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YARTS Strategic Plan White Paper Draft Plan Recommendations

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TO: Stacie Guzman, YARTS Executive Director

FROM: Gordon Shaw, Principal, LSC Transportation Consultants, Inc.

Introduction

This White Paper presents LSC Transportation Consultants, Inc.'s initial draft recommendations for the YARTS Strategy Study. It is intended as the basis for further discussion and refinement by the YARTS Board and Authority Advisory Committee. It builds upon the evaluation of existing conditions and issues presented in the Working Paper date January 5, 2021. As detailed in the previous document, the key near-term issues facing YARTS are:

- The very important issue of replacing the aging existing YARTS-owned fleet.
- The beneficial need to expand the YARTS-owned fleet to avoid the need for contractor-provided vehicles.
- Issues with shifting to a battery electric bus fleet in the immediate future.
- Changes in ridership patterns and connecting Amtrak *San Joaquins* service that impact the optimal service plan.
- Assuring sustainable funding not only for operations, but for ongoing administration and capital needs.

An overall goal of this study is to define a scope of work for the Request For Proposals (RFP) that will guide the selection of a contractor at the end of the current service contract in November of 2022, as well as maximize the potential for a competitive bid process. A draft RFP should be developed by the Summer

of 2021 in order to provide potential bidders with an opportunity to observe YARTS service in full operation.

In short, this plan would reduce services in order to generate the local funds (within existing available local resources) to replace the aging YARTS-owned fleet and expand it to reduce long-term operating costs. This document first presents service recommendations, with a focus on reductions in service to generate local match funding. Next, capital recommendations are presented, followed by financial and institutional strategies. This plan also reflects the recent decision to end funding provided through Fresno Council of Governments after the summer 2022 operating season, which affects the 41 Route.

SERVICE RECOMMENDATIONS

The following presents recommended service modifications to all routes. Table 1 presents a summary of the recommended service modifications, while Table 2 presents details of the analysis.

Table 1: Draft Recommended Service Reduction Plan to Generate Local Capital Match Funding									
<i>Also Reflecting Elimination of Fresno Participation and Recommended Oakhurst-Valley Service</i>									
Service	Plan Element	Plan Element Annual Impact				2019 Total		Percent Change From 2019	
		Change in Operating Subsidy	Ridership	Vehicle-Hours	Peak Buses in Operation	Ridership	Vehicle-Hours	Ridership	Vehicle-Hours
140 Route	Drop Run 2, Year-Round	-\$65,300	-1,700	-387	0				
	Drop Runs 1 and 8, Year-Round	-\$243,800	-4,500	-1,419	-1				
	Total	-\$309,100	-6,200	-1,806	-1	60,305	13,060	-10%	-14%
120 Route	Reduce 3 Runs per Day to Groveland -- Valley	-\$133,400	-1,100	-760	0	16,135	2,197	-7%	-35%
395 Route	Eliminate Service After September 15	-\$30,700	-830	-190	0	6,279	1,318	-13%	-14%
TOTAL 3 Routes - Excludes Consideration of 41 Route		-\$473,200	-8,130	-2,756	-1	82,719	16,574	-10%	-17%
41 Route	Eliminate All Service	-\$272,500	-8,636	-3,097	-3	--	--	--	--
	Initiate Oakhurst-Valley Service	\$132,600	5,900	831	2	--	--	--	--
	Net Change	-\$139,900	-2,736	-2,267	-1	8,636	3,097	-32%	-73%
TOTAL 4 Routes -- If 41 Route Eliminated		-\$745,700	-16,766	-5,854	-4	91,355	19,671	-18%	-30%
TOTAL 4 Routes -- With Oakhurst-Valley Service		-\$613,100	-10,866	-5,023	-2	91,355	19,671	-12%	-26%

140 Route Modifications

The existing utilization of buses over the course of a summer day is important in defining which service options can reduce the number of buses needed to operate YARTS service. This is a straightforward process for the 120 Route (as all three routes are in operation at once) and the 395/120 Route (with both buses in operation at once). Table 3 shows the vehicle utilization over the course of a day for the 140 Route. As shown, six buses are in operation (including layover time in the Valley and deadhead time) over much of the day, with a peak of seven buses in the 10 AM hour.

