

**San Joaquin Regional Rail Commission
On-Call Network Integration Services
Task Order 11: South of Merced Integration Study**

Final South of Merced Integration Study Report

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SAN JOAQUIN
REGIONAL
RAIL COMMISSION



San Joaquin
Joint Powers Authority

Prepared by:

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ACRONYMS

BNSF	BNSF Railway
CAHSR	California High-Speed Rail
CHSRA	California High-Speed Rail Authority
COG	Council of Governments
CVRC JPA	Cross Valley Rail Corridor Joint Powers Authority
DMU	Diesel Multiple Unit
ETO	Early Train Operator
FRA	Federal Railroad Administration
FY	Fiscal Year
HSR	High-Speed Rail
KART	Kings Area Rural Transit
KCAPTA	Kings County Area Public Transit Agency
KCAG	Kings County Association of Governments
LRT	Light Rail Transit
MOU	Memorandum of Understanding
NAS	Naval Air Station
O&M	Operation and Maintenance
PTC	Positive Train Control
SJJPA	San Joaquin Joint Powers Authority
SJVR	San Joaquin Valley Railroad
TCAG	Tulare County Association of Governments
TCaT	Tulare County Area Transit
UPRR	Union Pacific Railroad
ZEMU	Zero-Emission Multiple Unit

EXECUTIVE SUMMARY

With the proposed implementation of the California High-Speed Rail Merced to Bakersfield Interim Service (HSR Interim Service) and proposed changes to the San Joaquins Intercity Passenger Rail Service (San Joaquins), the San Joaquin Joint Powers Authority (SJJPA) has been working with state and local agencies to explore opportunities to re-envision public transit connectivity in the San Joaquin Valley.

The South of Merced Integration Study (Study) is focused on three objectives:



Objective 1: Bus Connectivity

Explore options to provide bus connectivity from Hanford, Corcoran, and Wasco to rail service after loss of San Joaquins service.

SJJPA expects to truncate the San Joaquins service at Merced once the HSR Interim Service begins operations (Figure 1 and Figure 2), thereby eliminating rail service to Hanford, Corcoran, and Wasco, which will not have HSR stations. To address this loss of rail service, SJJPA reviewed two models for providing bus connectivity from Hanford, Corcoran, and Wasco to the HSR Interim Service in cooperation with local and regional agencies in Kings, Tulare, and Kern Counties. The two models include:

- SJJPA-Managed Connecting Bus Service (SJJPA would contract with private bus operators to provide connecting bus services)
- Partnership Connecting Bus Service (SJJPA would partner with local agencies to provide integrated connecting bus services)



Source: AECOM 2021

Figure 1: Existing San Joaquins System



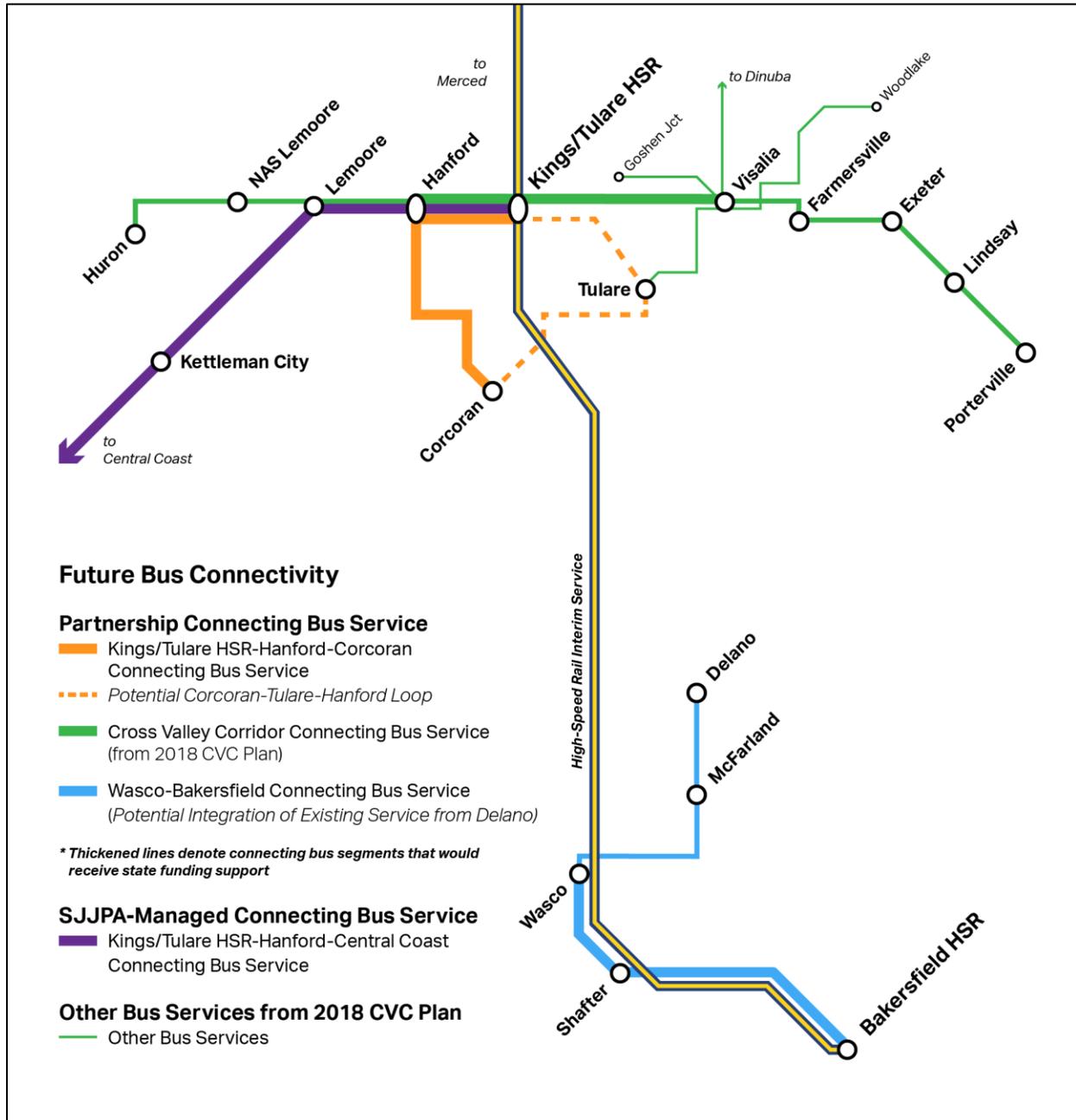
Source: AECOM 2021

Figure 2: Truncated San Joaquins Service, HSR Interim Service, and Cross Valley Rail (Future)

This Study assessed bus connectivity in two regions:

- Kings and Tulare Counties, where Hanford and Corcoran are located
- Kern County, where Wasco is located

Connecting bus services for each region are discussed below and shown on Figure 3.



Source: AECOM 2021

Figure 3: Future Bus Connectivity (after implementation of HSR Interim Service)

Kings and Tulare Counties

The communities of Hanford and Corcoran have been served by the San Joaquin rail service for many years. Additionally, the San Joaquin provided Thruway Bus connections between Visalia and Hanford (Amtrak station) and the Central Coast by contracting with Orange Belt Stages using state funding. Twice daily round trips were run between Central Coast and Visalia via Hanford in Fiscal Year (FY) 2019.

Phase 1 of the Tulare County Association of Governments (TCAG) 2018 Cross Valley Corridor Plan (2018 CVC Plan) includes providing more coordinated bus service along the Cross Valley Corridor (Huron to Porterville via Hanford and Visalia). It included consolidating transit agencies and helping them run more efficiently to serve the three counties of Kings, Tulare, and Fresno. This network includes Huron, Naval Air Station (NAS) Lemoore, Lemoore, Hanford, Farmersville, Exeter, Lindsay, Porterville, Dinuba, Woodlake, and Tulare.

Based on conversations with local partner agencies, it was determined that a partnership for connecting bus service within the **Cross Valley Corridor** would be beneficial. Rather than SJJPA providing a separate service, which would duplicate and compete with existing regional bus service for riders and funding, forming a partnership would not only provide connectivity to the station, but would also improve local and regional transit.

In addition to the bus service envisioned in the 2018 CVC Plan, bus connectivity from both **Corcoran and the Central Coast to the Kings/Tulare HSR Station** were assessed. Based on review and conversations with local partner agencies, it was determined that a partnership for bus service connecting Corcoran, Hanford, and Visalia to the Kings/Tulare HSR Station is preferred. As with the Cross Valley Corridor, rather than SJJPA providing a service that would duplicate and compete with local/regional bus service for both riders and funding, the agencies agreed partnering together and developing an integrated network was most beneficial.

For both connecting bus services within the Cross Valley Corridor and from Corcoran, partnering and pooling resources would not only provide connectivity to the future Kings/Tulare HSR Station, but would also improve local and regional transit serving additional Kings/Tulare communities, including connectivity and frequency for local (non-HSR) trips between Kings and Tulare Counties.

In terms of service to and from the Central Coast the partners concluded that this service would not fit into the local bus service model due to the length of the bus route and associated equipment/amenity requirements and that this service should be managed separately by SJJPA. In the short-term, the partner agencies would like to work toward enhancing bus service between Visalia and Hanford to improve connectivity to the existing San Joaquin service until the HSR Interim Service begins operations.

TCAG, Kings County Association of Governments (KCAG), Kings County Area Public Transit Agency (KCAPTA), Visalia Transit, Tulare County Regional Transit Agency, and SJJPA recommend partnering with the local bus agencies to provide the connectivity and integration for their respective jurisdictions. The partners' recommendations for Kings and Tulare Counties are below.

OBJECTIVE 1: RECOMMENDATIONS FOR KINGS AND TULARE COUNTIES

- ✓ Execute a memorandum of understanding (MOU) to contain two components—bus and Cross Valley Rail— with TCAG, KCAG, KCAPTA, Visalia Transit, and Tulare County Regional Transit Agency to jointly provide bus connectivity. The MOU will state each agency’s responsibilities and will describe the 2018 CVC Plan and SJJPA’s efforts for network integration with future California High-Speed Rail (CAHSR).
- ✓ Continue to provide direct connections to downtown Hanford and downtown Corcoran to intercity passenger rail service, by working to secure state funds to enable timed local/regional operated bus connections from Corcoran and Hanford to the Kings/Tulare HSR Station, while increasing local/regional operated bus connectivity between the Kings/Tulare HSR Station and Visalia.
- ✓ Partner with the following existing local/regional transit operators to operate connecting bus services within Kings and Tulare Counties: KCAPTA, Visalia Transit, and Tulare County Regional Transit Agency. SJJPA intends to support a larger, more frequent, and coordinated local/regional operated bus service that will coincide with the opening of HSR Interim Service. This partnership to enhance bus service will be key toward the implementation of Phase 1 of the 2018 CVC Plan.
- ✓ For connecting bus service between the Kings/Tulare HSR Station and the Central Coast service, operate as an SJJPA-managed service.
- ✓ In the short-term, work with KCAPTA and Visalia Transit to enhance bus service between Visalia and Hanford to improve connectivity to the existing San Joaquins service until the HSR Interim Service begins operations.

Kern County

The community of Wasco has been served by the San Joaquins rail service for many years. No Thruway Bus connections have been provided from Wasco. With the loss of the San Joaquins service to the Wasco Station, SJJPA has been coordinating with the City of Wasco, Kern Council of Governments (COG), and Kern Transit on bus connectivity between Wasco and the Bakersfield HSR Station. As with the Kings and Tulare County partners, Kern County partner agencies concluded that running two separate bus systems in the Wasco-Bakersfield corridor is not desirable. Rather, leveraging existing Kern Transit bus service would not only avoid competing bus services, but would also provide an opportunity to integrate with existing service to McFarland and Delano. Therefore, it was determined that a partnership model for this bus connection is beneficial.

Through this coordination, SJJPA and Kern Transit are working toward the development of an MOU. SJJPA will also continue coordination with Kern Transit to find opportunities for near-term partnerships, including a bus connection between Bakersfield and the Antelope Valley.

The partners’ recommendations for Kern County are below.

OBJECTIVE 1: RECOMMENDATIONS FOR KERN COUNTY

- ✓ Execute an MOU with Kern Transit to jointly provide bus connectivity. The MOU would state each agency's responsibilities and SJJPA's efforts for network integration with future HSR Interim Service.
- ✓ Continue to provide a direct connection from Wasco to intercity passenger rail service by working to secure state funds to enable timed local/regional operated bus connections from Wasco to the Bakersfield HSR Station.
- ✓ Through this coordination, work to find opportunities for near-term partnerships, including a bus connection between Bakersfield and the Antelope Valley.

Objective 2: Cross Valley Rail Project

Review and assist in the integration and implementation of the Cross Valley Rail Project.

The Cross Valley Rail Project would establish passenger rail service along the 75-mile existing rail corridor between Huron and Porterville in Kings and Tulare Counties that could connect downtown Hanford, downtown Visalia, and other Kings/Tulare cities to the future Kings/Tulare HSR Station. Union Pacific Railroad (UPRR) currently owns the right-of-way and the San Joaquin Valley Railroad (SJVR) operates on most of the corridor except for a 1-mile portion of the UPRR mainline near Goshen. Existing track conditions are not suitable for passenger rail operations.

TCAG completed the CVC Plan in March 2018. Cross Valley Rail is supported in Tulare County and Kings County General Plans and is included in the 2018 State Rail Plan.

TCAG, KCAG, KART, Visalia Transit, Tulare County Regional Transit Agency, and SJJPA in partnership recommend the following related to the rail component studied in the CVC Plan.

OBJECTIVE 2: RECOMMENDATIONS

- ✓ Execute an MOU to commit to work in partnership with TCAG and KCAG to plan, secure funding, and implement Cross Valley Rail.
- ✓ In the MOU, identify the following steps for the implementation of Cross Valley Rail:
 - Phase 1 will secure environmental clearance and right-of-way protection, conduct site selection, negotiate with freight railroads, and begin transit stations in communities without existing transit centers.
 - Phase 2 will implement passenger rail service between Lemoore and Visalia (with stations at Hanford and Kings/Tulare HSR Station).
 - Phase 3 will extend passenger rail service to Huron and Porterville with additional intermediate stations at NAS Lemoore, Farmersville, Exeter, and Lindsey.
- ✓ In the MOU, identify SJJPA as a potential operating agency for Cross Valley Rail.

- ✓ Acknowledge that additional and more detailed agreements will be needed and that parties would agree to work together toward achieving common agreed upon goals.

Objective 3: BNSF Slots

Assess possible complementary regional uses for existing BNSF slots.

SJJPA considered the use of existing and potentially freed up rail slots on the BNSF Railway (BNSF) corridor. The concepts included investigation of the feasibility for local or regional rail service that could operate once CAHSR is in service and the San Joaquin service is no longer operating south of Merced. SJJPA coordinated with TCAG, KCAG, KCAPTA, Visalia Transit, Tulare County Regional Transit Agency, Kern Transit, and Kern COG for consideration of this objective. SJJPA in partnership with the local entities determined that implementation of regional commuter rail service using BNSF slots was not recommended to be pursued in the foreseeable future and that the focus should be on bus connections to HSR Interim Service and the implementation of Cross Valley Rail.

This conclusion was based on the following:

- High capital and operating and maintenance costs
- Competing with HSR markets and services
- Lack of regional support

OBJECTIVE 3: RECOMMENDATIONS

- ✓ Use of the BNSF slots for regional commuter rail service does not appear to be feasible in the foreseeable future. Therefore, do not further study commuter rail at this time.

1 INTRODUCTION

With the proposed implementation of the California High-Speed Rail Merced to Bakersfield Interim Service (HSR Interim Service) and proposed changes to the San Joaquins Intercity Passenger Rail Service (San Joaquins), the San Joaquin Joint Powers Authority (SJJPA) has been working with state and local agencies to explore opportunities to re-envision public transit connectivity in the San Joaquin Valley.

This South of Merced Integration Study (Study) is focused on three objectives:



2 BACKGROUND

SJJPA is the Managing Agency for the San Joaquins, which provides service between Oakland/Sacramento and Bakersfield, as shown on Figure 4. SJJPA has been closely coordinating with the California High-Speed Rail Authority (CHSRA) and the California State Transportation Agency on the HSR Interim Service, which will implement high-speed rail service between Merced and Bakersfield. The HSR Interim Service is scheduled to be operational by 2029, and SJJPA is expected to be the operating agency.

2.1 Changes to San Joaquins Service

As shown on Figure 5, the HSR Interim Service will replace the existing San Joaquins service between Merced and Bakersfield. Merced will be the new southern terminus for the San Joaquins and will serve as a transfer point between the new HSR Interim Service and the truncated San Joaquins service. The implementation of the HSR Interim Service will remove passenger rail service for the Cities of Hanford, Corcoran, and Wasco, which have been served by the San Joaquins for many years.

