



Technical Memorandum

TO: Woody Deloria, Executive Director, El Dorado County Transportation Commission
FROM: Darryl DePencier, Kimley-Horn
PROJECT: SR-49 American River Confluence Study
DATE: October 20, 2022
SUBJECT: Cost Estimate Analysis & Existing/Proposed Conditions for Vehicle Parking and Shuttle Service along SR-49

COST ESTIMATE ANALYSIS

INTRODUCTION

Kimley-Horn has completed a cost analysis for potential shuttle services between Auburn and both Cool and Placerville, through the Auburn State Recreation Area. The following sections outline the methodology and results of the cost analysis.

METHODOLOGY

Kimley-Horn calculated shuttle cost estimates for the following scenarios:

- Auburn to Cool (30-minute headways)
- Auburn to Cool (1-hour headways)
- Auburn to Placerville (30-minute headways)
- Auburn to Placerville (1-hour headways)

Costs were calculated for each of these scenarios for services year-round, weekend, and from Memorial Day to Labor Day.

To calculate the cost of these services, both vehicle revenue hours and vehicle revenue miles were calculated.

To calculate vehicle revenue hours, it was assumed that there will be a 12-hour service span, with 5 minutes of terminal time for the Auburn-Cool route and 20 minutes of terminal time for the Auburn-Placerville route, as well as a 19 minute one-way travel time on the Auburn-Cool route and a 58 minute one-way travel time on the Auburn-Placerville route.

To calculate vehicle revenue miles, it was assumed there is a 12.6 mile roundtrip distance on the Auburn-Cool route and a 52.2 mile roundtrip distance on the Auburn-Placerville route.

To calculate daily costs from the vehicle revenue hours and vehicle revenue miles, costs for each of these factors was determined by averaging the operating costs in Auburn, El Dorado, and Placer counties. Operating expenses data was also analyzed to determine the percentage of operating expenses used for labor, fuel, and maintenance. This data was taken from the National Transit Database. **Table 1** below shows the cost parameters used.

Table 1: Cost Parameters

	\$ per VRM	\$ per VRH	% Labor	% Fuel	% Maintenance
Auburn County	\$ 10.28	\$ 142.27	n/a	n/a	n/a
El Dorado County	\$ 6.83	\$ 125.99	68.4%	8.8%	22.8%
Placer County	\$ 8.25	\$ 167.18	62.9%	5.2%	31.9%
Average	\$ 8.45	\$ 145.15	65.7%	7.0%	27.3%

For electric buses, it assumed that fuel costs are reduced by 69.8% and maintenance costs are reduced by 47.4%, compared to diesel bus operations (Quarles, Kockelman, & Mohamed, 2020). Total operating costs are assumed to be reduced by 17.8%.

It is assumed that there will be 6 stops on the Auburn-Cool route and 15 stops on the Auburn-Placerville route. It is assumed that each stop will cost \$30,000. This cost assumes installation of a pole and sign, as well as pavement for the bus pull out.

The number of buses needed for each scenario was calculated by dividing the total round trip time by the headway, rounding up to the nearest whole number, and adding an additional bus for reserve. It is assumed that each bus will cost \$500,000 for a diesel bus, and \$750,000 for an electric bus.

RESULTS

The operating cost estimates for each route and each scenario and presented in **Tables 2 - 5** below.

Table 2: Auburn - Cool (1-hour headways)

	Diesel	Electric
Vehicle Revenue Hours	8.6	8.6
Daily Operating Cost (VRH)	\$ 1,248	\$1,025
Vehicle Revenue Miles	151.2	151.2
Daily Operating Cost (VRM)	\$1,278	\$1,050

	Diesel	Electric
Daily Operating Cost (Average)	\$1,263	\$1,038
Operating Cost - Memorial Day to Labor (97 days)	\$122,530	\$100,688
Operating Cost – Year-Round (365 days)	\$461,068	\$378,877
Operating Cost – Weekend Only (104 days)	\$131,373	\$107,954
Buses Needed	2	2
Bus Costs	\$1,000,000	\$1,500,000
Stops Needed	6	6
Stop Costs	\$180,000	\$180,000

Table 3: Auburn - Cool (30-minute headways)