Table 2: YARTS Alternative Service Reductions Analysis

Route	1-Way Run Parameters			Daily Service		Annual		Annual Operating Cost	Change in Peak Buses	Ridership	Farebox Revenue	Operating Subsidy	Psgr-Trip / VSH	Operating Subsidy / Psgr				
	Hours	Miles	Runs	Days/Yr	Hours	Miles												
ROUTE 140																		
Drop Run 2	Summer	1.5	51	-1	63	-95	-3,213	-\$18,000	0	-400	-\$2,000	-\$16,000	4.2	\$40.00				
	Non-Summer	1.5	51	-1	195	-293	-9,945	-\$56,000	0	-1,300	-\$6,700	-\$49,300	4.4	\$37.92				
	Total					-387	-13,158	-\$74,000	0	-1,700	-\$8,700	-\$65,300	4.4	\$38.41				
Drop Runs 1 and 8	Summer	2.5	87	-1	63	-158	-5,481	-\$30,000	-300	-300	-\$1,500	-\$28,500	1.9	\$95.00				
	Winter	3	87	-1	63	-189	-5,481	-\$35,000	-400	-400	-\$2,100	-\$32,900	2.1	\$82.25				
	Total					-347	-10,962	-\$65,000	-1	-700	-\$3,600	-\$61,400	2.0	\$87.71				
Drop Runs 7 and 14	Summer	2.5	87	-1	195	-488	-16,965	-\$93,000	-1,300	-1,300	-\$6,700	-\$86,300	2.7	\$66.38				
	Winter	3	87	-1	195	-585	-16,965	-\$109,000	-2,500	-2,500	-\$12,900	-\$96,100	4.3	\$38.44				
	Total					-1,073	-33,930	-\$202,000	0	-3,800	-\$19,600	-\$182,400	3.5	\$48.00				
Year Round					-1,419	-44,892	-\$267,000	-1	-4,500	-\$23,200	-\$243,800	3.2	\$54.18					
Drop Runs 7 and 14	Summer	3.2	87	-1	88	-282	-7,656	-\$52,000	-1,200	-1,200	-\$6,200	-\$45,800	4.3	\$38.17				
	Winter	2.5	87	-1	88	-220	-7,656	-\$42,000	-700	-700	-\$3,600	-\$38,400	3.2	\$54.86				
	Total					-502	-15,312	-\$94,000	-1	-1,900	-\$9,800	-\$84,200	3.8	\$44.32				
Drop Runs 7 and 14	Summer	3.2	87	-1	273	-874	-23,751	-\$161,000	-4,700	-4,700	-\$24,100	-\$136,900	5.4	\$29.13				
	Winter	2.5	87	-1	273	-683	-23,751	-\$130,000	-4,700	-4,700	-\$24,100	-\$105,900	6.9	\$22.53				
	Total					-1,556	-47,502	-\$291,000	0	-9,400	-\$48,200	-\$242,800	6.0	\$25.83				
Year Round					-2,058	-62,814	-\$385,000	-1	-11,300	-\$58,000	-\$327,000	5.5	\$28.94					
Route 120																		
Reduce 2 Runs per Day to Groveland -- Valley						-1.44	-37	4	88.00	-507	-13,024	-\$93,000	0	-700	-\$3,600	-\$89,400	1.4	\$127.71
Reduce 3 Runs per Day to Groveland -- Valley						-1.44	-37	6	88.00	-760	-19,536	-\$139,000	0	-1,100	-\$5,600	-\$133,400	1.4	\$121.27
Eliminate Service After Labor Day						3.25	84	6	-9	-176	-4,536	-\$32,000	0	-430	-\$2,200	-\$29,800	2.5	\$69.30
Route 395/120 East																		
Eliminate October Service						7.3	220	1	-11	-80	-2,420	-\$15,000	0	-250	-\$1,300	-\$13,700	3.1	\$54.80
Eliminate Sept 15-30 svc						7.3	220	1	-15	-110	-3,300	-\$20,000	0	-531	-\$2,700	-\$17,300	4.8	\$32.58
Eliminate Service After September 15						7.3	220	1	-26	-190	-5,720	-\$35,000	0	-830	-\$4,300	-\$30,700	4.4	\$36.99
Oakhurst - Valley Service																		
Summer - June						2.1	48	2	103	433	9,888							
1 to Mid-Sept.						1.9	48	2	103	398	9,888							
Total										831	19,776	\$171,000	2	5,900	\$38,400	\$132,600	7.1	\$22.47

Table 3: Existing Buses Required In Service by Time of Day -- 140 Summer Schedule

Period Start Time	Run Pairs										# of Buses in Operation
	2 Solo	1 & 4	3 & 6	5 & 8	7 & 10	9 & 14	11 & 12	13 & 16	15 & 18		
4:45 AM		Merced									1
5:00 AM	Deadhead From Merced	Merced									2
5:15 AM		Merced									2
5:30 AM		Merced	Merced								3
5:45 AM	Midpines	Merced									3
6:00 AM		Merced									4
6:15 AM		Merced									4
6:30 AM		Merced									4
6:45 AM		Merced									5
7:00 AM		Merced									5
7:15 AM	Merced	YNP									5
7:30 AM											4
7:45 AM											4
8:00 AM		YNP	YNP								5
8:15 AM		YNP									5
8:30 AM		YNP					Deadhead From Merced				5
8:45 AM		YNP					Mariposa	Merced			6
9:00 AM								Merced			6
9:15 AM											6
9:30 AM											6
9:45 AM											6
10:00 AM											6
10:15 AM											6
10:30 AM											6
10:45 AM									Merced		7
11:00 AM		Merced									7
11:15 AM											6
11:30 AM											6
11:45 AM								YNP			6
12:00 PM											6
12:15 PM											6
12:30 PM											6
12:45 PM											6
1:00 PM											6
1:15 PM											6
1:30 PM											6
1:45 PM									YNP		6
2:00 PM											6
2:15 PM											6
2:30 PM			YNP								6
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4:45 PM											6
5:00 PM											6
5:15 PM											6
5:30 PM			Merced				YNP				6
5:45 PM										Merced	6
6:00 PM									YNP		5
6:15 PM											5
6:30 PM											5
6:45 PM							Merced	Mariposa			5
7:00 PM											4
7:15 PM											4
7:30 PM							Deadhead To Merced	Merced			4
7:45 PM											2
8:00 PM											2
8:15 PM											2
8:30 PM											2
8:45 PM									Merced	YNP	2
9:00 PM										YNP	1
9:15 PM											1
9:30 PM											1
9:45 PM											1
10:00 PM											1
10:15 PM										Midpines	1
10:30 PM											1
10:45 PM											1
11:00 PM										Deadhead To Merced	1
11:15 PM											1

Note 1: Including layover in YNP and deadhead time.

The focus of reductions on the 140 Route is a reduction in the number of daily runs. In assessing the best way to accomplish this, the individual runs were reviewed. Some runs are needed to meet key train connection times in Merced, specifically eastbound departures from Merced at 10:30 AM and 5:45 PM and westbound departures from YNP at 8:15 AM and 4:35 PM. Other runs also need to be operated to position buses for these Amtrak connection runs. Note that this analysis is based on the pre-COVID schedule and ridership levels, though the current run numbering system is used.

140 Route: Eliminate Run 2

Run 2 currently starts in Midpines at 5:54 AM on weekdays (year-round). The bus is deadheaded up from Merced to start the run. Even before COVID in 2019, ridership on this route was low at 5.1 passengers per day in July, 5.2 in September and 3.4 in January. In 2020, ridership dropped to 0.9 riders per day in July and only 0.4 in September.

Eliminating this run would reduce annual operating costs by a total of \$63,000 per year -- \$15,000 in the summer operating season and \$48,000 in the remainder of the year. Assuming that ridership would return to pre-pandemic levels and that half of the reduction in riders on this run would also result in a lost rider on the return trip, a total of 1,700 passenger-trips per year would be lost (400 in the summer season and 1,300 in the remainder of the year). Considering the loss in revenue, this would generate a subsidy savings of \$69,200 per year. The cut in service would reduce ridership by 4.4 passengers for every hour of reduced service and save roughly \$41 for every passenger-trip lost. Note that the service cut does not reduce the peak number of buses needed to operate YARTS 140 Route service, as this peak occurs later in the summer operating day.