While Hanford, Corcoran, and Wasco will no longer have direct access to passenger rail service, SJJPA is investigating how best to provide these communities with a high-quality and convenient connections to the new HSR Interim Service. To explore ways to continue to serve this demand as well a future demand from the initiation of the HSR Interim Service, this report evaluates strategies to provide connectivity from Hanford, Corcoran, and Wasco to the HSR Interim Service.

2.2 Pre-Pandemic Travel Patterns

To understand the existing demand and travel patterns of the San Joaquins in Kings, Tulare, and Kern Counties, San Joaquins ridership data for the Hanford, Corcoran, and Wasco San Joaquins Stations were documented and analyzed, along with the ridership between key origin-destination pairs.

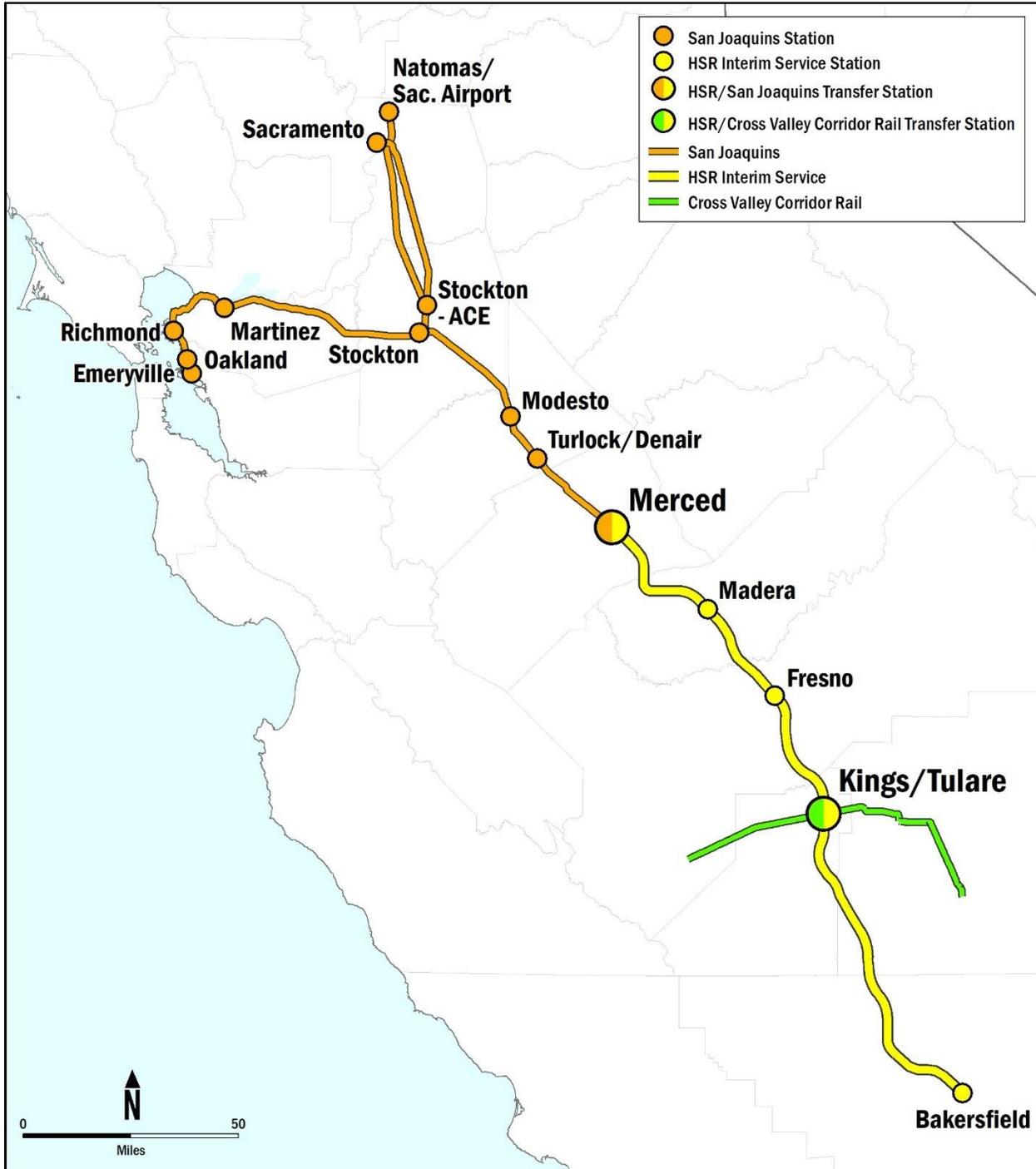
According to the SJJPA 2021 Business Plan, in Fiscal Year (FY) 2019, 182,143 passengers boarded or alighted at the Hanford San Joaquins Station (Hanford Station). In FY 2018, the most popular destinations for people utilizing the Hanford Station was Fresno (62,695 riders in FY 2018), followed by Sacramento (12,054 riders), Corcoran (9,862 riders), and Los Angeles Union Station (9,311 riders). With a population of just over 50,000 in the City Hanford (located in Kings County), there is a relatively high transit activity at the Hanford Station, which indicates that in addition to Hanford residents, the residents of the nearby communities such as Tulare and Visalia in Tulare County also utilize the Hanford Station. Additionally, commuters have historically ridden the San Joaquins for commuting between Hanford and Fresno.

There were 26,993 passengers in FY 2019 that boarded or alighted at the Corcoran San Joaquins Station (Corcoran Station), with the most popular destination being Hanford Station (9,862 riders in FY 2018) indicating a somewhat significant level of intercity travel demand within Kings County. The Wasco San Joaquins Stations (Wasco Station) had 39,411 boardings and alightings in FY 2019.



Source: AECOM 2021

Figure 4: Existing San Joaquins Service



Source: AECOM 2021

Figure 5: Truncated San Joaquins Service, HSR Interim Service, and Cross Valley Corridor Rail (Future)

3 OBJECTIVE 1: BUS CONNECTIVITY

Explore options to provide bus connectivity from Hanford, Corcoran, and Wasco to rail service after loss of San Joaquins service

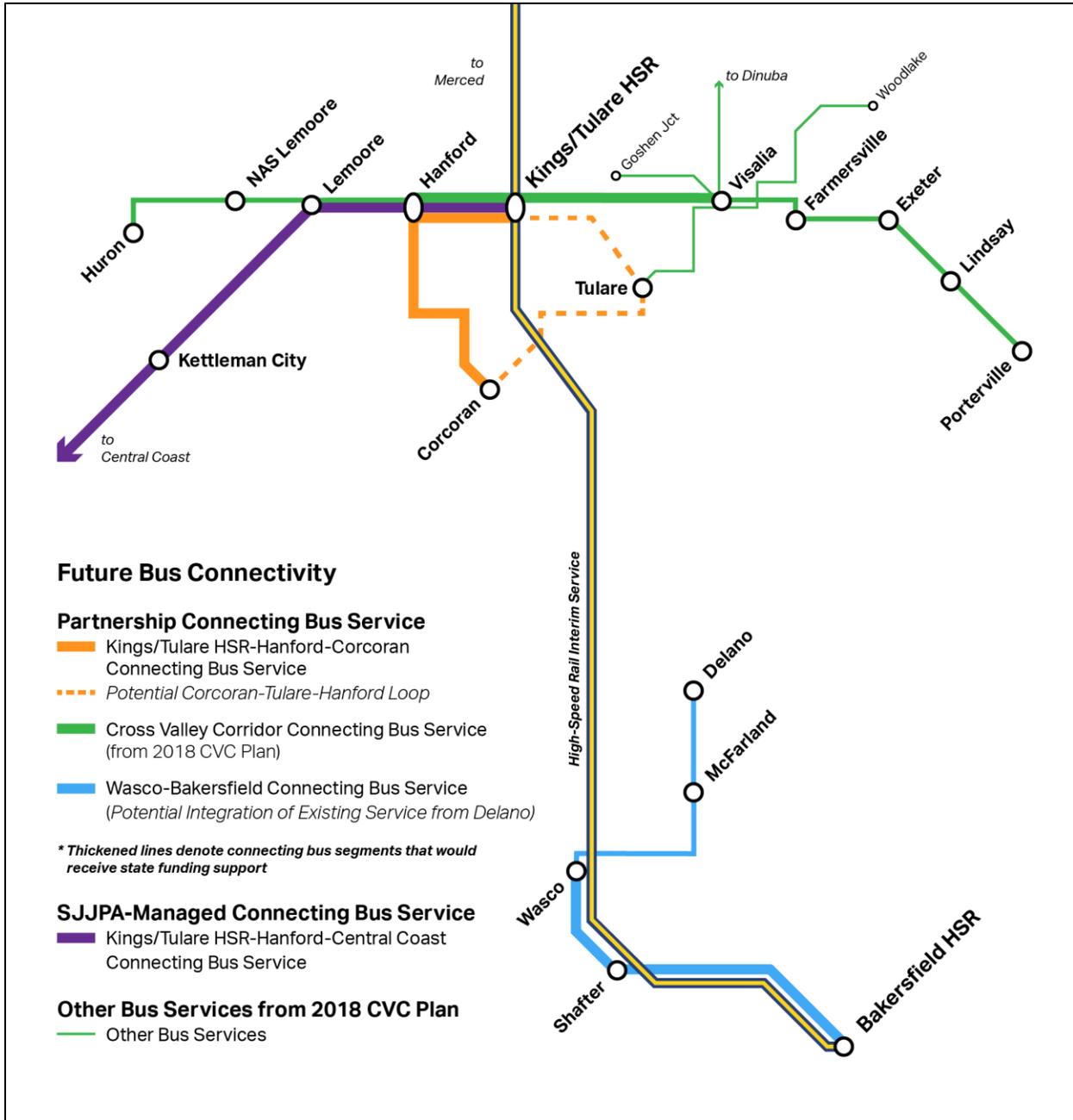
SJJPA expects to truncate the San Joaquins at Merced once the HSR Interim Service begins operations (Figure 4 and Figure 5), thereby eliminating rail service to Hanford, Corcoran, and Wasco, which will not have HSR stations. To address this loss of rail service, SJJPA reviewed two models for providing bus connectivity from Hanford, Corcoran, and Wasco to the HSR Interim Service in cooperation with local and regional agencies in Kings, Tulare, and Kern Counties.¹

The two models are described below:

- **SJJPA-Managed Connecting Bus Service.** The first model, in which SJJPA would contract for bus services with bus operating companies, would be similar to how Amtrak currently contracts for bus services as part of the SJJPA-Amtrak Master Operating Agreement for Thruway Bus services. The primary purpose of this type of connecting bus service would be to provide connectivity to and from future HSR stations. A secondary purpose could be to provide general bus service along the routes for passengers traveling between bus stops (and not using the service to connect to HSR stations). This type of bus service would not be coordinated with existing bus services and would be entirely managed and funded by SJJPA. As discussed in Appendix A, the operational costs of this model are high.
- **Partnership Connecting Bus Service.** For the second model, SJJPA would partner with local agencies to leverage existing regional bus systems to provide connecting bus service to HSR stations while enhancing the existing service. In this model, SJJPA would establish agreements with local agencies to have local bus operators increase service levels to allow for timed connections with HSR stations, in which buses would meet HSR trains on a pulsed schedule at levels desired by SJJPA. SJJPA would provide a commensurate amount of funding support to match desired service levels. This model has the added benefit of enhancing bus service for all users since increased service levels to existing bus services would benefit the system as whole. This model can also provide costs savings since it would be leveraging existing bus operation resources and can lead to more efficient use of bus resources. However, cost estimates for this model are not provided in this Study, as cost/service levels would need to be assessed and negotiated with the local bus providers. The cost to the state (through SJJPA) would be included as part of future, more detailed agreements developed between SJJPA and partner agencies. The outreach process conducted in relationship to the consideration of partnerships is discussed in Appendix B.

¹ It should be noted that the other cities with San Joaquins stations between (and including) Merced and Bakersfield (Merced, Madera, Fresno, and Bakersfield) will have HSR stations and will have considerably improved connectivity and accessibility once HSR Interim Service begins, and that Tulare County and parts of Kings County will also have improved connectivity and accessibility with the new Kings/Tulare HSR Station which will reduce access times to Tulare County.

Figure 6 shows the connecting bus services envisioned with the commencement of HSR Interim Service. Of the four connecting bus services envisioned, three are recommended to be partnership based, while one would be managed by SJJPA. Each connecting bus service is described below in detail along with analysis as to why a given model was selected.



Source: AECOM 2021

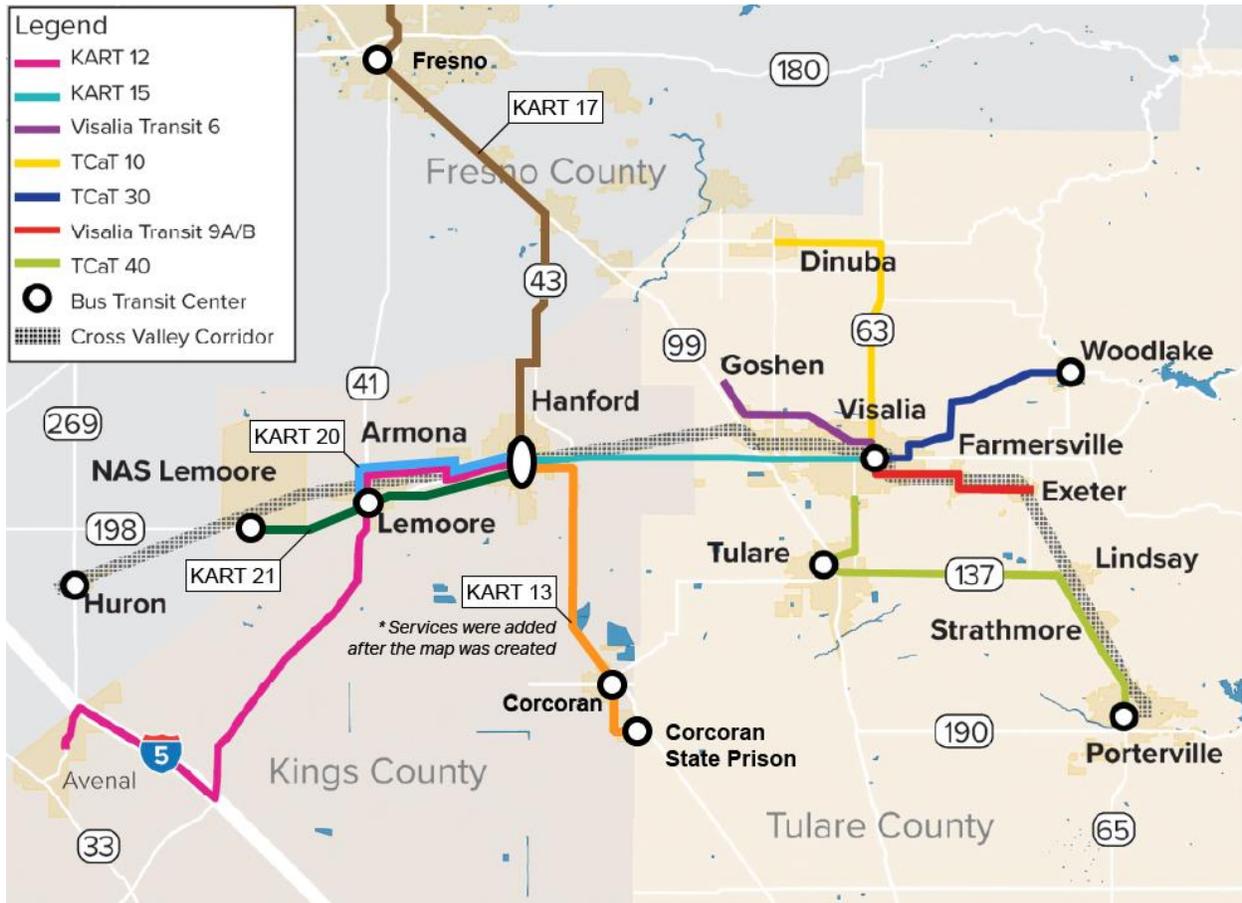
Figure 6: Future Bus Connectivity (after implementation of HSR Interim Service)

3.1 Kings and Tulare Counties

The communities of Hanford and Corcoran in Kings County have been served by the San Joaquin rail service for many years. Additionally, a Thruway Bus service is provided between Visalia in Tulare County and Hanford as well as the Central Coast. This service was previously provided by Orange Belt Stages, a bus operating company that is no longer in business. Currently, Amtrak is providing this Thruway Bus service by contracting a private bus operator separate from the SJJPA-Amtrak Master Agreement. One daily round trip currently runs between Visalia and Central Coast via Hanford.

3.1.1 Existing Bus Services

Several public agencies provide local and regional bus service in Kings and Tulare Counties. They include Kings County Area Public Transit Agency (KCAPTA), Visalia Transit, and Tulare County Area Transit (TCaT). Figure 7 shows the regional bus service routes that connect the various communities of the two counties. Local routes within each community are not shown.