	Diesel	Electric
Vehicle Revenue Hours	17.2	17.2
Daily Operating Cost (VRH)	\$2,496	\$2,051
Vehicle Revenue Miles	302.4	302.4
Daily Operating Cost (VRM)	\$2,556	\$2,100
Daily Operating Cost (Average)	\$2,526	\$2,076
Operating Cost - Memorial Day to Labor (97 days)	\$245,061	\$201,376
Operating Cost – Year-Round (365 days)	\$922,137	\$757,755
Operating Cost – Weekend Only (104 days)	\$262,746	\$215,908
Buses Needed	3	3
Bus Costs	\$1,500,000	\$2,250,000
Stops Needed	6	6
Stop Costs	\$180,000	\$180,000

Table 4: Auburn - Placerville (1 hour headways)

	Diesel	Electric
Vehicle Revenue Hours	27.2	27.2
Daily Operating Cost (VRH)	\$3,948	\$3,244
Vehicle Revenue Miles	626.4	626.4
Daily Operating Cost (VRM)	\$5,295	\$4,351
Daily Operating Cost (Average)	\$4,622	\$3,797
Operating Cost - Memorial Day to Labor (97 days)	\$448,293	\$368,379
Operating Cost – Year-Round (365 days)	\$1,686,876	1,386,170
Operating Cost – Weekend Only (104 days)	\$480,644	\$394,963
Buses Needed	4	4
Bus Costs	\$2,000,000	\$3,000,000
Stops Needed	15	15
Stop Costs	\$450,000	\$450,000

Table 5: Auburn - Placerville (30 minute headways)

	Diesel	Electric
Vehicle Revenue Hours	54.4	54.4
Daily Operating Cost (VRH)	\$7,896	\$6,488
Vehicle Revenue Miles	1252.8	1252.8
Daily Operating Cost (VRM)	\$10,590	\$8,702
Daily Operating Cost (Average)	\$9,243	\$7,595
Operating Cost - Memorial Day to Labor (97 days)	\$896,586	\$736,759
Operating Cost – Year-Round (365 days)	\$3,373,752	\$2,772,340

	Diesel	Electric
Operating Cost – Weekend Only (104 days)	\$961,288	\$789,927
Buses Needed	6	6
Bus Costs	\$3,000,000	\$4,500,000
Stops Needed	15	15
Stop Costs	\$450,000	\$450,000

EXISTING AND PROPOSED CONDITIONS FOR VEHICLE PARKING AND SHUTTLE SERVICE ALONG SR-49

INTRODUCTION

The following examines the current and proposed conditions for private vehicle parking and shuttle service along SR-49 in the Auburn State Recreation Area. Kimley-Horn previously completed a cost estimate analysis for shuttle service between Auburn State Recreation Area and the unincorporated community of Cool and the City of Placerville. Findings in this memorandum examine the impact that the increase in parking supply and daily usage rate of parking spaces can be used to subsidize shuttle service through the Recreation Area. The findings of this analysis are presented below.

EXISTING CONDITIONS

During the summer season (generally Memorial Day weekend to Labor Day weekend), between 400-500 vehicles park in the confluence area per day. Currently, there are 221 spaces in the parking inventory that are free, consisting of 126 lot spaces and 95 pull-out spaces. In addition, the Park Service hosts an additional 12 spaces, which are not factored into the revenue calculations, but do address parking demand. When dividing the total number of daily vehicles by the number of available parking spaces, this leads to a parking space utilization of 1.8 to 2.3 vehicles per space, per day.

The existing flat-rate for parking in the recreation area is \$10 per vehicle per day. Assuming the same parking fee is charged for the 221 existing free spaces with a maximum turnover of 2.3 vehicles per parking space per day, each of the 221 existing parking spaces generates \$23 in revenue a day, for a total of \$5,083 of potential new revenue per day.

PROPOSED CONDITIONS

An additional 10 lot spaces and 11 pull-out spaces are proposed for the confluence area, bringing the total number of spaces to 242 spaces, with capacity for roughly 50 more vehicles per day. This equates to a total of \$5,566 per day in potential “new” parking revenue. An additional 80 free park-and-ride spaces are proposed in Cool to encourage visitors to use the shuttle service.

Shuttle operating costs could potentially be subsidized using parking fees. All calculations were conducted assuming the shuttle service could claim 50% of parking revenue for the busy summer

season (97 days from Memorial Day to Labor Day). If this is the case, then \$247,000 would be contributed to shuttle operations over the summer season. Under this scenario, the costs to run shuttles on an hourly or half-hourly frequency for the entire summer season or every weekend (104 days total) throughout the year could be subsidized (see **Table 6**).