140 Route: Eliminate Runs 1 and 8 and Shift Run 10 to a 3:15 PM Departure

Of the other runs not needed for Amtrak connections, the lowest ridership (pre-COVID) is on the 5:00 AM eastbound run (Run 1) and the 4:15 westbound run (Run 10). However, as Runs 1 and 8 operate on weekdays only, this option would eliminate the existing Runs 1 and 8, and shift Route 10 to a 3:15 PM departure. Ridership on Run 8 (departing the valley at 3:15 PM) is higher than on Run 10 (4:15 PM departure), indicating that passengers would be better served if the Run 10 schedule is shifted to 3:15 PM. (The outbound Run 4, which provides an important Amtrak connection, would be paired with remaining Run 3.) The impacts would be as follows:

- In the summer only, eliminating these runs would reduce operating costs by \$65,000 per year. Ridership would drop by 1,100 per year, resulting in a loss of \$5,700 in farebox revenues and a net reduction in operating subsidy needs of \$59,300 per year. This would reduce the number of buses needed to operate YARTS by one.
- In the non-summer operating seasons, operating costs would be reduced by \$202,000 per year. Ridership would drop by 5,800 per year, resulting in a loss of \$29,800 in farebox revenues and a net reduction in operating subsidy needs of \$172,200 per year. As peak bus fleet needs occur in the summer, this option would not change the peak fleet needs.
- Over the whole year, operating costs would be reduced by \$267,000, ridership by 6,900, fare revenue by \$35,500 and required operating subsidy by \$231,500.

Cutting these runs in the summer would be a better option than in the non-summer seasons. In the summer season, ridership would be reduced by 3.2 passengers per vehicle-hour of service, and \$53.91 in operating subsidy would be saved for every passenger eliminated. In comparison, these figures would be 4.9 and \$33.55 in the non-summer seasons.

140 Route: Other Changes Considered But Not Recommended

In addition to the recommended reductions above, the following changes were considered but are not recommended at present:

- If additional subsidy savings are needed, the next paired set of runs that should be considered are the 6:45 AM eastbound departure (Run 7) and the 5:15 PM westbound departure (Run 14). However, this would have a substantially greater impact on ridership (a loss of approximately 11,300 passengers per year) and is therefore not recommended.
- Another alternative would be to shorten some of the 140 Route runs to provide Mariposa-Yosemite Valley service only. In concept, this would allow a single bus and driver to make multiple round-trips per day. It would not currently be effective to operate additional trips between El Portal and the Valley, given the limited lodging and intercept parking opportunities in El Portal¹. A round-trip between Mariposa and the Valley requires roughly 4 hours of running time. This means that a bus making an early morning eastbound run into the Valley would not be able to start a second eastbound run until roughly 10:30 AM. This would provide additional capacity for travel into the Park in the mid-day, such as for Mariposa visitors that want to have a leisurely half-day trip to the Park, or day visitors driving to Mariposa in the morning and park-and-riding to the Park. However, there already is available YARTS capacity for these trips, such as existing Run 140-11 (10:15 AM eastbound service from the Mariposa Park-and-Ride and Run 140-13 (a noon eastbound departure). Ridership on these existing runs is relatively low, with roughly 35 percent existing passenger load factor. Given the low potential to generate new ridership and an estimated annual marginal operating cost of \$43,000, this option is not considered further as part of this Strategy Study. However, it may be a valid element of a longer-term plan if additional intercept parking (particularly in the El Portal area) is developed.

395 Route Modifications

395 Route: Reduce Fall Days of Service

Options to reduce 395 Route operating subsidy requirements are limited. The 395 Route currently provides only two round-trips per day, which is a reasonable minimum level of service that provides at least a few options for passengers. The ridership pattern (reflecting the relative lodging capacity) indicates that a shortened service only as far east as Lee Vining would not be effective. In addition, previous service providing a shorter run between Mammoth Lakes and Tuolumne Meadows was not effective and generated only low ridership. Given this, the only realistic means of reducing service on this

¹ Note that a longer term strategy of expanding intercept parking in El Portal served by short YARTS runs may well be feasible but would have an implementation period longer than the focus of this Strategy Study.

route is to consider reduction in the days of service. As the start of service is defined by when Tioga Pass opens, this in actuality is limited to possibly moving up the season end date.

In 2019, the 395 Route was operated until October 11th with a single-round trip after August 31st. Two options were considered, as discussed below:

- **Eliminate Service After September 30:** Ridership figures indicate that approximately 250 passenger-trips (or 125 round-trips if all make a round-trip) are served after September 30. Eliminating this service would reduce operating costs by \$15,000 and reduce operating subsidy by \$13,700 per year. \$54.80 would be saved per passenger-trip eliminated, or 3.1 per vehicle-hour.
- **Eliminate Service After September 15:** If service were ended after the second weekend after Labor Day (roughly September 15th) the subsidy savings would be increased to \$30,700, while the reduction in ridership would total 830. Overall, YARTS operating subsidy would be reduced by \$36.99 for every passenger-trip lost, or 4.4 per vehicle-hour.

While the first option (eliminating service after September 30) offers a better cost savings per passenger trip, it does not significantly decrease the operating cost for the 395 Service. To provide additional capital local match funding and since the cost-effectiveness and productivity of the service in late September is relatively low, it is recommended that service be eliminated after the second weekend in September (approximately September 15th).

120 Route Modifications

Route 120 is operated in summer only, over a relatively short season (mid-June to mid-September). The three round-trips operated per day are some of the most effective overall runs in the YARTS system. As such, options to reduce the number of runs or the days of service were not considered. However, a detailed evaluation of the ridership by route segment indicates that the portion of the route west of Groveland is very ineffective, which indicates the potential to reduce costs by shortening the route.

120 Route: Reduce Route to Groveland – Yosemite Valley

It is recommended that the 120 Route be reduced to service between Groveland (Mary Laveroni Park) and Yosemite Valley. Table 4 presents a summary of ridership by stop for the busy summer month of July in 2019 and 2020. As indicated, in July 2019 of all boardings outside the National Park, 92 percent were between Groveland and the park boundary, while only 8 percent were west of Groveland. This ratio was even more skewed in 2020, with 94 percent between Groveland and the park boundary and 6 percent to the west. As a result of this low ridership and the fact that roughly 55 percent of the operating cost is generated by the one hour and 45 minute schedule time per one-way trip west of Groveland, the current service results in a subsidy of \$121 per one-way trip served west of Groveland – or \$242 in public funding for every passenger provided with a round-trip.

