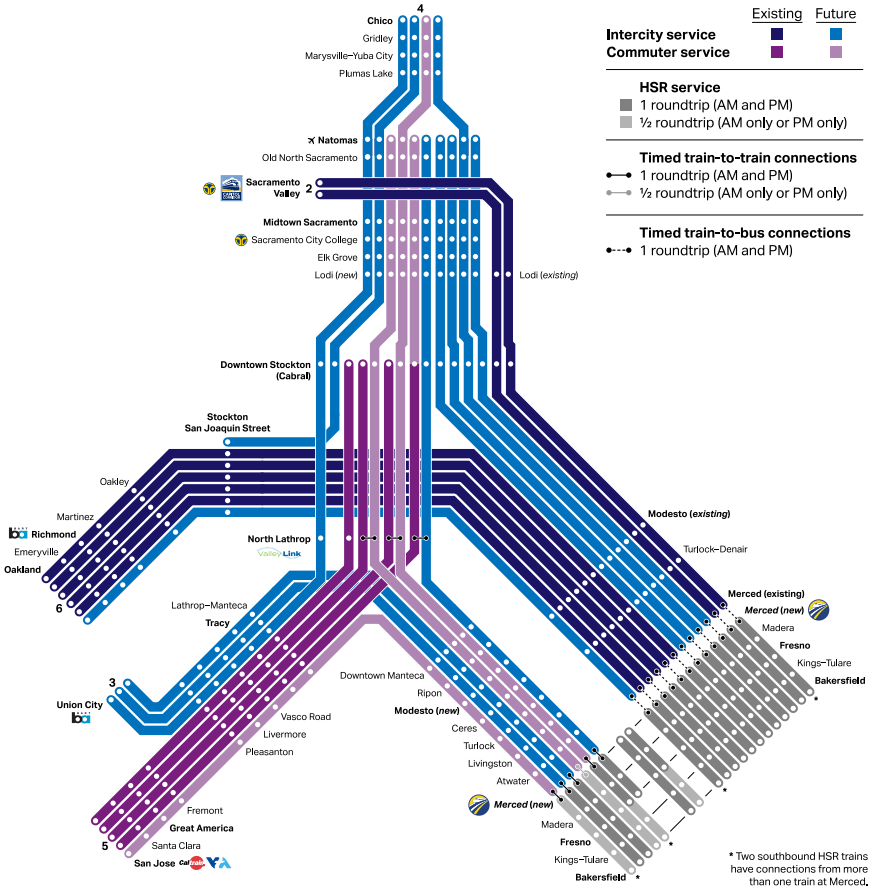


Figure 4. San Joaquins Service under Cumulative No-Project Scenario (Everyday)

Cumulative Project (Service to the proposed Merced High-Speed Rail Station)

Table 4. San Joaquins Service under Cumulative Project Scenario (Everyday)

Trip	One-way Distance (Miles)	Number of Round Trips	Annual Miles
Merced to Oakland	144.3	6	631,942
Merced to Sacramento Valley	110.7	2	161,577
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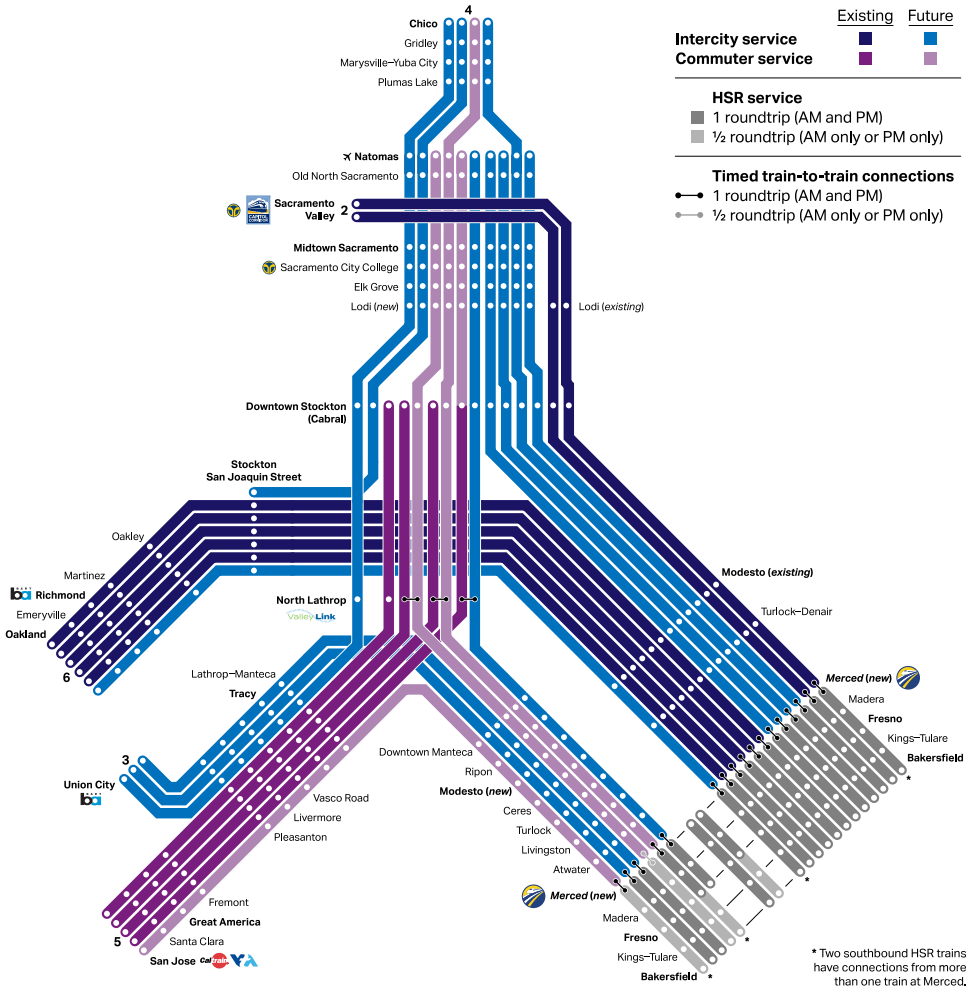