In addition to parking fees, fare collection for the shuttle service could be used to support operations, slightly lowering the subsidy needed for parking. Assumptions include standard patterns regarding drivers choosing to switch to transit: increased frequency leads to increased rider convenience and higher ridership, and charging fares lowers competitiveness for vehicles with multiple occupants, as the cost for parking remains fixed at \$10 per vehicle regardless of the number of occupants, while bus fares are charged per person.

Estimates generated assume that shuttles will operate for 12 hours a day, and that fares will cover a two-way trip. In peak conditions and with 30-minute headways, an estimated 5% of peak vehicle demand will be captured by the shuttle service. With an average vehicle occupancy of 3, this would generate 75 riders per day with no fare, 60 riders with a \$2.00 fare (assuming the capture would drop to 4%), and 38 riders with a \$3.50 fare (with the capture lowered to 2.5%). This would lead to an additional revenue of \$0, \$120, and \$133, per day respectively (See **Table 7**).

With a 60-minute headway, it is assumed that only 3% of vehicle trips would be captured by the service, leading to a total of 45 daily riders with no fare, 36 with a \$2.00 fare (assuming the capture lowers to 2.4%), or 23 with a \$3.50 fare (with the capture lowered to 1.5%), leading to a total of \$0, \$72, and \$81 of additional revenue per day respectively (See **Table 7**).

Alternative revenue services to parking fees could include Congestion Mitigation and Air Quality Improvement (CMAQ) funding, which could be used to subsidize shuttle operation costs for a pilot period of up to 3 years. These federal funds are programmed by the El Dorado County Transportation Commission (EDCTC) to fund transportation projects that improve air quality and relieve congestion. Over \$8.2 million in funding was available for the 2022 Call for Projects. Transportation Development Act (TDA) funding, Local Transportation Funding (LTF) or funding from the El Dorado Air Quality Management District (AQMD) could also be utilized.

RESULTS AND CONCLUSION

If shuttle service can claim 50% of peak parking revenues during the summer season (about \$247,000), then bus service can be subsidized between Auburn and Cool on all 97 days of the summer season, or all 104 weekend days throughout the year, regardless of fare collection (**Table 6**). Year-round shuttle service between Auburn and Cool, and all service scenarios between Auburn and Placerville could not be subsidized using this model. All revenues from the different service and fare pricing scenarios, while adding some value, are not large enough to cause any of the aforementioned scenarios to reach the threshold required to be subsidized (**Table 8**). Therefore, it is recommended that providing shuttle service under the proposed conditions be explored between Auburn and Cool only during the summer season or weekends only, as these are the only cost-effective scenarios.

Table 6: Estimated Operating Costs for Shuttle Service in Various Scenarios			
Scenario	Days	Auburn – Cool	Auburn - Placerville
Summer Season – 30 Min Headway	97	\$201,376	\$736,759
Summer Season – 60 Min Headway	97	\$100,688	\$368,379
Weekends Only – 30 Min Headway	104	\$215,908	\$789,927
Weekends Only – 60 Min Headway	104	\$107,954	\$394,963
Year Round – 30 Min Headway	365	\$757,755	\$2,772,340
Year Round – 60 Min Headway	365	\$378,877	\$1,386,170
Note: Scenarios in bold are paid entirely with 50% of peak parking revenues			

Table 7: Daily Shuttle Service Ridership and Fare Collection			
Metric	\$0.00 Fare	\$2.00 Fare	\$3.50 Fare
Ridership (30 min)	75	60	38
Fare Revenue (30 min)	\$0	\$120	\$133
Ridership (60 min)	45	36	23
Fare Revenue (60 min)	\$0	\$72	\$81

Table 8: Additional Revenue Produced through Fare Collection				
Scenario	Days	\$0.00 Fare	\$2.00 Fare	\$3.50 Fare
Summer Season – 30 Min Headway	97	\$0	\$11,640	\$12,901
Summer Season – 60 Min Headway	97	\$0	\$6,984	\$7,857
Weekends Only – 30 Min Headway	104	\$0	\$12,480	\$13,832
Weekends Only – 60 Min Headway	104	\$0	\$7,488	\$8,424
Year Round – 30 Min Headway	365	\$0	\$43,800	\$48,545
Year Round – 60 Min Headway	365	\$0	\$26,280	\$29,565