Source: 2018 CVC Plan / Annotation of Map by AECOM shows KART Route 13 (Hanford-Corcoran-Corcoran State Prison)

Figure 7: Existing Regional Bus Service in Kings and Tulare Counties

Two Kings Area Rural Transit (KART) routes (provided by KCAPTA) operate in the corridors being considered for connecting bus service in this Study and include the following:

- KART's Route 13 bus service runs between Hanford and Corcoran (and on to Corcoran State Prison), with two rounds trip each weekday.
- KART's Route 15 bus service runs between Hanford and Visalia, with three round trips each weekday.

3.1.2 Recommended Bus Connectivity

Based on conversations with local partner agencies, it was determined that a partnership model for two connecting bus service is beneficial compared to implementing a separate SJJPA-managed service. These two services would run within the following corridors:

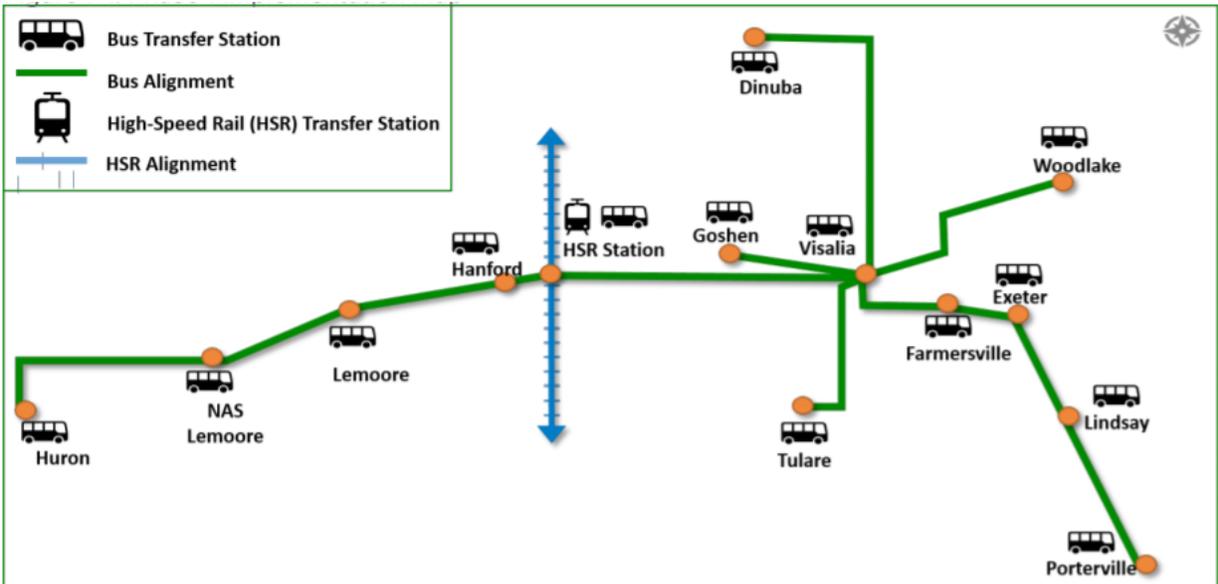
- The Cross Valley Corridor (roughly defined by an existing freight rail corridor that runs between Huron to the west and Porterville to the southeast via Hanford and Visalia)
- Between the Kings/Tulare HSR Station and Corcoran via Hanford

However, for a third corridor running from Kings/Tulare HSR Station to the Central Coast, the partners concluded that a connecting bus service should be managed by SJJPA.

All three connecting bus services are described below, along with the rationales for why the partners preferred the partnership model or the SJJPA-managed model.

3.1.2.1 Cross Valley Corridor Connecting Bus Service (Partnership)

Phase 1 of the Tulare County Association of Governments' (TCAG) 2018 Cross Valley Corridor Plan (2018 CVC Plan) envisioned a network of enhanced bus services to the communities of Huron, Naval Air Station (NAS) Lemoore, Lemoore, Hanford, Farmersville, Exeter, Lindsay, Porterville, Dinuba, Woodlake, and Tulare (Figure 8). The spine of this system of coordinated bus services would be along the Cross Valley Corridor and would be implemented prior to passenger rail, which is also envisioned by the 2018 CVC Plan for the corridor. Additionally, the 2018 CVC Plan included a recommendation to consolidate transit agencies to increase bus operational efficiency in the three counties of Kings, Tulare, and Fresno.



Source: 2018 CVC Plan

Figure 8: Proposed Phase 1 Bus Services from the 2018 Cross Valley Corridor Plan

Route Characteristics and Service Planning

Connecting bus service within the Cross Valley Corridor, referred to in this Study as the “Cross Valley Corridor Connecting Bus Service,” was proposed in the 2018 CVC Plan. It is relevant to this Study because it includes service to Hanford and Visalia, which is currently serviced by a Thruway Bus. The Cross Valley Corridor Connecting Bus Service would serve 10 bus stops (which would be converted to rail stations in future phases) and provide both eastbound and westbound service. The partnership to augment this service would apply to the segment between Hanford and Visalia via the Kings–Tulare HSR Station. Several of the proposed bus stops would provide connections to local transit services, while the Kings/Tulare HSR bus stop would provide a direct connection to the HSR Interim Service. As shown in Table 1, the full route would be approximately 90 miles in length and have an estimated end-to-end travel time of 2 hours and 14 minutes.

Table 1: Cross Valley Corridor Bus Service and Route Characteristics

	Stop	Distance (miles)	Estimated Travel Time (minutes)	City/Town Population (2019, ACS)	Connections
1	Huron Lassen Avenue	0	0	7,281	—
2	NAS Lemoore Naval Air Station	15	15	Located in a County Area	—
3	Lemoore Lemoore Depot – East Street	24	29	26,725	KART
4	Hanford Transit Center*	33	44	56,910	KART
5	Kings/Tulare HSR Lacey Boulevard at Ponderosa Road	36	53	Located in a County Area	CAHSR
6	Visalia Visalia Transit Center	56	78	134,605	TCaT, KART, Visalia Transit
7	Farmersville Farmersville Boulevard and Visalia Road	63	91	10,703	Visalia Transit
8	Exeter East Palm Street and North E Street	67	99	10,485	Visalia Transit
9	Lindsay City Hall/Library – Mirage Avenue	76	114	13,463	TCaT
10	Porterville Porterville Transit Center	87	131	59,599	TCaT

Source: AECOM 2021 (Table based on route from 2018 CVC Plan)

Note: Rows in gray indicate the segment of the corridor that would be considered for state funding support.

*Assumes future location of Hanford Transit Center at 7th Street and Harris Street.

Based on the current and past Thruway Bus services connected to the San Joaquins between Hanford and Visalia, SJJPA would work with the partners to obtain state funding support for increased bus service between these two cities, as well as to incorporate a new bus stop at the future Kings/Tulare HSR Station. The length of this segment of the bus route would be approximately 28 miles.

According to the schedule created by the Early Train Operator (ETO) for the HSR Interim Service, HSR trains would run on an hourly pulse schedule. A total of 18 trains in each direction per day would serve the Kings/Tulare HSR Station, or 36 trains total per day (Table 2 and Table 3).

Table 2: Northbound Schedule for HSR Interim Service (Kings/Tulare HSR Station)

Station	ST-2	ST-4	102	104	106	108	110	112	114	116
Bakersfield	/	/	6:19	7:19	8:19	9:19	10:19	11:19	12:19	13:19
Kings Tulare	/	/	6:53	7:53	8:53	9:53	10:53	11:53	12:53	13:53
Fresno	5:09	6:09	7:09	8:09	9:09	10:09	11:09	12:09	13:09	14:09
Madera	5:21	6:21	7:21	8:21	9:21	10:21	11:21	12:21	13:21	14:21
Merced	5:42	6:42	7:42	8:42	9:42	10:42	11:42	12:42	13:42	14:42

Station	118	120	122	124	126	128	130	132	ST-6	ST-8
Bakersfield	14:19	15:19	16:19	17:19	18:19	19:19	20:19	21:19	22:19	23:19
Kings Tulare	14:53	15:53	16:53	17:53	18:53	19:53	20:53	21:53	22:53	23:51
Fresno	15:09	16:09	17:09	18:09	19:09	20:09	21:09	22:09	23:07	/
Madera	15:21	16:21	17:21	18:21	19:21	20:21	21:21	22:21	/	/
Merced	15:42	16:42	17:42	18:42	19:42	20:42	21:42	22:42	/	/

Source: California High-Speed Rail Authority 2020 Business Plan (report done by the Early Train Operator)

Table 3: Southbound Schedule for HSR Interim Service (Kings/Tulare HSR Station)

Station	ST-1	ST-3	101	103	105	107	109	111	113	115
Merced	/	/	6:08	7:08	8:08	9:08	10:08	11:08	12:08	13:08
Madera	/	/	6:30	7:30	8:30	9:30	10:30	11:30	12:30	13:30
Fresno	/	5:41	6:41	7:41	8:41	9:41	10:41	11:41	12:41	13:41
Kings Tulare	4:58	5:58	6:58	7:58	8:58	9:58	10:58	11:58	12:58	13:58
Bakersfield	5:30	6:30	7:30	8:30	9:30	10:30	11:30	12:30	13:30	14:30

Station	117	119	121	123	125	127	129	131	ST-5	ST-7
Merced	14:08	15:08	16:08	17:08	18:08	19:08	20:08	21:08	22:08	23:08
Madera	14:30	15:30	16:30	17:30	18:30	19:30	20:30	21:30	22:30	23:30
Fresno	14:41	15:41	16:41	17:41	18:41	19:41	20:41	21:41	22:41	23:41
Kings Tulare	14:58	15:58	16:58	17:58	18:58	19:58	20:58	21:58		
Bakersfield	15:30	16:30	17:30	18:30	19:30	20:30	21:30	22:30		

Source: California High-Speed Rail Authority 2020 Business Plan (report done by the Early Train Operator)

The HSR Interim Service schedule coordinates the northbound and southbound trains so that they arrive/depart at times very close to each other. For example, the northbound train from Kings/Tulare HSR Station would depart at 6:53 a.m., while the southbound trains from the same station would depart at 6:58 a.m. Cross Valley Corridor buses coming from the west and coming

from the east could arrive a few minutes before 6:53 a.m., so passengers from either bus could connect to either the northbound or southbound HSR trains within a few minutes of their arrival. The HSR Interim Service schedule carries this pattern for all the daily 18 round trips. Given this, this Study has assumed an average 10-minute transfer time for the Cross Valley Corridor Connecting Bus Service

SJJPA and the partners would need to determine how many of these couplets of HSR trains should be connected with Cross Valley Corridor Connecting Bus Service buses. Table 4 shows three service scenarios with differing levels of connecting bus service – light, moderate, and robust.

Table 4: Connecting Bus Service Level Scenarios

Light	Moderate	Robust
4 round trips per day	8 round trips per day	12 round trips per day
Peak service only	Approximately every 120 minutes (or every 2 hours)	Approximately every 60 minutes (or every hour), though some day hours would be skipped
Connects from/to select HSR trains in peak periods only. Similar to the current service level of comparable local bus services.	Connects from/to about half of HSR trains. Similar to the current service level of Amtrak San Joaquins.	Coordinated 60-minute pulse schedule during peak periods plus significant off-peak service with HSR trains.

Source: AECOM 2021

Travel times were also compared from downtown Hanford to other cities in the San Joaquin Valley to assess improvements or deterioration of intercity travel times from downtown Hanford² when San Joaquins is no longer available and the HSR Interim Service combined with connecting bus service is implemented (Table 5). Travel times would significantly improve from downtown Hanford to Merced and Bakersfield, while a slight improvement would be realized to Fresno (currently the biggest market for Hanford on the San Joaquins). Travel times between Hanford and Corcoran would take approximately 6 minutes longer than current San Joaquins service. Travel times from Hanford to Wasco would significantly deteriorate, but demand between these two cities is small as indicated by pre-pandemic San Joaquins ridership. According to origin-destination data provided by Amtrak, only 806 trips were taken during FY 2017 between the two cities on the San Joaquins, which is just over two trips per day.

² It should be noted that the Hanford Station serves passengers throughout Kings and Tulare counties. This study only focused on the impacts of trips from downtown Hanford. For many potential riders (like those coming from Tulare County) the HSR trip times would be considerably better since even the access to the future Kings/Tulare HSR station would be less than getting to the existing downtown Hanford Station.

Table 5: Travel Time Comparisons for Trips Originating in Downtown Hanford

Origin – Destination	Existing (via San Joaquins)	Future (via Bus Only)	Future (via HSR + Bus)
Hanford – Merced	1 hour, 40 minutes	N/A	1 hour, 6 minutes*
Hanford – Fresno	40 minutes	N/A	36 minutes*
Hanford – Corcoran	20 minutes	26 minutes	N/A
Hanford – Wasco	55 minutes	N/A	1 hour, 43 minutes**
Hanford - Bakersfield	1 hour, 20 minutes	N/A	53 minutes*

Source: AECOM 2021

*10 minute HSR-bus transfer time is assumed for origin-destination pairs that require one transfer.

** 20 minute HSR-bus transfer time is assumed for origin-destination pairs that require two transfers.

Benefits

Based on conversations with local partner agencies, it was determined that a partnership for connecting bus service within the Cross Valley Corridor would be beneficial. Rather than SJJPA providing a separate service, which would duplicate and compete with existing regional bus service for riders and funding, forming a partnership would not only provide connectivity to the station, but would also improve local and regional transit.

Benefits of pursuing a partnership for the Cross Valley Corridor Connecting Bus Service include:

- The 2018 CVC Plan already provides a vision for a bus network, including a route that would connect Hanford, Kings/Tulare HSR, and Visalia. A partnership would jump start implementation of Phase 1 of the 2018 CVC Plan.
- Leveraging the resources of existing bus systems, in this case KCAPTA and potentially Visalia Transit, avoids adding another bus operating entity, which would just compete for riders and funding.
- Utilizing existing bus operating agencies to provide service can lead to increasing efficiencies and reducing lower overall costs.
- By pooling resources, increased frequencies can be provided, improving connectivity to the future Kings/Tulare HSR Station, while also benefiting all riders (including those not making an HSR trip that are traveling within and between Kings and Tulare Counties) with more convenient service.
- A partnership would bring state resources to support the service in an area where public transportation dollars are limited.

3.1.2.2 Kings/Tulare HSR–Hanford–Corcoran Connecting Bus Service (Partnership)

In addition to connecting the City of Hanford to the future Kings/Tulare HSR Station, connecting Corcoran to the Kings/Tulare HSR Station is important since direct rail service will no longer serve the city with the loss of the San Joaquins station. Therefore, SJJPA and the local partners are recommending a second partnership for connecting bus service that would link Corcoran to both downtown Hanford and to the Kings/Tulare HSR Station. While this bus service is not envisioned in the 2018 CVC Plan, it would integrate seamlessly with it, as the proposed line would also connect directly with the Cross Valley Rail Connecting Bus Service (Figure 9).



Source: AECOM 2021

Figure 9: Kings/Tulare HSR–Hanford–Corcoran Connecting Bus Service

Route Characteristics and Service Planning

The Kings/Tulare HSR–Hanford–Corcoran Connecting Bus Service would serve three stops, connecting Corcoran and Hanford to the Kings/Tulare HSR Station as shown on Figure 9. Both the proposed Corcoran and Hanford bus stops would provide connections to local transit services, while the Kings/Tulare HSR stop would provide a direct connection to the HSR Interim Service. As shown in Table 6, the full route would be 23 miles in length and have an estimated end-to-end travel time of 36 minutes.

Table 6: Kings/Tulare HSR–Hanford–Corcoran Connecting Bus Service and Route Characteristics

	Stop	Distance (miles)	Estimated Travel Time (minutes)	City/Town Population (2018, ACS)	Connections
1	Corcoran Corcoran Station	0	0	21,676	Corcoran Area Transit
2	Hanford Transit Center*	20	27	56,910	KART, Cross Valley Corridor
3	Kings/Tulare HSR Lacey Boulevard at Ponderosa Road	23	36	Located in a County Area	CAHSR, KART

Source: AECOM 2021

Note: This entire service would be considered for state funding support.

**Assumes future location of Hanford Transit Center at 7th Street and Harris Street.

The City of Tulare is not currently served by the San Joaquin or a Thruway Bus service. With a population over 64,000 within the city limits, there is a strong potential travel market between Tulare and the Kings/Tulare HSR Station. To provide Tulare with a direct connection to the Kings/Tulare HSR Station, a potential extension for the proposed Corcoran-Hanford Bus Service was identified during conversations with KCAG, KCAPTA, and Visalia Transit. The potential extension would create a “bus loop” route that would serve the City of Tulare while providing increased regional connectivity between the Cities of Hanford, Corcoran, and Tulare. The proposed bus loop route would offer bus service in both directions: one bus running in the clockwise direction and the other running in the counterclockwise direction. As shown in Table 7, the full route would be 62 miles in length and have an estimated end-to-end travel time of 1 hour and 24 minutes.