An example schedule is shown in Table 5 (which is modified somewhat from the current schedule to provide more convenient service times for the remaining stops). This modification will reduce ridership by 1,100 per year or an average of 12 per day (assuming that none of the ridership generated by the Jamestown – Black Oak Casino stops choose to drive to Groveland to catch the bus). However, it will reduce annual operating subsidy needs by \$133,400 per year.

Table 4: Route 120 Average Daily Ridership in July				
Stop	Average Daily Boardings			
	2019		2020	
	#	% Outside YNP	#	% Outside YNP
Black Oak Hotel	0.8	1.2%	0.5	1.0%
Sonora Best Western	1.7	2.5%	1.0	2.2%
Cal Inns Washington	1.1	1.6%	0.9	2.0%
Jamestown	2.1	3.1%	0.3	0.7%
<i>West of Groveland</i>	5.7	8.3%	2.7	5.9%
Mary Laveroni Park	7.6	11.1%	3.9	8.5%
Yosemite Pines RV Park	29.8	43.6%	18.9	41.0%
Buck Meadows Resort	4.7	6.8%	6.0	13.0%
Yosemite Lakes Campground	20.5	30.1%	14.6	31.7%
<i>Outside the Park</i>	68.3	100%	46.2	100%
Big Oak Flat	2.0		2.0	
Crane Flat Gas Station	0.5		0.2	
Yosemite Visitors Center	73.6		48.5	
Total	148.2		107.1	

Source: VIA Monthly Reports

Table 5: 120 Route Groveland - Valley Schedule				
June 22 to September 11				
Yosemite → Groveland				
	Location	Run 120-2*	Run 120-4	Run 120-6*
	Yosemite Valley Visitor Center	3:30 PM	4:30 PM	5:30 PM
Crane Flat	Crane Flat	4:05 PM	5:05 PM	6:05 PM
Big Oak Flat, Rush Creek, Yosemite Lakes	Big Oak Flat/Park Entrance Gate	4:19 PM	5:19 PM	6:19 PM
	Rush Creek Lodge	4:24 PM	5:24 PM	6:24 PM
	Yosemite Lakes Campground	4:29 PM	5:29 PM	6:29 PM
Bucks Meadows, Groveland	Buck Meadows Restaurant	4:56 PM	5:56 PM	6:56 PM
	Yosemite Pines RV Park	5:01 PM	6:01 PM	7:01 PM
	Groveland - Laveroni Park	5:18 PM	6:18 PM	7:18 PM
Sonora, Jamestown	Jamestown - Rocca Park	REQ	REQ	REQ
	Downtown Sonora - Heritage Inn	REQ	REQ	REQ
	Sonora Best Western	REQ	REQ	REQ
	Black Oak Hotel and Resort	7:15 PM	7:45 PM	8:50 PM
Groveland → Yosemite				
	Location	Run 120-1*	Run 120-3	Run 120-5*
Sonora, Jamestown	Black Oak Hotel and Resort	6:40 AM	7:40 AM	8:40 AM
	Sonora Best Western	7:00 AM	8:00 AM	9:00 AM
	Downtown Sonora - Heritage Inn	7:15 AM	8:15 AM	9:15 AM
	Jamestown - Rocca Park	7:25 AM	8:25 AM	9:25 AM
Bucks Meadows, Groveland	Groveland - Laveroni Park	8:00 AM	9:00 AM	10:00 AM
	Yosemite Pines RV Park	8:10 AM	9:10 AM	10:10 AM
	Buck Meadows Restaurant	8:24 AM	9:24 AM	10:24 AM
Big Oak Flat, Rush Creek, Yosemite Lakes	Yosemite Lakes Campground	8:41 AM	9:41 AM	10:41 AM
	Rush Creek Lodge	8:46 AM	9:46 AM	10:46 AM
	Big Oak Flat/Park Entrance Gate	8:59 AM	9:59 AM	10:59 AM
Crane Flat	Crane Flat	9:09 AM	10:09 AM	11:09 AM
	Yosemite Visitor Center	9:44 AM	10:44 AM	11:44 AM
* Note -- Only Operated Through August 31.				

120 Route: Other Changes Considered But Not Recommended

Keeping one of the existing three daily round-trips on the existing full route to Sonora and Black Oak Casino would still generate \$89,400 in annual operating subsidy savings. It would, however, still yield very inefficient service west of Groveland, would generate less savings for local capital match purposes, and would constrain riders to only a single service time in the morning and in the afternoon, and is therefore not recommended.

Another option would be to eliminate the 9 days of service (using a single bus only) currently operated after the Labor Day weekend until the 3rd weekend in September. This would generate a modest (\$29,800) additional operating subsidy savings but would eliminate service in a period of the year when ridership is growing and is therefore not recommended.

Route 41 Service

The Fresno Council of Governments has recently confirmed that funding for the Route 41 service will end once the existing Congestion Mitigation Air Quality (CMAQ) funds are fully expended at the end of the 2022 summer operating season. This will result in the cessation of service to/from Fresno after the 2022 operating season. However, the ridership generated in the Oakhurst area has been relatively strong and has the potential to grow with the expansion of lodging in the community. A review of the Route 41 ridership data during August of 2019 and 2020 is presented in Table 6. As shown, for 2020 (which actually generated higher daily ridership than 2019), a large majority (74 percent) of boardings outside of the National Park was generated at the Oakhurst and Tenaya Lodge stops, compared with only 4 percent at the Coarsegold stop, 5 percent at the Chukchansi stop and a total of 17 percent at the Fresno stops. This is consistent with the strong pattern of ridership from the other immediate “gateway” communities (such as Groveland and Mariposa) on YARTS. A reasonable strategy is therefore to consider a service for the southern gateway community of Oakhurst in Madera County.