Figure 5. San Joaquins Service under Cumulative Project Scenario (Everyday)

Operations and Maintenance Cost Estimate

Below is a summary of the operations and maintenance costs (FY 2024).

Current (7 Round Trips)

- Operating Mileage 1,560,513
- Annual Cost $126,823,710
- Cost per Mile $81.27

No-Project (8 Round Trips)

- Operating Mileage 772,276
- Annual Cost (40 percent added for efficiency loss and cost variation) $87,868,561
- San Joaquins Portion of Merced Layover and Maintenance Facility $650,000
- Total No-Project Cost $88,518,561
- Cost per mile $114.62

Project (8 Round Trips)

- Operating Mileage 772,276
- Annual Cost (40 percent added for efficiency loss and cost variation) $87,868,561
- San Joaquins Portion of Merced Layover and Maintenance Facility $650,000
- Maintenance of MITC Alignment $500,000
- Total Project Cost $89,018,561
- Cost per mile $115.27

Cumulative No-Project (12 Round Trips)

- Operating Mileage 1,185,526
- Annual Cost (40 percent added for efficiency loss and cost variation) $134,887,633
- San Joaquins Portion of Merced Layover and Maintenance Facility $850,000
- Total No-Project Cost $135,737,633
- Cost per mile $114.62

Cumulative Project (12 Round Trips)

- Operating Mileage 1,185,526
- Annual Cost (40 percent added for efficiency loss and cost variation) $134,887,633
- San Joaquins Portion of Merced Layover and Maintenance Facility $850,000
- Maintenance of MITC Alignment $700,000
- Total Project Cost $136,437,633
- Cost per mile $115.27

Hydrogen Variants

Below is a description of the hydrogen variants.

Hydrogen Variant 1

- Production of green hydrogen on-site to support three trains.
- Purchasing green hydrogen for remaining five trains; not all trains would be fueled in Merced.

Hydrogen Variant 2a

- Purchasing green hydrogen for eight trains with delivery by truck; not all trains will be fueled in Merced.

Hydrogen Variant 2b

- Purchasing grey hydrogen for eight trains with delivery by truck; not all trains will be fueled in Merced.

Hydrogen Variant 3a

- Purchasing green hydrogen for eight trains with delivery by train car; not all trains will be fueled in Merced.

Hydrogen Variant 3b

- Purchasing grey hydrogen for eight trains with delivery by train car; not all trains will be fueled in Merced.

Annual Operating and Maintenance Costs (FY 2024)

Hydrogen Variant 1

- On-Site Production $1,200,000
- Purchase and Delivery $7,300,000
- Storage and Fueling $1,000,000
- Total $9,500,000

Hydrogen Variant 2a

- Purchase and Delivery $11,680,000
- Storage and Fueling $1,000,000
- Total $12,680,000

Hydrogen Variant 2b

- Purchase and Delivery $10,220,000
- Storage and Fueling $1,000,000
- Total $11,220,000

Hydrogen Variant 3a

- Purchase and Delivery $10,512,000
- Storage and Fueling $1,000,000
- Total $11,512,000

Hydrogen Variant 3b

- Purchase and Delivery $9,052,000
- Storage and Fueling $1,000,000

- Total $10,052,000