Table 7: Kings/Tulare HSR–Hanford–Corcoran Connecting Bus Service and Route Characteristics With Tulare Loop Extension

	Stop	Distance (miles)	Estimated Travel Time (minutes)	City/Town Population (2018, ACS)	Connections
<i>Loop continues from/to Tulare</i>					
1	Corcoran Corcoran Station	0	0	21,676	Corcoran Area Transit
2	Hanford Transit Center*	20	27	56,910	KART, Cross Valley Corridor
3	Kings/Tulare HSR Lacey Boulevard at Ponderosa	23	36	Located in a County Area	CAHSR, KART
4	Tulare Tulare Transit Center	43	58	64,475	TCaT, TIME Tulare Transit, Visalia Transit
1	Corcoran Corcoran Station	62	84	21,676	Corcoran Area Transit
<i>Loop continues from/to Hanford</i>					

Source: AECOM 2021

Note: Rows in gray indicated the segment of the corridor that would be considered for state funding support.

*Assumes future location of Hanford Transit Center at 7th Street and Harris Street.

As with the Cross Valley Corridor Connecting Bus Service, connecting bus service to/from Corcoran would also connect to the Kings/Tulare HSR Station. Therefore, coordinating timed connections with the pulse-scheduled HSR trains would need to have buses arriving at the Kings/Tulare HSR Station a few minutes before the northbound and southbound HSR trains (which would depart at :53 and :58 of every other hour, respectively, for all 18 HSR round trips). See Table 2 and Table 3 for the HSR Interim Service schedule. Given this schedule, this Study has assumed an average 10-minute transfer time for the Kings/Tulare HSR-Hanford-Corcoran Connecting Bus Service. As was the case with the Cross Valley Corridor Connecting Bus Service, SJJPA and the partners would need to determine how many of these couplets of HSR trains would need to meet with connecting bus service.

Travel times were compared from downtown Corcoran to other cities in the San Joaquin Valley to assess improvements or deterioration of intercity travel times when San Joaquins is no longer available and the HSR Interim Service combined with connecting bus service is implemented (Table 8). Travel times would significantly improve from Corcoran to Merced, while staying about the same to Bakersfield. Travel times from Fresno would slightly increase but not significantly. Travel times from Corcoran to Hanford would take approximately 9 minutes longer than current San Joaquins service. Travel times from Corcoran to Wasco would significantly increase. However, demand between these two cities is small as indicated by pre-pandemic San Joaquins ridership. FY 2017 San Joaquins ridership data indicate very low demand for trips between Corcoran and Wasco to justify providing new bus service between these cities. In FY 2017, only 113 trips occurred between Corcoran and Wasco on the San Joaquins, which is less than one trip per day.

Table 8: Travel Time Comparisons for Trips Originating in Downtown Corcoran

Origin – Destination	Existing (via San Joaquins)	Future (via Bus Only)	Future (via HSR + Bus)
Corcoran – Merced	1 hour, 59 minutes	N/A	1 hour, 33 minutes*
Corcoran – Fresno	58 minutes	N/A	1 hour, 3 minutes*
Corcoran – Hanford	17 minutes	27 min (Note: It is 9 minutes from Hanford to Kings/Tulare HSR via bus, for a total travel time of 36 minutes from Corcoran to Kings/Tulare HSR)	N/A
Corcoran – Wasco	36 minutes	N/A	2 hours, 10 minutes**
Corcoran – Bakersfield	1 hour, 17 minutes	N/A	1 hour, 20 minutes*

Source: AECOM 2021

* 10 minute HSR-bus transfer time is assumed for origin-destination pairs that require one transfer.

** 20 minute HSR-bus transfer time is assumed for origin-destination pairs that require two transfers.

The only destination that would see a substantial increase in travel time from both Corcoran and Hanford is Wasco. The travel time between Corcoran and Wasco is anticipated to increase by 1 hour and 35 minutes, while the travel time between Hanford and Wasco is anticipated to increase by 48 minutes.

Based on this analysis, the proposed Kings/Tulare HSR–Hanford–Corcoran Bus Service would either maintain or improve the travel times to the destinations that people most frequently travel to and from Corcoran and Hanford.

Benefits

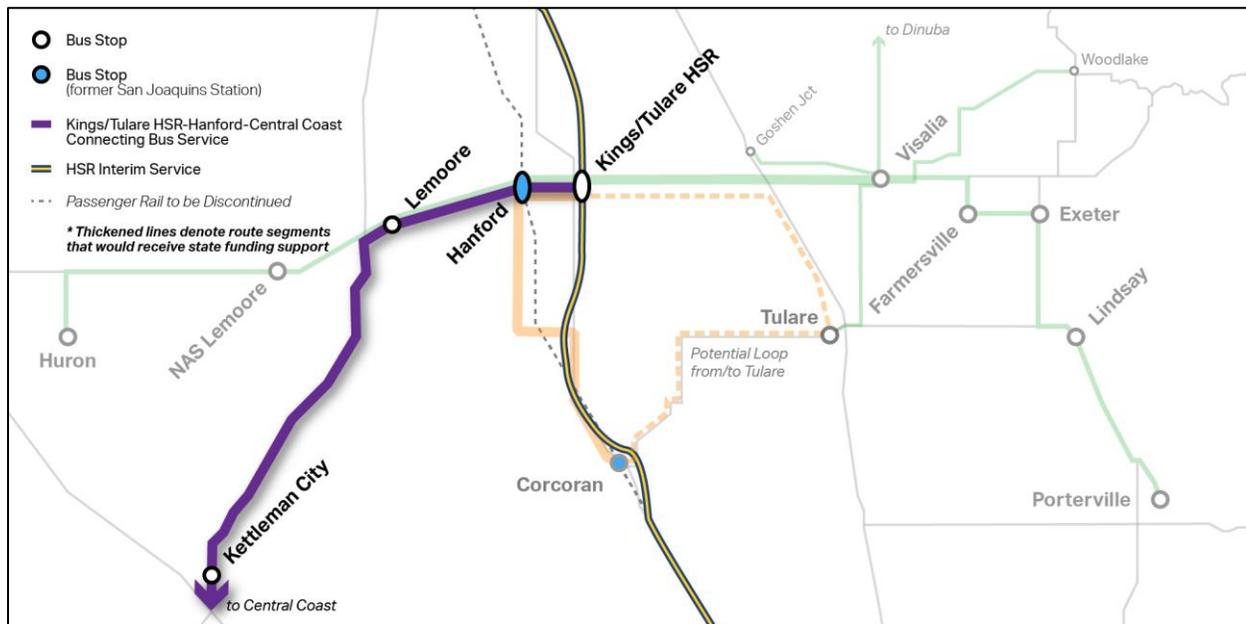
Benefits of pursuing a partnership for the Kings/Tulare HSR–Hanford–Corcoran Connecting Bus Service include:

- Would augment existing bus service provided in the corridor by KART (Route 13), and extend the service from Hanford to the future Kings/Tulare HSR Station.
- Leveraging the resources of an existing bus system, in this case KART, avoids adding another bus operating entity and competition for riders and funding.

- Utilizing existing bus operating agencies to provide service can lead to increasing efficiencies and reducing overall costs.
- By pooling resources, increased frequencies can be provided, improving connectivity to the future Kings/Tulare HSR Station, while also benefiting all riders (including those not making an HSR trip that are traveling within and between Kings and Tulare Counties) with more convenient service.
- A partnership will bring state resources to support the service in an area where public transportation dollars are limited.

3.1.2.3 Kings/Tulare HSR–Hanford–Central Coast Connecting Bus Service (SJJPA-Managed)

The Kings/Tulare HSR–Hanford–Central Coast Connecting Bus Service would provide a similar service to the Thruway Bus service currently operating between Visalia and the Central Coast, though the eastern terminus would be at the Kings/Tulare HSR Station, since the partnership related to the Cross Valley Corridor service would provide service to Visalia. The Kings/Tulare HSR– Hanford–Central Coast Connecting Bus Service could include nine stops, connecting the Kings/Tulare HSR Station to Hanford, Lemoore, and Kettleman City in Kings County, and five other cities along the Central Coast (Figure 10 and Table 10).



Source: AECOM 2021

Figure 10: SJJPA-Managed Kings/Tulare HSR–Hanford–Central Coast Connecting Bus Service

Route Characteristics and Service Planning

Due to the length of the bus route (156 miles) and end-to-end travel times of well over 3 hours, buses along this route (Table 9) would need to include onboard equipment and amenities not normally provided in local and regional buses, including seating for long distance travel and a

bathroom. Given this, KCAPTA would need to develop an entirely new type of bus fleet, which would diminish the cost savings of a partnership. Additionally, KCAPTA is not ready organizationally manage another fleet type, which would require re-tooling their maintenance facility, etc. Given these factors, SJJPA and KCAPTA concluded that maintaining this SJJPA-managed connecting bus service would make the most sense.

Table 9: Kings/Tulare HSR–Hanford–Central Coast Connecting Bus Service and Route Characteristics

	Stop	Distance (miles)	Estimated Travel Time (minutes)	City/Town Population (2018, ACS)	Connections
1	Kings/Tulare HSR	0	0	Located in a County Area	CAHSR, KART
2	Hanford Transit Center*	3	9	56,910	KART, Cross Valley Corridor
3	Lemoore Lemoore Depot – East Street	12	24	26,725	KART, Cross Valley Corridor
4	Kettleman City Carl’s Jr – Hubert Way	38	49	1,395	KART
5	Paso Robles Intermodal Station	93	124	31,656	Amtrak, SLO RTA, MST
6	Atascadero Transit Center	104	144	30,037	SLO RTA
7	San Luis Obispo Amtrak Station	122	174	47,160	Amtrak, SLO RTA, SLO Transit
8	Grover Beach Amtrak Station	137	189	13,538	Amtrak, SoCo Transit
9	Santa Maria IHOP – Cypress Street and Nicholson Avenue	156	214	105,483	SLO RTA, SMAT

Source: AECOM 2021

Note: This entire service would be considered for state funding support.

*Assumes future location of Hanford Transit Center at 7th Street and Harris Street.

Benefits

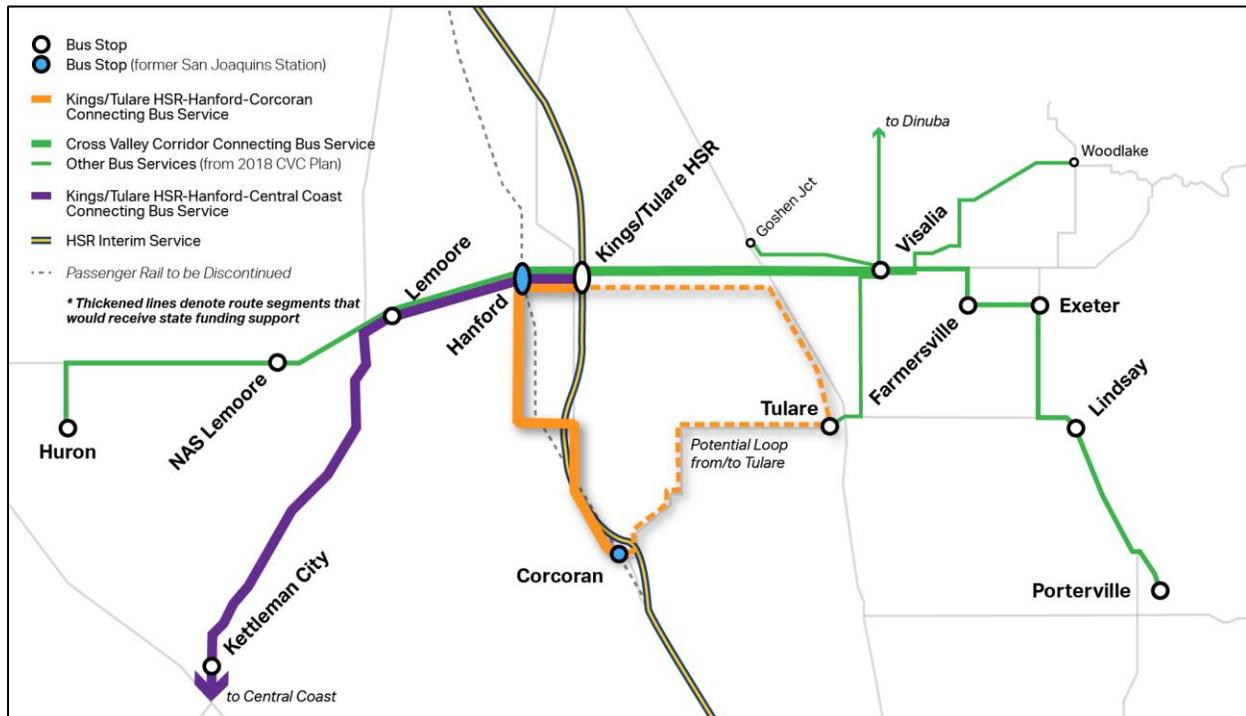
Continuing to provide connecting bus service to Kings and Tulare Counties and the Central Coast with the commencement of the HSR Interim Service will be desirable for maintaining a public transportation link between the HSR Interim Service in the San Joaquin Valley and the Central Coast. Additionally, with the recent change in state law, there is an opportunity to provide service to bus-only travelers between the two regions.

3.1.3 Near-Term Connecting Bus Service Enhancements

In addition to the recommended connecting bus services that correspond with the commencement of HSR Interim Service around 2029, SJJPA and stakeholders in Kings and Tulare Counties have expressed an interest in working together to improve connectivity to the San Joaquins stations in the interim period. Specifically, improving connectivity between the San Joaquins at Hanford Station and Visalia is a near-term goal expressed by SJJPA and all the partners in Kings and Tulare Counties. Therefore, consideration is currently being given to augmenting KART and/or Visalia Transit service between Hanford Station and Visalia, with state funding assistance in the near-term.

3.1.4 Implementation Recommendations

TCAG, Kings County Association of Governments (KCAG), KCAPTA, Visalia Transit, Tulare County Regional Transit Agency, and SJJPA recommend partnering with the local bus agencies to provide the connectivity and integration for their respective jurisdictions. The partners' recommendations for Kings and Tulare Counties are below.