Stop	Average Daily Boardings			
	2019		2020	
	#	% Outside YNP	#	% Outside YNP
Fresno Airport (FAT)	7.8	21%	3.3	7.8%
Amtrak/Greyhound	5.9	15%	1.7	3.9%
North Fresno	4.3	11%	2.3	5.4%
Chukchansi	2.4	6%	2.1	4.8%
Coarsegold Historic Village	4.0	10%	1.7	4.1%
Oakhurst Best Western	11.0	29%	19.4	45.5%
Tenaya Lodge	2.7	7%	12.1	28.4%
<i>Outside the Park</i>	38.2	100%	42.6	100.0%
The Mariposa Grove	4.1		2.0	
Wawona Store	3.9		0.8	
Yosemite Visitor Center	33.5		35.6	
Total	79.6		81.0	

Source: VIA Monthly Reports

Based on a review of the existing Route 41 ridership and service plan, a reasonable operating plan for this service would be as follows:

- The service would start from the Oakhurst Community Park on Civic Circle, near the Library. This has the ability to provide overnight parking for buses (if the contractor chooses to do so) and to provide some informal park-and-ride parking for persons staying or living in the Oakhurst area.
- In addition to the existing stops served by Route 41, a new stop could be served at the recently-constructed Fairfield Inn on the northern side of Oakhurst, which is also adjacent to the Holiday Inn Express on one side and the Hampton Inn on the other.
- A conceptual schedule is provided as Table 7, showing two AM northbound runs (departing at 7:30 AM and 9:00 AM) and two PM southbound runs (departing the Yosemite Valley Visitors Center at 3:30 PM and 5:00 PM). There is sufficient existing ridership generated in this corridor to warrant two buses and providing two schedule options expands the variety of potential trip choices for travelers. If demand warrants and funding is expanded, additional daily runs could be considered.
- A reasonable operating season would be from June 1 through the second weekend of September (or roughly 103 days per year). This also could be expanded as warranted and as funds allow. This service would operate 8.06 vehicle-hours and 192 vehicle-miles of service per day, or 831 vehicle-hours and 19,776 vehicle-miles over the full season.

Table 7: Example Oakhurst-YNP Schedule			
<i>June 1 - Sept 12</i>			
Oakhurst → Yosemite			
Location		Run 41-1	Run 41-3
Oakhurst	Oakhurst Community Park	7:30 AM	9:00 AM
	Oakhurst Best Western	7:34 AM	9:04 AM
	Oakhurst Holiday Inn / Hampton Inn / Fairfield	7:38 AM	9:08 AM
Wawona, Mariposa Grove, Fish Camp	Tenaya Lodge	7:56 AM	9:26 AM
	The Mariposa Grove	8:06 AM	9:36 AM
	Wawona Store	8:26 AM	9:56 AM
	Yosemite Visitor Center	9:36 AM	11:06 AM
Yosemite → Oakhurst			
Location		Run 41-2	Run 41-4
	Yosemite Valley Visitor Center	3:30 PM	5:00 PM
Wawona, Mariposa Grove, Fish Camp	Wawona Store	4:30 PM	6:00 PM
	The Mariposa Grove	4:50 PM	6:20 PM
	Tenaya Lodge	5:00 PM	6:30 PM
Oakhurst	Oakhurst Holiday Inn / Hampton Inn / Fairfield	5:18 PM	6:48 PM
	Oakhurst Best Western	5:22 PM	6:52 PM
	Oakhurst Community Park	5:26 PM	6:56 PM

At the YARTS contractor's current rate of \$162.85 per vehicle service hour (for a contractor-provided bus) and assuming \$0.80 per vehicle-mile for fuel, the annual operating cost of this service would be \$151,000. Ridership on this service can be estimated based on existing ridership generated by run and by stop and factored to reflect the change in the calendar of service. Annual ridership is estimated to total 5,900 boardings per year. Note that this does not reflect any growth in ridership demand due to new lodging in the Oakhurst area, which could well increase ridership. Based on existing fare revenues, adjusted to reflect the change in service, an estimated average fare per passenger-trip of \$6.50 is assumed. Over the course of the operating season, this totals \$38,400 per year. Subtracting the fare revenue, a total of \$154,600 in subsidy funding would be required, including operations, capital funding and management/marketing. Additional discussion of the financial and institutional aspects of this service is provided below.

The Oakhurst-YNP service would perform relatively well: it would carry 7.1 passenger-trip per vehicle service hour, compared with the systemwide average of 4.6 in 2019 (pre-COVID). The service would nearly match the best performing route in the YARTS system by this measure of 7.3 generated by the 120 West service. Comparing the operating subsidy (operating costs minus passenger fares) to the number of passenger-trips, this service would require roughly \$19.00 in operating subsidy per passenger-trip, compared with a systemwide average in 2019 of \$21.70.

As an aside, another option was considered that would extend this route south the additional 12 miles to start and end at the Chukchansi Gold Resort and Casino. Over the course of the season, this would add approximately 400 vehicle-hours and 2,300 vehicle-miles to the service, increasing operating costs by \$67,000. Ridership (per existing boarding data) would only increase by 700 per year. Considering fare revenue, operating subsidy would increase \$62,500 per year. This additional service would be relatively inefficient, generating only 1.7 passenger-trips per vehicle-hour and requiring \$89 in subsidy per additional passenger-trip. It therefore should only be operated if additional funding is made available to extend the route.

Total Service Modifications

The change in overall YARTS services and ridership was evaluated both for the core service operated for the existing JPA members (the 140, 120 and 395 Routes), as well as for all existing routes including the 41 Route. For the three core services combined, the recommended service modifications would:

- Reduce ridership by a total of 2,756 annual vehicle-hours, or 17 percent of current service for the three core routes. Note that the proportion of reduction is equal at 14 percent on the 140 Route and 395 Route, and higher (35 percent) on the 120 Route.
- Reduce ridership by 8,130 annual one-way passenger-boardings, or 10 percent of 2019 ridership on the three core routes. This ridership loss is relatively modest (7 percent) on the 120 Route, reflecting the low existing ridership on service west of Groveland. As the drop in ridership is less than the drop in service levels, this strategy would overall improve the performance measures for the YARTS program.
- Reduce the number of buses in peak operation by 1 (from the reduction in runs on the 140 Route).

- Reduce the annual operating subsidy by \$473,200, which should be used to develop a local capital reserve fund.

If the current 41 Route service is replaced with a smaller Oakhurst-Valley service, this would reduce service on this corridor by 73 percent while reducing ridership by 32 percent and the number of buses in operation by one additional bus. The overall YARTS system would operate 5,023 less vehicle-hours per year (a 26 percent reduction) and would serve 12 percent fewer passenger-trips than in 2019. Reducing or eliminating the Route 41 service could potentially also free up additional NPS funding for capital purchases.