Source: AECOM

Figure 11: Recommended Connecting Bus Services in Kings and Tulare Counties

OBJECTIVE 1: RECOMMENDATIONS FOR KINGS AND TULARE COUNTIES

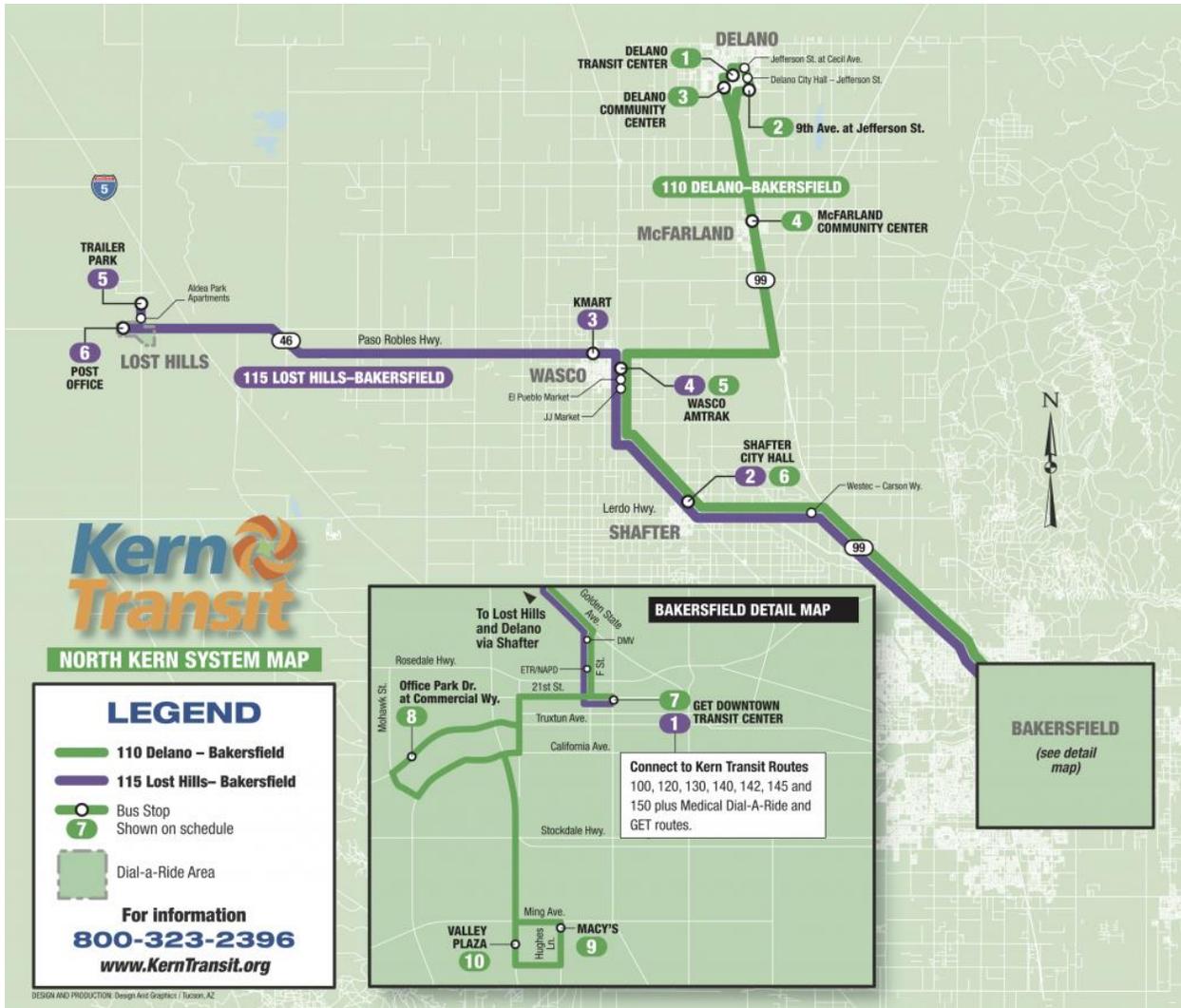
- ✓ Execute a memorandum of understanding (MOU) to contain two components—bus and Cross Valley Rail— with TCAG, KCAG, KCAPTA, Visalia Transit, and Tulare County Regional Transit Agency to jointly provide bus connectivity. The MOU will state each agency’s responsibilities and will describe the 2018 CVC Plan and SJJPA’s efforts for network integration with future California High-Speed Rail (CAHSR).
- ✓ Continue to provide direct connections to downtown Hanford and downtown Corcoran to intercity passenger rail service, by working to secure state funds to enable timed local/regional operated bus connections from Corcoran and Hanford to the Kings/Tulare HSR Station, while increasing local/regional operated bus connectivity between the Kings/Tulare HSR Station and Visalia.
- ✓ Partner with the following existing local/regional transit operators to operate connecting bus services within Kings and Tulare Counties: KCAPTA, Visalia Transit, and Tulare County Regional Transit Agency. SJJPA intends to support a larger, more frequent, and coordinated local/regional operated bus service that will coincide with the opening of HSR Interim Service. This partnership to enhance bus service will be key toward the implementation of Phase 1 of the 2018 CVC Plan.
- ✓ For connecting bus service between the Kings/Tulare HSR Station and the Central Coast service, operate as an SJJPA-managed service.
- ✓ In the short-term, work with KCAPTA and Visalia Transit to enhance bus service between Visalia and Hanford to improve connectivity to the existing San Joaquins service until the HSR Interim Service begins operations.

3.2 Kern County

One connecting bus service is being studied for Kern County. The Wasco-Bakersfield HSR Connecting Bus Service would connect Wasco and Shafter to the Bakersfield HSR Station as shown on Figure 10.

3.2.1 Existing Bus Services

One public agency – Kern Transit – currently provides regional bus service within Kern County. Two Kern Transit routes serve Wasco and include Route 110, which provides service between Bakersfield and Delano, and Route 115, which provides service between Bakersfield and Lost Hills. Figure 12 shows these two routes. Kern Transit has several other routes serving Kern County, but they are not shown since they do not serve Wasco.



Source: Kern Transit

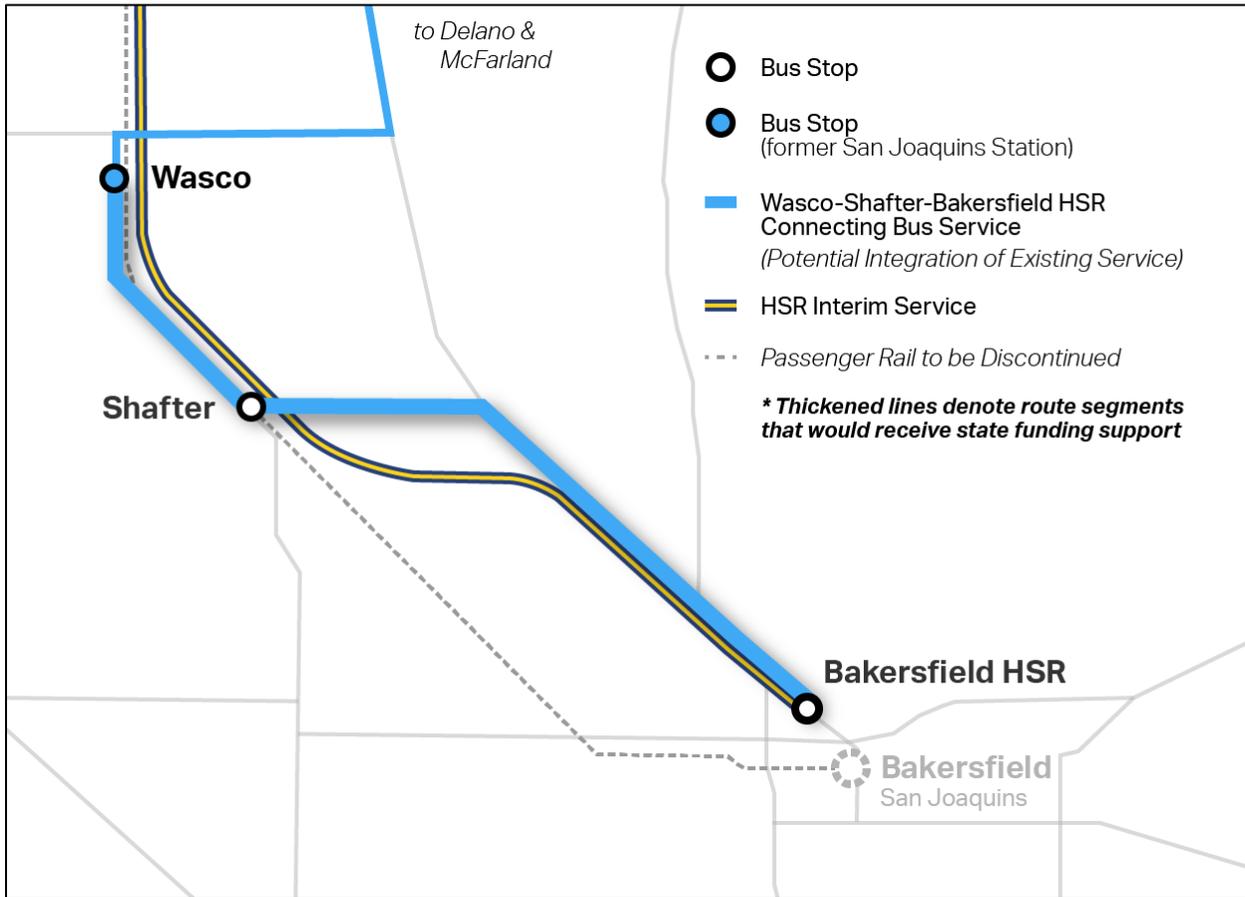
Figure 12: Kern Transit Routes Serving Kern County

3.2.2 Recommended Bus Connectivity

Based on conversations with Kern Transit, the City of Wasco, and Kern Council of Governments (COG), there is an interest in providing bus connectivity from Wasco to the future Bakersfield HSR Station. SJJPA and Kern Transit are also considering a partnership in which Kern Transit’s existing service to Wasco could be augmented and adjusted to provide a connecting bus service from Wasco to the Bakersfield HSR Station. An additional route was explored as part of this Study that would run service from Wasco to Bakersfield HSR Station via Rosedale, California State University Bakersfield and downtown Bakersfield, but based on conversations with Kern Transit, a more direct route similar to existing service was preferred. The potential connecting bus service that be a partnership is described in the following section.

3.2.2.1 Wasco–Bakersfield HSR Connecting Bus Service (Partnership)

The Wasco–Bakersfield HSR Connecting Bus Service would serve three stops, connecting the Bakersfield HSR Station to Wasco and Shafter (Figure 13). There would also be the possibility of leveraging state support to Wasco to facilitate better service to Delano and McFarland to the north of Wasco.



Source: AECOM 2021

Figure 13: Proposed Wasco–Bakersfield HSR Connecting Bus Service Route

Route Characteristics and Service Planning

Both the proposed Wasco and Shafter bus stops will provide connections to local transit services, while the Bakersfield HSR stop would provide a direct connection to the HSR Interim Service. As shown in Table 10, the full route would be 25 miles in length and have an estimated end-to-end travel time of 40 minutes.

Table 10: Wasco-Bakersfield Connecting Bus Service Route Characteristics

	Stop	Distance (miles)	Estimated Travel Time (minutes)	City/Town Population (2018, ACS)	Connections
1	Wasco City Hall – 8th Street	0	0	27,976	Kern Transit
2	Shafter City Hall – Pacific Avenue	8	12	20,058	Kern Transit
3	Bakersfield HSR F Street and Golden State Avenue	25	40	383,579	CAHSR, Kern Transit, GET Bus

Source: AECOM 2021

Note: This entire service would be considered for state funding support.

According to the schedule created by the ETO for the HSR Interim Service, HSR trains would run on an hourly pulse schedule, for a total of 18 trains in each direction serving the Kings/Tulare HSR Station, or 36 trains total (Table 11 and Table 12).

Table 11: Northbound Schedule for HSR Interim Service (Bakersfield HSR Station)

Station	ST-2	ST-4	102	104	106	108	110	112	114	116
Bakersfield	/	/	6:19	7:19	8:19	9:19	10:19	11:19	12:19	13:19
Kings Tulare	/	/	6:53	7:53	8:53	9:53	10:53	11:53	12:53	13:53
Fresno	5:09	6:09	7:09	8:09	9:09	10:09	11:09	12:09	13:09	14:09
Madera	5:21	6:21	7:21	8:21	9:21	10:21	11:21	12:21	13:21	14:21
Merced	5:42	6:42	7:42	8:42	9:42	10:42	11:42	12:42	13:42	14:42

Station	118	120	122	124	126	128	130	132	ST-6	ST-8
Bakersfield	14:19	15:19	16:19	17:19	18:19	19:19	20:19	21:19	22:19	23:19
Kings Tulare	14:53	15:53	16:53	17:53	18:53	19:53	20:53	21:53	22:53	23:51
Fresno	15:09	16:09	17:09	18:09	19:09	20:09	21:09	22:09	23:07	/
Madera	15:21	16:21	17:21	18:21	19:21	20:21	21:21	22:21	/	/
Merced	15:42	16:42	17:42	18:42	19:42	20:42	21:42	22:42	/	/

Source: California High-Speed Rail Authority 2020 Business Plan (report done by the Early Train Operator)

Table 12: Southbound Schedule for HSR Interim Service (Bakersfield HSR Station)

Station	ST-1	ST-3	101	103	105	107	109	111	113	115
Merced	/	/	6:08	7:08	8:08	9:08	10:08	11:08	12:08	13:08
Madera	/	/	6:30	7:30	8:30	9:30	10:30	11:30	12:30	13:30
Fresno	/	5:41	6:41	7:41	8:41	9:41	10:41	11:41	12:41	13:41
Kings Tulare	4:58	5:58	6:58	7:58	8:58	9:58	10:58	11:58	12:58	13:58
Bakersfield	5:30	6:30	7:30	8:30	9:30	10:30	11:30	12:30	13:30	14:30

Station	117	119	121	123	125	127	129	131	ST-5	ST-7
Merced	14:08	15:08	16:08	17:08	18:08	19:08	20:08	21:08	22:08	23:08
Madera	14:30	15:30	16:30	17:30	18:30	19:30	20:30	21:30	22:30	23:30
Fresno	14:41	15:41	16:41	17:41	18:41	19:41	20:41	21:41	22:41	23:41
Kings Tulare	14:58	15:58	16:58	17:58	18:58	19:58	20:58	21:58		
Bakersfield	15:30	16:30	17:30	18:30	19:30	20:30	21:30	22:30		

Source: California High-Speed Rail Authority 2020 Business Plan (report done by the Early Train Operator)

The HSR Interim Service schedule coordinates the northbound and southbound trains serving the Bakersfield HSR Station, so they arrive/depart at times fairly close to each other. For example, the northbound train from Bakersfield HSR Station would depart at 7:19 a.m., while the southbound trains would arrive at 7:30 a.m. Connecting buses to/from Wasco could arrive a few minutes before 7:19 a.m., so riders could transfer to catch a northbound HSR train. The same bus could then wait for the arriving HSR train at 7:30 a.m. to pick up passengers after they disembark the HSR train. This pattern could repeat throughout the day as the HSR Interim Service would be on a pulse-schedule at hourly intervals. This is a simpler operational pattern than the connection to the Kings/Tulare HSR Station since the Bakersfield HSR Station is a terminal station, whereas the former is mid-line station with service coming and going from two directions. This would make bus connections less complex to coordinate.

SJJPA and Kern Transit would need to determine how many of these couplets of HSR trains to meet with connecting bus service. Table 4 shows three possible service scenarios with differing levels of connecting bus service – light, moderate, and robust.

Travel times were compared from downtown Wasco to other cities in the San Joaquin Valley to assess improvements or deterioration of intercity travel times when San Joaquin is no longer available and the HSR Interim Service combined with connecting bus service is implemented (Table 13). Overall, there is a deterioration of intercity travel times from Wasco with San Joaquin Valley (except travel father north to Fresno and Merced is comparable given the longer time riders would be on HSR trains). This is due to the location of Wasco being north of the Bakersfield HSR Station, so to go north travelers would need to first go south and then north. A potential solution to this was explored, which would run a bus service north from Wasco all the

way to the Kings/Tulare HSR Station. However, given the long travel times, small population served, limited demand that would be generated by Wasco, and high operating costs, this was not pursued as part of this Study as it would not be cost effective.

When considering travel to Los Angeles, travel times would only be about 15 minutes longer from Wasco over current service that includes the San Joaquins. Also, the bus service would include the benefit of serving the community of Shafter.

Table 13: Travel Time Comparisons for Trips Originating in Wasco

Origin – Destination	Existing (via Amtrak San Joaquins)	Future (via Bus Only)	Future (via HSR + Bus)
Wasco – Merced	2 hours 35 minutes	N/A	2 hours 11 minutes*
Wasco – Fresno	1 hour 35 minutes	N/A	1 hour 41 minutes*
Wasco – Hanford	55 minutes	N/A	1 hour 43 minutes**
Wasco – Corcoran	35 minutes	N/A	2 hours 10 minutes**
Wasco – Bakersfield	25 minutes	40 minutes	N/A

Source: AECOM 2021

* 10 minute HSR-bus transfer time is assumed for origin-destination pairs that require one transfer.

** 20 minute HSR-bus transfer time is assumed for origin-destination pairs that require two transfers.

Benefits

As with the Kings and Tulare County partners, it was concluded that running two separate bus systems in the Wasco-Bakersfield corridor is not desirable. Rather, leveraging existing Kern Transit bus service would not only avoid competing bus services, but would also provide an opportunity to integrate with existing service to McFarland and Delano. Therefore, it was determined that a partnership model for this bus connection is beneficial. Benefits of pursuing a partnership for the Wasco–Bakersfield HSR Station Connecting Bus Service include:

- Would augment existing bus service provided in the corridor by Kern Transit Routes 110 and 115, while providing service directly to the Bakersfield HSR Station.
- Leveraging the resources of an existing bus system, in this case Kern Transit, avoids adding another bus operating entity and competition for riders and funding.
- Utilizing existing bus operating agencies to provide service can lead to increasing efficiencies and reducing lower overall costs.
- By pooling resources, increased frequencies can be provided, improving connectivity to the future Bakersfield HSR Station, while also benefiting all riders including those not making an HSR trip that are traveling within and between Kings and Tulare Counties) with more convenient service. This improved service could potentially benefit riders from Delano and McFarland to the north of Wasco given existing Wasco service also serves these cities.
- A partnership will bring state resources to support the service in an area where public transportation dollars are limited.

3.2.3 Near-Term Connecting Bus Service Enhancements

Interim bus route improvements to Wasco are currently not under consideration given the San Joaquins is still serving Wasco. However, SJJPA and Kern Transit are discussing the possibility of partnering on near-term improvements to bus service to the Antelope Valley, which could improve connectivity from the San Joaquins to that region. The connection to this service would take place at the existing San Joaquins Bakersfield Station.

3.2.4 Implementation Recommendations

SJJPA and Kern Transit recommend partnering on a Wasco-Bakersfield HSR Connecting Bus Service. Below are specific recommendations for implementing connecting bus service in Kern County.

OBJECTIVE 1: RECOMMENDATIONS FOR KERN COUNTY

- ✓ Execute an MOU with Kern Transit to jointly provide bus connectivity. The MOU would state each agency's responsibilities and SJJPA's efforts for network integration with future HSR Interim Service.
- ✓ Continue to provide a direct connection from Wasco to intercity passenger rail service by working to secure state funds to enable timed local/regional operated bus connections from Wasco to the Bakersfield HSR Station.
- ✓ Through this coordination, work to find opportunities for near-term partnerships, including a bus connection between Bakersfield and the Antelope Valley.

4 OBJECTIVE 2: CROSS VALLEY RAIL PROJECT

Review and assist in the integration and implementation of the Cross Valley Rail project.

4.1 Background and History of Corridor

The Cross Valley Corridor is a 75-mile existing freight rail corridor between Huron and Porterville in Kings and Tulare Counties that is active in some segments and abandoned in others. The Southern Pacific Railroad constructed the railroad in the late 1800s. Union Pacific Railroad (UPRR) currently owns the right-of-way and the San Joaquin Valley Railroad (SJVR) operates on most of the corridor except for a 1-mile portion of the UPRR mainline near Goshen. Existing track conditions are not suitable for passenger rail operations.

In 2000, the City of Lemoore worked with the Cities of Huron and Visalia to form the Cross Valley Rail Corridor Joint Powers Authority (CVRC JPA) with the purpose of upgrading 45 miles of track from the City of Huron, through Lemoore and Hanford, to the Visalia industrial park. The CVRC JPA raised \$14.2 million from government and private sources to resurface the rail corridor in 2002–2003 to accommodate heavier freight traffic and keep the line in operation in preparation for a passenger rail service.

In 2004 KCAG released the Cross Valley Rail Corridor Passenger Rail Study and in March 2018 TCAG published the CVC Plan, which evaluates connecting downtown Hanford, downtown Visalia, the Kings/Tulare HSR Station, and other cities.

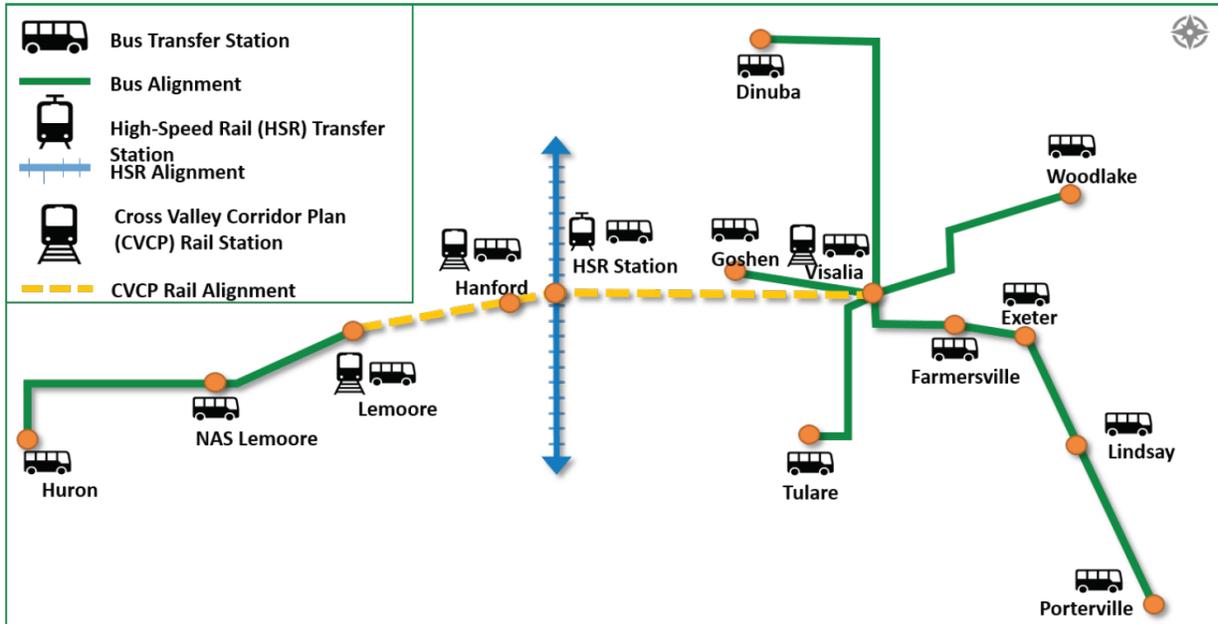
According to the CVC Plan, the tracks between Lindsay and Porterville were abandoned in 2008 and removed in 2012, but the City of Porterville recently acquired the right-of-way with assistance from TCAG with the purpose of preserving the right-of-way for future rail service.

4.2 Cross Valley Corridor Plan Phases

The 2018 CVC Plan recommended a three-phase implementation plan:

- Phase 1 would implement bus service between the cities on the Cross Valley Corridor (as described in Section 3).
- Phase 2 would implement passenger rail service from Lemoore to Visalia.
- Phase 3 would extend passenger rail service from Lemoore to Huron and from Visalia to Porterville.

Phase 2 of the implementation plan would have four stations located at Lemoore, Hanford, the Kings/Tulare HSR Station, and Visalia. As shown on Figure 14, the remaining communities along the CVC, including Huron, Farmersville, Exeter, Lindsay, and Porterville, would continue to be served by bus service. Lemoore and Visalia would serve as transfer points between the bus service and the passenger rail service.

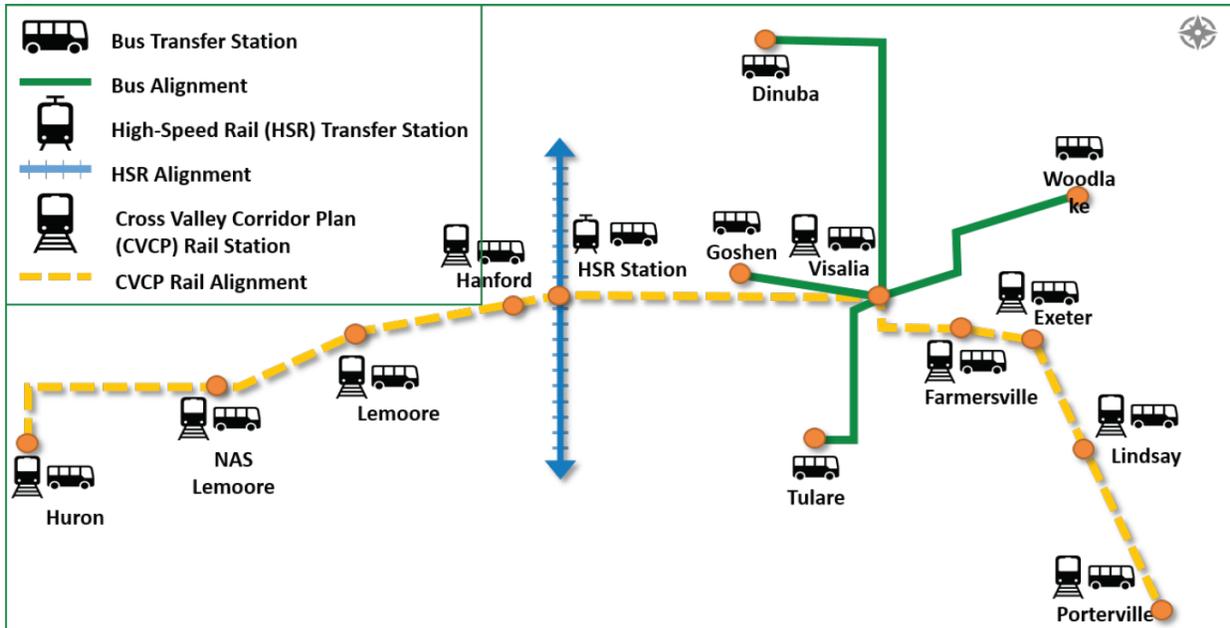


Source: 2018 CVC Plan

Figure 14: 2018 CVC Plan Phase 2 Bus and Rail Service Map

Phase 3 would implement passenger rail service on the entire CVC from Huron to Porterville. As shown on Figure 15, the ultimate configuration of a CVC rail service would serve 10 stations: Huron, NAS Lemoore, Lemoore, Hanford, the Kings/Tulare HSR Station, Visalia, Farmersville, Exeter, Lindsay, and Porterville. Once the full build-out of a CVC rail corridor is operational, the CVC bus service would be replaced by the passenger rail service.

Cross Valley Rail is supported in Tulare County and Kings County General Plans and was included in the 2018 California State Rail Plan as part of the 2040 Vision to connect local communities to HSR.



Source: 2018 CVC Plan

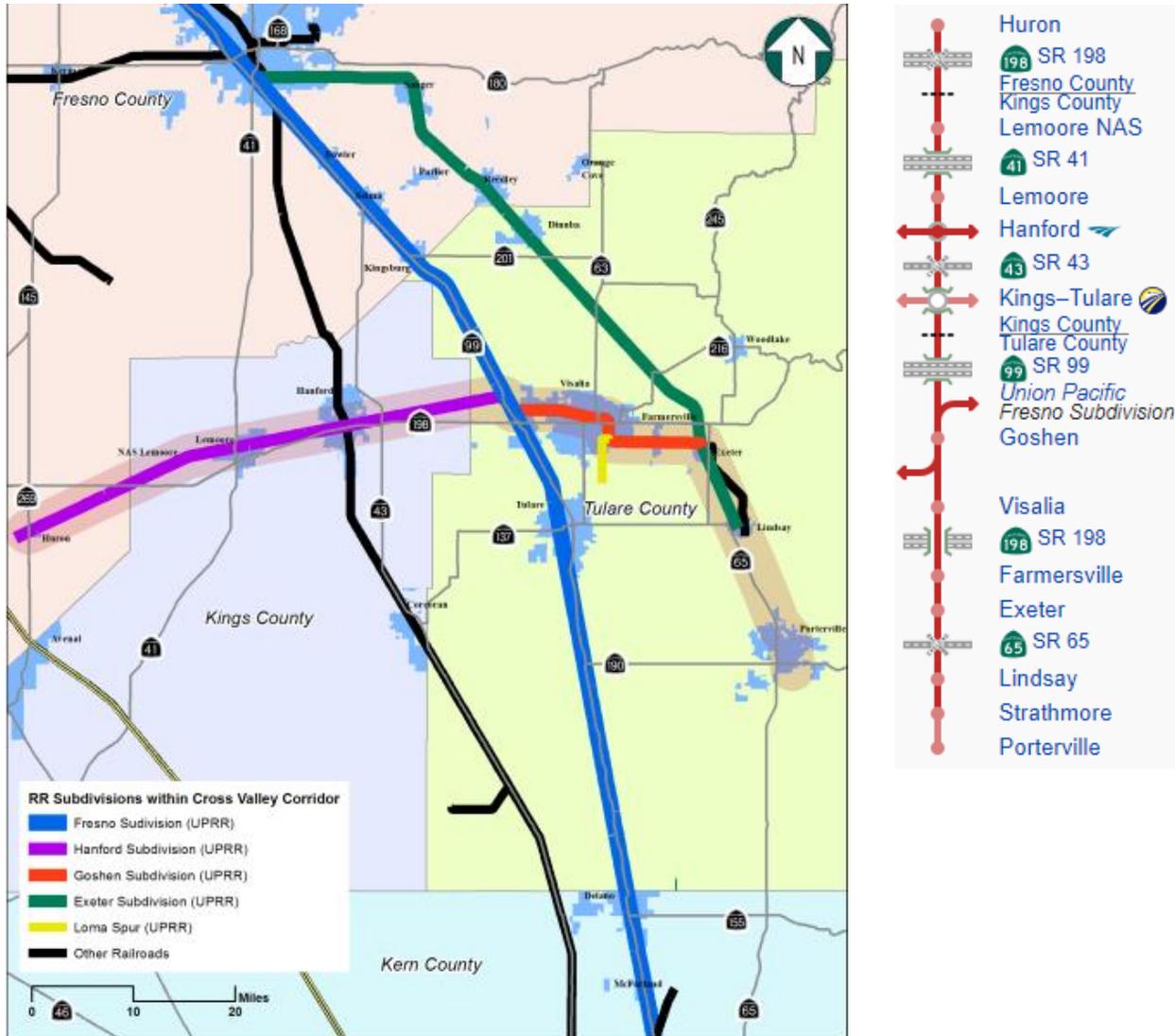
Figure 15: 2018 CVC Plan Phase 3 Bus and Rail Service Map

4.3 Key Findings Related to Rail from the 2018 CVC Plan

Key findings from the 2018 CVC Plan related to rail are summarized in the following sections.

4.3.1 Right-of-Way Ownership and San Joaquin Valley Railroad

As previously described, the CVC is currently a freight railroad corridor that is active in certain segments and abandoned in others. The majority of the corridor is single track freight railway owned by UPRR, as shown on Figure 16. The active portion of the railway is built and maintained to handle low-speed freight rail traffic.



Source: 2018 CVC Plan

Figure 16: Railroad Subdivisions Map and CVC Track Map

According to the 2018 CVC Plan, SJVR is a Class III railroad owned by Genesee & Wyoming, Inc. that has trackage rights over the UPRR main line to operate several segments throughout Kern, Tulare, and Fresno Counties. The SJVR-operated segments connect the local shippers to the greater rail system through interchanges with BNSF and UPRR mainlines, which generally run parallel between Fresno and Bakersfield. The trackage rights allow SJVR to move its own equipment on the UPRR track to each of its segments. Any freight traffic from SJVR's branch lines must be interchanged to UPRR to move on that line. Traffic includes lumber and forest products, consumer products, fresh and frozen fruits and vegetables, packaged foods, canned foods, frozen meats, poultry, cheese, carbonated beverages, and petroleum/chemical products.

4.3.2 Suitability for Passenger Rail

According to the 2018 CVC Plan, the existing freight rail line right-of-way is already in place and could serve as a backbone for a future CVC rail system. Overall, the right-of-way, which ranges from 50 to 200 feet in width, would be ideally suited for passenger rail mixed with freight use due to the following corridor conditions:

- Long, straight geometry
- Large turning radii
- Virtually zero gradients
- Very few major geographic obstacles
- Existing grade separations from major roadway crossings

In addition, the alignment generally connects downtown areas of the cities along the CVC, since the cities were founded by the railroad with the exception of the older City of Visalia.

4.3.3 Improvements Identified for Implementation of Passenger Rail

The following summarizes improvements identified in the 2018 CVC Plan potentially needed to allow the implementation of passenger rail:

- **Condition of the Railroad:** The track and structures (including bridges, culverts, and crossings) are aging and not suitable for passenger rail operations. The rails, ties, plates, embankments, switches, signaling, etc., would not meet United States Department of Transportation, Federal Railroad Administration (FRA), or Federal Transit Administration regulations for passenger rail service. Many bridges, such as the Kings River bridge, may need to be replaced or upgraded.
- **Shared Track:** A small length of track (approximately 500 feet) on the main UPRR line is shared by both the CVC and the main UPRR line, which may present an obstacle (UPRR approvals or operational limitations) and could necessitate improvements to allow for passenger rail service.
- **Right-of-Way:** Additional land acquisitions may be required for passing lanes, pocket tracks, maintenance facilities, operations centers, etc.
- **Positive Train Control:** To upgrade to passenger service, the Rail Safety Improvement Act of 2008 would require a Positive Train Control (PTC) system (49 CFR Part 236, Subpart I). PTC is a safety system designed to monitor and control trains and eliminate collisions within its system by using GPS and computerized tracking systems. It monitors the speed and positions of all trains and implements accident avoidance countermeasures if it detects an accident is imminent. The system will first warn the train operator, then take control of the train and bring it to a controlled stop.
- **Maintenance and Storage Facility:** A maintenance and storage facility would be required, and there are available sites along the CVC.
- **Stations:** Station infrastructure would be required. Potential station locations are shown on Figure 7. The cities of Lemoore, Hanford, Visalia, Tulare, Porterville, and Dinuba have public transportation systems that could serve a CVC station.

4.3.4 2018 CVC Plan Recommended Rail Vehicle Technology

The 2018 CVC Plan recommended diesel multiple unit (DMU) trainsets for further analysis, concluding that DMU trainsets have the highest potential to provide efficient and flexible transit service compared with the other mode alternatives. These same benefits could be realized by a zero-emission multiple unit (ZEMU) system. Subsequent to the completion of the 2018 CVC Plan, the state has adopted a policy of transitioning to an entire statewide fleet of zero emission vehicles by 2035 (Fleet Management Plan). It is likely that by the time that CVC Rail trainsets are ready to be procured in the future, that ZEMU trainsets will be the standard for these types of services in California. When CVC Rail is ready for procurement, it may not make sense to purchase DMU equipment that would need to be replaced by 2035. DMU or ZEMU trainsets have moderate costs compared to the other technologies examined in the 2018 CVC Plan. The other technologies evaluated include bus rapid transit, light rail transit (LRT), heavy rail, commuter rail, streetcar, Maglev, and a people mover system. Figure 17 lists the benefits of DMU or ZEMU systems as outlined in the 2018 CVC Plan.