It should be noted that under the current operator contract, a 15% reduction in service hours triggers a contract renegotiation. As presented in Table 1, above, under this strategy plan the overall services would be cut by 26 percent. However, this full cut would not occur until 2023, after the existing Route 41 full service to Fresno is stopped. Prior to that, service would be cut by 17 percent, still triggering the need for renegotiation. This could change the cost implications of this overall plan.

CAPITAL RECOMMENDATIONS

Bus Fleet Improvements

The appropriate fleet improvement strategy for YARTS is impacted by several factors, as discussed below: fuel type, vehicle size, and operating plan requirements.

Recommended Fuel Strategy

The California Air Resources Board (CARB) Fleet Rule for Transit Agencies requires that public transit programs start purchasing alternative fuel vehicles (Battery Electric Buses (BEBs) or hydrogen) as 25 percent of bus purchases starting in 2026, with full conversion expected by 2035. It is recommended that YARTS delay implementation of conversion to an alternative fuels fleet for at least five years. There are several reasons why Zero Emissions Buses (ZEBs) are not currently viable, and would reduce the overall ridership and environmental benefits of the transit program:

- Of the two ZEB options (Battery Electric Buses (BEBs) or hydrogen), the region does not have the fueling infrastructure needed for hydrogen fueled buses. Providing sufficient hydrogen fueling facilities at the various operating termini of the YARTS routes (at a per-site cost on the order of \$2,000,000) would be excessively expensive.
- The distances that BEB buses would need to travel without a mid-day charge in Yosemite National Park exceeds the range that currently available models can reliably operate, particularly given the additional power needed to climb mountain grades, operate air conditioning (such as in the Central Valley in summer) and operate heating systems (such as in the Park in winter). The roughly 4,000 feet of elevation gain between Merced and Yosemite Valley and the 6,000 feet of gain from the Valley to Tioga Pass are examples of the challenging conditions.
- The region also lacks existing electric vehicle charging capacity. Where there are small charging locations in the region (such as in Yosemite Valley, Sonora, Mammoth Lakes, Mariposa and Merced), these are sized for private autos and lack the electrical capacity for charging a bus fleet. Establishing

charging facilities for buses often includes expansion of local electrical substations and potentially upgrading transmission lines. Defining the necessary level of upgrade to the limited electrical grid (particularly within the Park) has yet to be conducted. This should be conducted in consideration of overall electrical vehicle charging requirements (such as for Valley Shuttle buses, charter buses, commercial vehicles and private autos). Making the necessary modifications could potentially require extensive environmental review, delaying when actual operation of BEBs can be initiated.

- BEBs are much more expensive than diesel buses ... on the order of \$1,300,000 per bus compared with \$750,000 per bus (with necessary chain and communications equipment), or 75 percent more. YARTS lacks a dedicated source of funds available for the local match – and the financial capacity of the largely-rural local member jurisdictions is very constrained. As a result, local matching funds for bus purchase grants will need to be generated by reductions in operating subsidy costs resulting from cuts in service. Doubling these local match costs thus would double the necessary cuts in service and increase the loss of YARTS ridership. The resulting increase in auto use would expand the environmental impacts of overall access to Yosemite, such as greenhouse gas emissions.
- Over-the-road coaches – which have proven to be the appropriate vehicle type for the majority of YARTS routes – have only recently started to be available from manufacturers in BEB models. Like any new technology, there is a substantial “learning curve” with regards to a new BEB model type during which manufacturing processes are refined, dependability increases, and costs tend to decrease. Given the very limited local resources available to YARTS, it is prudent to allow this learning curve to occur prior to investment in the new technology.

Given these factors, it is recommended that YARTS work with Caltrans to modify the existing BEB grant award to instead purchase six diesel buses.

Bus Size Recommendations

YARTS has historically used over-the-road coaches with a 50-passenger capacity to serve all routes. These buses are relatively comfortable for the long distance trips required for YARTS, are designed to provide a smooth ride over mountain roads and provide plenty of space for luggage. Given the critical need and high cost to replace buses, it is appropriate to review the type and size of buses required. The next smaller standard bus size are 35-foot-long models. Considering the space needed for a restroom and for luggage, these vehicles have seating for a maximum of 30 passengers.

VIA records daily passenger loads by route and run. Using this data from July 2019 for each trip pair (meaning the same bus serving both the inbound and outbound trip), the average load was analyzed, along with the 90th percentile load, 95th percentile load, and maximum load. Given YARTS is a discretionary service for most passengers, their comfort is an important aspect of the service. In order to minimize the number of potential riders that would be denied service, we assumed a 95th percentile passenger load to estimate what size bus is required for each run (with the potential to deny additional reservations on 5 percent of the runs).

As shown in Table 8, the 95th percentile loads ranged from lows of 8 passengers on the 5:54 AM run from Midpines to Merced and 20 passengers on the 4:05 PM Yosemite to Mammoth run, to highs of 47 passengers on the 5:00 PM Yosemite to Mammoth run and 50 passengers on both the 6:40 AM Tuolumne County to Yosemite and 4:00 PM Yosemite to Tuolumne County runs.

Table 8: YARTS Bus Size Requirements

Based on Summer 2019 Passenger Loads

Existing Route/Run Pairs ¹	Estimated Passenger Load ²				Paired 95th Percentile ³	Bus Size Required ⁴	Recommended For Elimination?
	Average	90th Percentile	95th Percentile	Maximum			
140 Route							
M to Y 5:00 AM	9	11	14	16	29	Small	Yes
Y to M 9:05 AM	19	21	29	32			No
M to Y 5:30 AM	16	18	24	27	24	Small	No
Y to M 3:40 PM	13	15	21	23			No
M to Y 6:00 AM	21	23	32	35	44	Large	No
Y to M 3:15 PM	29	33	44	48			No
M to Y 6:45 AM	24	27	37	40	37	Large	No
Y to M 4:15 PM	20	23	31	34			Yes
MPS to Y 9:00 AM	15	17	23	25	23	Small	No
Y to M 4:35 PM	13	14	19	21			No
M to Y 8:45 AM	22	25	35	38	35	Large	No
Y to M 5:15 PM	13	15	20	22			No
M to Y 10:30 AM	25	28	38	42	38	Large	No
Y to M 6:00 PM	24	28	38	41			No
M to Y 5:45 PM	16	19	25	28	25	Small	No
Y to M 8:17 PM	12	13	18	20			No
Mid to M 5:54 AM	5	6	8	9	8	Small	Yes
395 Route							
MM to Y 8:00 AM	15	23	26	30	47	Large	No
Y to MM 5:00 PM	28	43	47	50			No
MM to Y 6:45 AM	13	20	22	25	20	Large ⁵	No
Y to MM 4:05 PM	12	18	20	23			No
120 Route							
TC to Y 7:40 AM	24	37	39	44	39	Large	No
Y to TC 4:30 PM	22	33	35	39			No
TC to Y 6:40 AM	33	50	50	50	50	Large	No
Y to TC 4:00 PM	35	50	50	50			No
TC to Y 8:40 AM	15	24	25	28	31	Large	No
Y to TC 5:35 PM	19	30	31	34			No
41 Route							
F to Y 5:37 AM	17	24	26	32	26	Large ⁶	No
Y to F 11:15 AM	8	12	13	16			No
F to Y 7:50 AM	15	21	23	28	31	Large	No
Y to F 4:06 PM	20	28	31	38			No
F to Y 11:15 AM	9	13	14	17	19	Small	Yes
Y to F 5:46 PM	13	18	19	24			Yes