DMU and ZEMU based rail systems are run by self-propelling railcars that can operate in LRT corridors, in dense urban areas, and in freight corridors as long as the vehicles are compliant with FRA crash and operational safety policies. The typical configuration of DMU vehicles in the United States is that of a diesel engine generating electric power for the vehicle's traction motors (so-called diesel-electric multiple units). However, other propulsion systems have been under development, such as hydrogen fuel cells and natural gas-powered engines, which would be used in place of diesel engines to generate electric power for the vehicle's traction motors in the absence of electric wires.

ZEMU vehicles are similar to LRT vehicles as they both can use an overhead catenary system. ZEMU systems can utilize battery power or hydrogen fuel cell and achieve FRA crash and operation safety policies. ZEMUs have higher vehicle costs than DMU trainsets; however, they have operational benefits (in terms of operational cost, acceleration, etc.) as the system grows in size and scale and meet the states goals for zero emission vehicles.

Benefits of DMU Transit Systems:

- Propulsion** Diesel-powered vehicles do not require the construction of overhead electrical wires, which are costly and visually impactful, or separate locomotives which are heavy and require longer station platforms
- Guideway** DMU trains offer the most flexibility for guideways and can operate in-street and on shared freight corridors such as the Cross Valley Corridor
- Speed** DMU trains can operate at speeds up to 65+ miles per hour, but new models enable top speeds between 75 mph and 100 mph. Faster acceleration and braking capabilities can reduce travel times.
- Stations** DMU station distances can vary greatly due to lighter vehicles with faster acceleration and braking capabilities. Stations can be as close as 2-miles apart.
- Investment** Since DMU vehicles are able to operate in freight corridors, the need to acquire property or right-of-way is minimized, which is typically the most costly aspect of transit infrastructure.

Source: 2018 CVC Plan (Note: These benefits would also apply to ZEMU trainsets)

Figure 17: Benefits of DMU Transit Systems



Source: 2018 CVC Plan

Figure 18: Capital Metro DMU System in Austin, Texas



Source: 2018 CVC Plan

Figure 19: Sprinter DMU System in Oceanside, California

4.4 2018 CVC Plan Cost Estimates

The 2018 CVC Plan estimates both capital and operation and maintenance (O&M) costs for each phase of the implementation plan assuming DMU operations. The 2018 CVC Plan estimated that the annual cost-per-mile for Phases 2 and 3 would be \$515,000. This cost includes operator wages, fuel, and vehicle maintenance. Costs were based on operating costs for Denton County Transportation Authority, New Jersey Transit Corporation, and North County Transit District. The schedule assumed operations would be seven days a week, from 6 a.m. to 11 p.m., with 30-minute peak headways and 60-minute off-peak headways. For Phase 2 operations 9 vehicles were assumed and for Phase 3 operations 26 vehicles were assumed.

Capital and operating cost estimates for Phase 2 and Phase 3 are shown in Table 14.

Table 14: Costs for DMU Rail Phases of CVC from 2018 CVC Plan

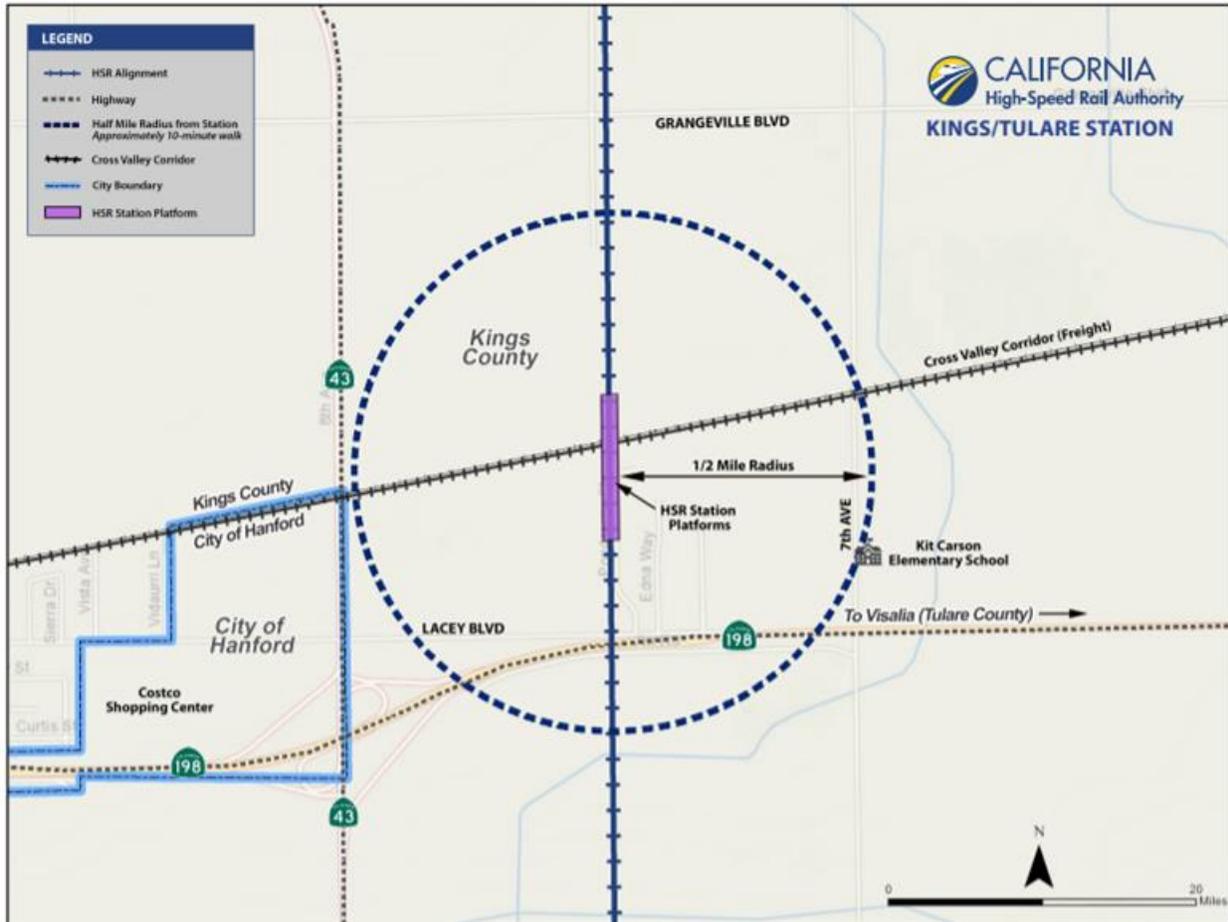
	Capital Costs (2018 dollars assumed)	Operating Costs (2018 dollars assumed)
Phase 2 DMU Rail Lemoore to Visalia (2018 dollars assumed)	\$162 to 225 M	\$16 M per year
Phase 3 DMU Rail Huron to Porterville (2018 dollars assumed)	\$179 to 252 M	\$20 M per year
Total	\$350 to \$489 M	\$36 M per year

Source: 2018 CVC Plan

4.5 Compatibility of Cross Valley Rail with Future Kings/Tulare HSR Station

In addition to providing rail service between the communities in central San Joaquin Valley, a CVC rail service would provide a convenient connection to the Kings/Tulare HSR Station. The 2018 CVC Plan discussed this connection, but a station concept was not provided as was provided for the other proposed rail stations along the CVC. The following is an update on the status of the design of the Kings/Tulare Station. In addition, the compatibility of the current design direction of the Kings/Tulare Station with transfers to a future CVC rail station is examined.

The location of the Kings/Tulare HSR Station is approximately one-half mile east and north of SR 43 and SR 198, respectively (Figure 20).

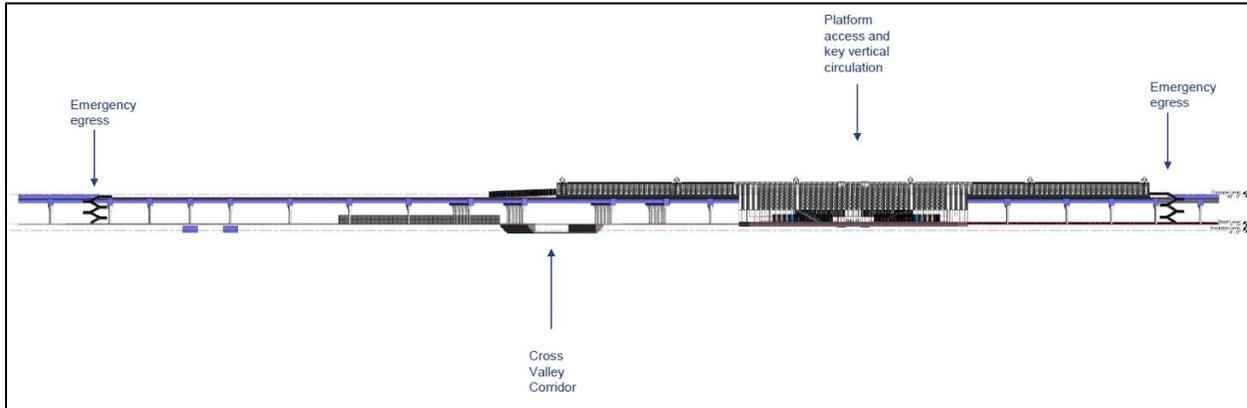


Source: CHSRA

Note: During subsequent design work by CHSRA, the station platform has been moved slightly south of the location shown above.

Figure 20: Location of the Future Kings/Tulare HSR Station

According to CHSRA officials, all track and civil design work is complete. The HSR tracks will be elevated on a viaduct structure in the vicinity of the Kings/Tulare Station. Therefore, the HSR track structure will be above the CVC tracks, which will remain at-grade (Figure 21 and Figure 22). The columns for the viaduct structure are complete except for the columns immediately adjacent to the CVC.



Source: CHSRA

Figure 21: Cross Section of HSR Tracks on Viaduct at the Kings/Tulare HSR Station and CVC



Source: CHSRA

Figure 22: View of Columns for Future HSR Track Viaduct at Kings/Tulare HSR Station and CVC

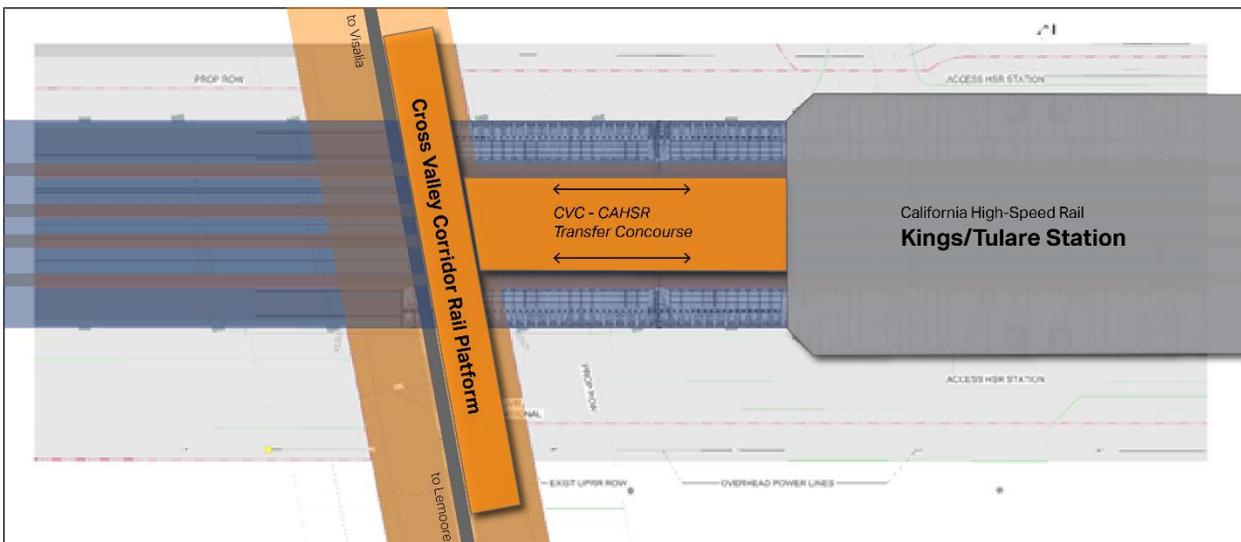
CHSRA provided a plan view graphic that indicates that a 100-foot wide right-of-way for the CVC would be accommodated between the columns flanking the CVC (Figure 23). While it is anticipated a single track and single side platform would be sufficient for operations, the right-of-way could accommodate expanded station facilities (i.e., a second track and second side platform if necessary).



Source: CHSRA

Figure 23: Plan View of Cross Valley Corridor Crossing Under HSR Viaduct

Given the configuration previously described, a station for the CVC rail service could be placed directly under the HSR viaduct. In discussions with CHSRA staff, an initial assessment was made that a platform on the south side of the CVC corridor could be constructed to provide direct access (i.e., no tracks to traverse) to a pathway under the HSR viaduct between the supporting columns and the HSR station. Figure 24 illustrates this concept. The HSR station structure is anticipated to be approximately 300 feet south from where the Cross Valley Rail tracks would cross under the HSR viaduct.



Source: CHSRA (Base Map) / AECOM (Annotations)

Figure 24: Concept of Potential Layout of Connection between Cross Valley Rail and Kings/Tulare HSR Station

Over the last several years, CHSRA has been conducting an outreach process with stakeholders from the region regarding connectivity to the Kings/Tulare HSR Station. As part of this process, the 2018 CVC Plan was completed. Following the release of the 2018 CVC Plan, there have been ongoing project updates and follow-up outreach. According to CHSRA, the next step in this process is outreach related to the pre-design of the station, with stakeholder meetings about every 8 weeks.

The following topics will be covered at meetings in 2021:

- Regional Transit Access – June
- Regional Patterns & Roadway Network – August
- Hanford and Visalia Plans & Other Local Multimodal Access – October
- Summary Meeting – December

The overall project schedule provided by CHSRA is shown in Figure 25.



Source: CHSRA 2020

Figure 25: Kings/Tulare HSR Station Delivery Schedule

4.6 Implementation Recommendations

Implementation of Cross Valley Rail service will require coordination among a range of local stakeholders in addition to the local and state government.

A critical factor in project development is the ability to obtain funding. While the 2018 CVC Plan identifies potential phases for implementation, it does not contain detailed cost estimates and funding. Ridership for this initial segment would need to be estimated and evaluated for competitiveness for funding.

The following recommendations for the Cross Valley Rail service were developed in coordination with TCAG, KACAG, KART, Visalia Transit, and Tulare County Regional Transit Agency.

OBJECTIVE 2: RECOMMENDATIONS

- ✓ Execute an MOU to commit to work in partnership with TCAG and KACAG to plan, secure funding, and implement Cross Valley Rail.
- ✓ In the MOU, identify the following steps for the implementation of Cross Valley Rail:

- Phase 1 will secure environmental clearance and right-of-way protection, conduct site selection, negotiate with freight railroads, and begin transit stations in communities without existing transit centers.
 - Phase 2 will implement passenger rail service between Lemoore and Visalia (with stations at Hanford and Kings/Tulare HSR Station).
 - Phase 3 will extend passenger rail service to Huron and Porterville with additional intermediate stations at NAS Lemoore, Farmersville, Exeter, and Lindsey.
- ✓ In the MOU, identify SJJPA as a potential operating agency for Cross Valley Rail.
 - ✓ Acknowledge that additional and more detailed agreements will be needed and that parties would agree to work together toward achieving common agreed upon goals.

5 OBJECTIVE 3: BNSF SLOTS

Assess possible complementary regional uses for existing BNSF slots.

This Study included the investigation of the potential use of existing and potentially available passenger rail slots along the BNSF Corridor for regional commuter rail services once the San Joaquin no longer operates between Merced and Bakersfield (after HSR Interim Service begins operations). The specific commuter rail services that were considered are described in the following sections and include a Fresno–Hanford–Corcoran service and Wasco–Bakersfield service. A commuter rail service between Merced and Fresno was not considered, as Merced, Madera and Fresno will have stations along the HSR system, and therefore, the biggest markets for a commuter rail service between Merced and Fresno would be competing directly with the much faster HSR system.

After consultation with TCAG, KCAG, KART, Visalia Transit, Tulare County Regional Transit Agency, Kern Transit, and Kern COG, it was concluded that commuter rail services should not be pursued for the foreseeable future for the following reasons:

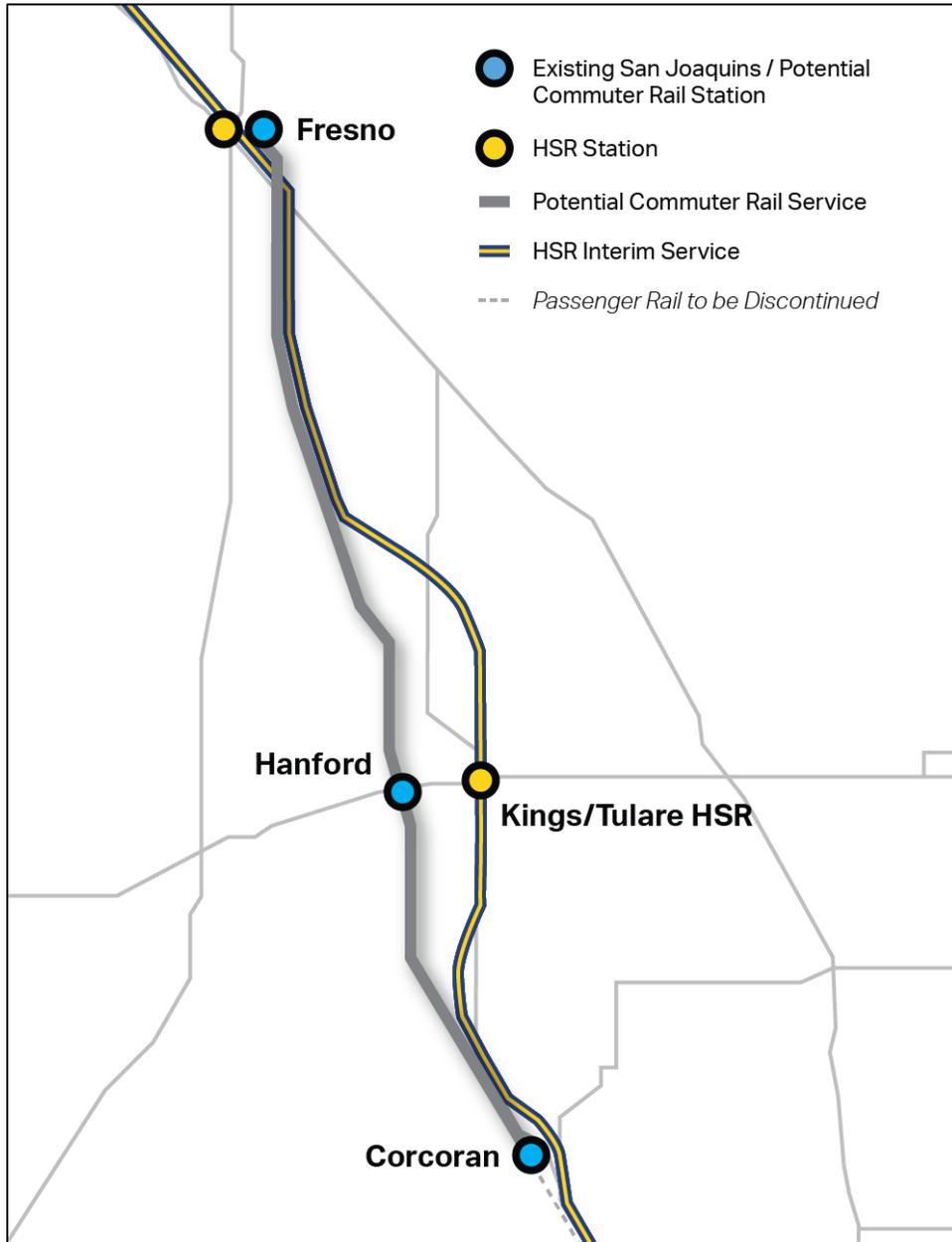
- **Capital and operating and maintenance costs.** Capital costs range from \$78 to \$174 million and operating costs range from \$5.9 to \$8.4 million per year depending on the route. See Appendix B for more details on the cost estimates. Capital costs are high compared to implementing connecting bus services. These costs would be borne by the local/regional communities, which have very limited budget capacity.
- **Competing with HSR markets and services.** Commuter rail service between Fresno, Hanford, and Corcoran would create a parallel rail system to HSR, which would significantly reduce the ridership potential of the commuter rail service, as HSR Interim Service will also run during commute times between Fresno and Kings/Tulare HSR Station near Hanford. Since travel on HSR trains will be much faster than travel on commuter rail trains, many commuters from Kings and Tulare Counties that park and ride would see improved travel times over that of commuter rail. For those accessing HSR via connecting bus services, there would be an increase in total travel time to Fresno from Hanford of about 4 minutes and from Corcoran of about 15 minutes (Table 16 and 17) over commuter rail. Given the similar travel times from Hanford, and the low population of Corcoran, this parallel commuter rail system is not seen as a good investment.

Commuter rail service between Wasco and Bakersfield would not compete directly with HSR (since there would not be an HSR station near Wasco). However, travel times were compared between commuter rail and a connecting bus service from Wasco to Bakersfield. While travel on a connecting bus would be about 10 minutes longer (Table 21), it was concluded that such a large investment in commuter rail would not be worth the investment at this time.

- **Lack of regional support.** For the reasons above, the stakeholders in Kings, Tulare, and Kern Counties have not expressed support for further consideration of commuter rail services on the BNSF. Implementation of Cross Valley Rail and bus connectivity are higher priorities for time and resources.

5.1 Fresno–Hanford–Corcoran Commuter Rail Service Considered

As shown on Figure 26, SJJPA evaluated a Fresno–Hanford–Corcoran Commuter Rail Service that would provide service to Corcoran, Hanford, and Fresno. All three stations would use the existing San Joaquins stations. As a result, no direct connection to the Kings/Tulare HSR Station would be provided as both the Fresno and Kings/Tulare HSR Stations are not adjacent to any existing San Joaquins stations. All three stations would have connections to local transit services.



Source: AECOM 2021

Figure 26: Fresno–Hanford–Corcoran Commuter Rail Service Considered

The full route would be 47 miles long and the end-to-end travel time is estimated at 48 minutes (Table 15).

Table 15: Potential Fresno–Hanford–Corcoran Commuter Rail Service Characteristics

	Station	Distance (miles)	Estimated Travel Time (minutes)	City/Town Population (2018, ACS)	Connections
1	Fresno Amtrak Station	0	0	530,093	Kern Transit
2	Hanford Amtrak Station	30	32	56,910	KART, Cross Valley Corridor
3	Corcoran Amtrak Station	47	48	21,676	Corcoran Area Transit

Source: AECOM 2021

The travel times for the potential Fresno–Hanford–Corcoran Commuter Rail Service were compared to the travel times of the existing San Joaquins service and the estimated travel times of the Kings/Tulare HSR–Hanford–Corcoran Bus Service.

As shown in Table 16, the travel times from Corcoran via commuter rail to key destinations are comparable with slight variations to existing San Joaquins service and the proposed Kings/Tulare HSR–Hanford–Corcoran Connecting Bus Service. However, since the commuter rail does not directly connect to the CAHSR system, the destinations that passengers could reach by direct access to HSR service are limited compared to the proposed Kings/Tulare HSR–Hanford–Corcoran Connecting Bus Service.

Table 16: Travel Time Comparisons for Trips Originating in Corcoran

Destination	Existing (via San Joaquins)	Future (via Commuter Rail)	Future (via HSR + Bus)
Merced	2 hours	N/A	1 hour 33 minutes*
Fresno	50 minutes	50 minutes	1 hour 3 minutes*
Hanford (Downtown)	15 minutes	15 minutes	27 minutes
Wasco	35 minutes	N/A	2 hours 10 minutes**
Bakersfield	1 hour	N/A	1 hour 20 minutes*

Source: AECOM 2021

*10-minute HSR-bus transfer time is assumed for origin-destination pairs that require one transfer.

**20-minute HSR-bus transfer time is assumed for origin-destination pairs that require two transfers.

As shown in Table 17, the travel times from Hanford to key destinations using the commuter rail line are comparable to existing San Joaquins service and the proposed Kings/Tulare HSR–Hanford–Corcoran Connecting Bus Service. However, since the commuter rail would not directly connect to the CAHSR system, the destinations that passengers could reach using the service are limited compared to the Kings/Tulare HSR–Hanford–Corcoran Connecting Bus Service.

Table 17: Travel Time Comparisons for Trips Originating in Downtown Hanford

Destination	Existing (via San Joaquins)	Future (via Commuter Rail)	Future (via HSR + Bus)
Merced	1 hour 40 minutes	N/A	1 hour 6 minutes*
Fresno	32 minutes	32 minutes	36 minutes*
Corcoran	15 minutes	15 minutes	27 minutes
Wasco	55 minutes	N/A	1 hour 43 minutes**
Bakersfield	1 hour 20 minutes	N/A	53 minutes*

Source: AECOM 2021

* 10-minute HSR-bus transfer time is assumed for origin-destination pairs that require one transfer.

**20-minute HSR-bus transfer time is assumed for origin-destination pairs that require two transfers.

For the purpose of this Study, it was assumed that trains would run two northbound trains on weekday mornings and two southbound trains on weekday evenings. Table 18 and Table 19 summarize estimated capital and O&M costs, respectively. See Appendix C for more details on the cost estimates.

Table 18: Estimated Capital Costs for Fresno–Hanford–Corcoran Commuter Rail Service

Improvement	Capital Cost Estimates (FY 2020)
Stations	\$3 M – \$6 M
Rolling Stock	\$25 M – \$70 M
Maintenance Facility	\$50 M
Total Capital Cost	\$78 M – \$126 M

Source: AECOM 2021

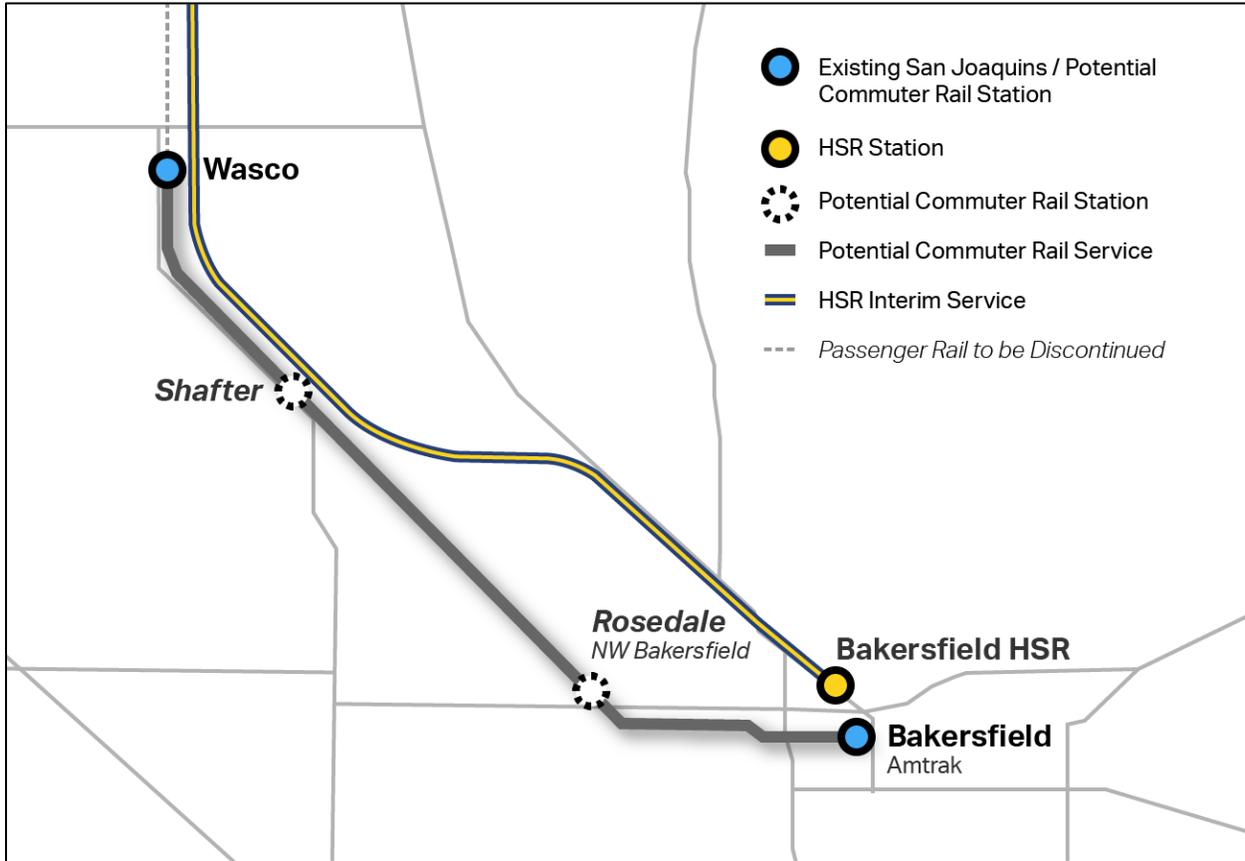
Table 19: Estimated O&M Costs for Fresno–Hanford–Corcoran Commuter Rail Service

O&M Cost Estimates	Lower-bound Estimate (FY 2020)	Upper-bound Estimate (FY 2020)
Agency Cost Items	\$ 1.5 M	\$ 2.5 M
Cost-per-mile Items	\$ 3.2 M	\$ 3.2 M
Other Unit Cost Items	\$ 2.6 M	\$ 2.7 M
Total Annual O&M Cost	\$ 7.3 M	\$ 8.4 M

Source: AECOM 2021

5.2 Wasco–Bakersfield Commuter Rail Service Considered

As shown on Figure 27, SJJPA evaluated a Wasco–Bakersfield Commuter Rail Service that would provide service to Wasco, Shafter, Rosedale, and Bakersfield. The route would stop at the existing Wasco and Bakersfield San Joaquins Station, while adding to new stations in Shafter and Rosedale. The route would not connect directly to HSR Interim Service.



Source: AECOM 2021

Figure 27: Wasco-Bakersfield Commuter Rail Service Considered

The full route would be 27 miles long and the end-to-end travel time is estimated at 30 minutes (Table 20).

Table 20: Potential Wasco–Bakersfield Commuter Rail Characteristics

	Stop	Distance (miles)	Estimated Travel Time (minutes)	City/Town Population (2018, ACS)	Connections
1	Wasco Amtrak Station	0	0	27,976	Kern Transit
2	Shafter City Hall – Pacific Avenue	8	9	20,058	Kern Transit
3	Rosedale Allen and Rosedale	19	21	16,737	GET Bus
4	Bakersfield Amtrak Station	27	30	383,579	Kern Transit, GET Bus

Source: AECOM 2021

The travel times for the potential Wasco–Bakersfield Commuter Rail Service were compared to the estimated travel times of the existing San Joaquins service and the proposed Wasco-Bakersfield HSR Bus Service. As shown in Table 21, the travel times from Wasco to key destinations using the commuter rail line are comparable to the existing San Joaquins service and the Wasco-Bakersfield HSR Bus Service. However, since the commuter rail does not directly connect to the Bakersfield HSR Station, the destinations that passengers could reach using the service are greatly limited compared to the Wasco–Bakersfield HSR Bus Service.

Table 21: Travel Time Comparisons for Trips Originating in Wasco

Destination	Existing (via San Joaquins)	Future (via Commuter Rail)	Future (via HSR + Bus)
Merced	2 hours 35 minutes	N/A	2 hours 11 minutes*
Fresno	1 hour 35 minutes	N/A	1 hour 41 minutes*
Hanford (Downtown)	55 minutes	N/A	1 hour 43 minutes**
Corcoran	35 minutes	N/A	2 hours 10 minutes**
Bakersfield	25 minutes	30 minutes	40 minutes (bus only)

Source: AECOM 2021

* 10 minute HSR-bus transfer time is assumed for origin-destination pairs that require one transfer.

** 20 minute HSR-bus transfer time is assumed for origin-destination pairs that require two transfers.

For the purpose of this analysis, it was assumed that trains would run two northbound trains on weekday mornings and two southbound on weekday evenings. Table 22 and Table 23 summarize estimated capital and O&M costs, respectively. See Appendix C for more details on the cost estimates.

Table 22: Estimated Capital Cost for Wasco-Bakersfield Commuter Rail Service

	Capital Cost Estimates (FY 2020)
Stations	\$42 M – \$54 M
Rolling Stock	\$25 M – \$70 M
Maintenance Facility	\$50 M
Total Capital Cost	\$117 M – \$174 M

Source: AECOM 2021

Table 23: Estimated O&M Cost for Wasco–Bakersfield Commuter Rail Service

O&M Cost Estimates	Lower-bound Estimate (FY 2020)	Upper-bound Estimate (FY 2020)
Agency Cost Items	\$ 1.5 M	\$ 2.5 M
Cost-per-mile Items	\$ 1.8 M	\$ 1.8 M
Other Unit Cost Items	\$ 2.6 M	\$ 2.7 M
Total Annual O&M Cost	\$ 5.9 M	\$ 7.0 M

Source: AECOM 2021

5.3 Recommendation

Below is the recommendation related to the possible utilization of passenger rail slots along the BNSF Corridor between Merced and Bakersfield for regional commuter rail.

OBJECTIVE 3 – RECOMMENDATIONS

- ✓ Use of the BNSF slots for regional commuter rail service does not appear to be feasible in the foreseeable future. Therefore, do not further study commuter rail at this time.