M = Merced

MM = Mammoth Mountain

Y = Yosemite

TC = Tuolumne County

Mid = Midpines

F = Fresno

Note 1: Paired runs per driver run cuts July 2019.

Note 2: Calculated based on reported passenger loads by route and run for July 2019.

Note 3: Shows the higher passenger load required for the paired runs to determine bus size.

Note 4: Assumes buses with 95th percentile loads 29 and under can use small buses, and 30 or more require large buses.

Note 5: Buses should be interchangeable for services due to overnighting in remote locations.

Note 6: Shift of existing demand to fewer runs would increase ridership over capacity of a smaller bus.

Potential Remaining Route Pairs by Necessary Bus Size

Route	Small	Large
140 Route	3	4
395 Route	0	2
120 Route ⁵	0	3
41 Route	0	2
Total	3	11

We made several assumptions to arrive at the required bus size. First, every run with a 95th percentile load of 30 passengers or less could potentially be operated with a smaller bus, and every run with 31 or more passengers would require a larger bus. However, in the case of Highway 395 service between Mammoth Lakes and Yosemite, only two buses are used in service and they are parked 175 miles from the YARTS operation base in Merced. The buses should be interchangeable as potential back-ups, and therefore both should be large buses. The analysis was also adjusted to reflect the recommended reductions in service, specifically (1) two of the round-trips that could be operated using a smaller bus are proposed to be eliminated and (2) the replacement of the existing three daily Route 41 runs with two daily shorter runs is expected to increase ridership on the remaining runs, thereby requiring large buses on both remaining runs. Based on these factors, at 2019 ridership levels, three round-trips could be operated using smaller buses (all on the 140 Route) while the remaining 11 round-trips (including two on the 41 Route) would require full-sized buses.

Beyond accommodating existing (2019) ridership loads there are other factors that need to be considered in identifying the appropriate bus size:

- The purchase price of smaller buses is less than the larger over-the-road coaches. A 30-passenger medium-duty bus costs approximately \$350,000 from the manufacturer, or on the order of \$400,000 with necessary equipment, compared with a total cost of approximately \$750,000 for a diesel over-the-road coach. However, larger buses have a longer useful life benchmark (ULB) of 12 years or 450,000 miles, compared to just 7 years of 200,000 miles on 30-passenger medium-duty small buses, which cost approximately \$350,000. On an annual basis, smaller vehicles require \$57,000 in capital compared with \$62,000 for a full-sized bus, or \$5,000 less per year. On a local basis, the fact that federal or state grant programs will typically fund 80 percent of the capital costs means that the cost savings to the YARTS JPA is only on the order of \$1,000 per bus per year (or \$3,000 for the three smaller buses). Therefore, due to the lesser useful life, smaller buses do not offer a significant cost savings.
- The operating cost savings of smaller buses is not as significant as might be first thought. The largest element of the operating costs associated with any transit service is driver wages and benefits and these do not change between a 30-passenger bus and a 50-passenger bus (as both require the same level of driver licensing). There can be some modest reduction in fuel costs (depending on the variation in costs), but overall savings in operating costs are typically in the range of 5 percent to 10 percent.
- Smaller buses are less comfortable than over-the-road buses, which is a significant issue for tourists and recreationists traveling long distances for leisure.
- Luggage space would be required to be provided in the passenger compartment on smaller buses, further reducing the seating capacity and increasing the constraints on the riders YARTS is able to serve in peak periods.

A disadvantage of having a mixed fleet (both large and small buses) is that they cannot be used interchangeably. Larger buses are therefore required for back-up. A mixed fleet also increases the cost of maintaining adequate inventory of spare parts as well as mechanic training.

The final key consideration is that purchasing smaller buses for a portion of the fleet would reduce the YARTS program’s ability to accommodate any future increase in ridership. Given these various considerations, it is recommended that YARTS continue to pursue a fleet of fully over-the-road coaches.

Overall Fleet Improvement Strategy

The long-term sustainability of the YARTS program would best be achieved through acquisition of a fleet of diesel powered over-the-road coaches to operate the service plan (including spares) without the need for contractor-supplied buses. As shown in Table 9, with the service modifications recommended above, YARTS service (excluding any service on the 41 Route) requires a maximum of 11 buses in peak operation. At a standard 20 percent spare ratio and a minimum of one spare per route, 3 spare vehicles are needed to provide reliable service, for a total of 14 vehicles in the fleet.

Table 9: YARTS Fleet Improvement Cost Analysis						
<i>Assuming Diesel Bus Purchases</i>						
	Existing			With Plan		
	In Service	Spares	Total	In Service	Spares	Total
Number of Buses Required						
140 Route	7	1	8	6	1	7
120 Route	3	1	4	3	1	4
395 Route	2	1	3	2	1	3
Total: JPA Routes	12	3	15	11	3	14
41 Route	3	1	4	2	1	3
Total: With 41 Route	15	4	19	13	4	17
Capital Cost of a 100% YARTS Owned Fleet @ \$750,000 per bus						
JPA Routes: Total Cost			\$11,250,000			\$10,500,000
JPA Routes: Local Match			\$2,250,000			\$2,100,000
# Years of Operating Cost Savings Needed to Generate Local Match						4.4
Capital Cost of 41 Route Oakhurst - YNP Service						
Total Cost						\$2,250,000
Local Match						\$450,000
Annual Local Match over 12-year Vehicle Life						\$37,500

At a cost of \$750,000 per vehicle (including equipment), the new fleet will require \$10,500,000 in total funding. At a 20 percent local match requirement, total local funding is \$2,100,000.

Depending on future discussions with Madera County, three additional buses may be needed in the YARTS fleet (two in peak service plus one spare), bringing the total fleet requirements up to 17 buses. These three additional buses would require \$2,250,000, including a \$450,000 local match. Over the course of the 12-year life of the vehicles, the annual local match for these three vehicles would total \$37,500.

Optimally, this new fleet would be obtained over the next 18 months in order to be available for the new service contract in November 2022. It would also be beneficial to complete the bus purchases at least prior to the requirements for ZEB purchases starting in 2026

As an aside, one potential option may be to purchase up to 9 buses currently owned by VIA Adventures and used in the YARTS service. These buses are 2014 year models, with the exception of one 2013 year model and thus are through slightly more than half of their useful life by age. The purchase price of these vehicles is not known. In addition, the mechanical condition of these vehicles is also not currently known, but typically maintenance costs associated with older buses tends to climb significantly as they near the end of their life. If grant funding can be obtained to offset 80 percent of the cost of a full new fleet, the YARTS program would have lower operating (maintenance) costs for a significantly longer number of years and would also put off the need for expensive investment in ZEB technologies for a longer period. Pursuing a 100 percent new fleet is therefore recommended, though purchase of the used vehicles may be a fallback strategy if funding limitations require it.

YARTS administrative staff should therefore work with Caltrans to shift the existing grant allocation from battery electric buses to six over-the-road diesel coach buses. Depending on the Madera County participation, other grant opportunities should be pursued to obtain 11 to 13 additional buses for YARTS over the next five years.

Establish YARTS Facilities

At present, YARTS relies on contractor-owned facilities for bus storage and maintenance in Merced and Fresno, bus parking on private (lodging property) land in Tuolumne County and bus parking along the side of a state highway (a chain-up area) in Mammoth Lakes. The lack of publicly owned facilities is a detriment in several ways:

- The contractor costs associated with providing facilities is reflected in higher ongoing operating costs. As the proportion of local funds for operating is higher than for capital, over time this results in higher costs to YARTS JPA members.
- The requirement that a contractor must provide facilities reduces the potential pool of possible contractors, decreasing competition and potentially resulting in higher costs.
- Public investment in electric bus charging equipment requires publicly owned (or long-term leased) locations. The lack of these locations is currently an impediment to implementing a BEB fleet.
- The lack of a secure (fenced) location at the park-out locations increases the possibility of vandalism to the buses.

YARTS should pursue the purchase of a facility in Merced sufficient to store the 140 Route fleet (and potentially buses used in Oakhurst-Yosemite Valley service). Depending on the ability to maintain the fleet at the existing TJPA facility in Merced, this site may also need to accommodate vehicle maintenance functions. Secured parking facilities should also be identified (preferably at existing publicly owned corporate yards) in Groveland, Mammoth Lakes and potentially Oakhurst.

The total cost of facilities is currently uncertain and will depend on the various factors discussed above. It will certainly increase the need for local capital funding.

Institutional Plan

Consider Madera County as a YARTS JPA Member

If current discussions regarding long-term service between Madera County and Yosemite Valley are successful, it would be optimal for Madera County to become a full member of the YARTS Joint Powers Authority (as Tuolumne County recently did), rather than this service be operated on a short-term agreement. The current agreement for the Route 41 service has shown the difficulties associated with a short-term approach, as it adds uncertainty to capital planning (bus fleet size, alternative fuels, facilities) and the year-to-year allocation of administrative/marketing resources.

The “fee” for JPA membership defined for Tuolumne County was identified based on the average local subsidy per vehicle-hour of service. Factoring the fee defined several years ago for inflation and multiplying by the annual vehicle-hours of service identified in Table 2, above, yields a value on the order of \$30,000. Over the last few years, however, the need for local capital funding for bus purchases has become clear. As discussed above, the annual local match requirements for three buses needed for Madera County service (two in operation plus one spare) would be approximately \$37,000. A total cost for JPA membership that would support the Madera County service (and capital) would therefore be on the order of \$67,000. Optimally, the overall decisions to continue Route 41 service beyond the end of Fresno COG funding and Madera County joining the JPA would be determined in time to be reflected in the draft Request For Proposals published in the summer of 2021.

Bid the 395 Route Service as a Separate RFP Option

At present, the YARTS operations contract scope of work includes all four individual routes. The inclusion of the 395 Route service in particular has the potential to reduce the number of capable transit contractor firms interested in the YARTS contract due to the challenges of managing operations so far removed from the other services. As it is important to maximize the potential for competitive bidding, it is recommended that the RFP be developed that allows an individual contractor to optionally bid on the 395 Route service, the remaining (west side) service, or both. Note that the Eastern Sierra Transit Authority could potentially bid on the 395 Route service.

LSC recognizes that MCAG management of two separate operations could potentially increase management staff time requirements. However, allowing for separate bidding of the two scopes of work could yield a better outcome for YARTS as a whole.

Change the MCAG Management/Marketing Contract and the County Agreements from Annual to Multiyear

The year-by-year nature of the current MCAG contract for YARTS management and marketing adds to the administrative burden to the organization, and limits MCAG’s ability to plan for staffing levels and ongoing marketing efforts. Given the long-term success of this arrangement, this contract should be modified to at least a three-year term, and preferably a five-year term. It would be prudent to stagger

the end date of this agreement from that of the service contract, in order to avoid a situation where management staff is not available to address the service procurement process.

It would also be beneficial to shift from annual agreements with the individual County JPA members to a multiyear agreement, in order to reduce administrative burden and provide more assurance for planning over a multiyear period.

Improve Coordination With Other Public Transit Services

YARTS provides the opportunity for connections with other transit services in the Yosemite Region, including ESTA and internal park shuttles. While detailed service planning is not the focus of this Strategy Study, YARTS/MCAG staff should continually consider means of coordinating with these other services to maximize the usefulness of the YARTS services to the Yosemite Region as a whole. In particular, the upcoming ESTA Short Range Transit Plan process will provide the opportunity to consider improved connections between ESTA and YARTS services along the US 395 corridor.
