City of San Luis Obispo Transit

Short Range Transit Plans

Working Paper 4 - Service Alternatives

Prepared for

SLO Transit

June 21, 2024

Prepared by LSC Transportation Consultants

City of San Luis Obispo Transit
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Working Paper 4:
Service Alternatives

Prepared for

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Chapter 1

SLO TRANSIT SERVICE ALTERNATIVES

INTRODUCTION

In this chapter, service alternatives for SLO Transit are presented. The alternatives are based on public input and the recommendations of related studies, including the recent *SLO Transit Innovations* (Transit Innovations) *Study* (2024). Given the City's goal of achieving a 7 percent transit mode split by 2030 and 12 percent transit mode split by 2035, many of the service alternatives are designed to increase ridership. Each alternative is evaluated as a stand-alone option in this chapter; the combined impacts of the recommended plan elements will be detailed in the Draft SLO Transit SRTP.

The following discussion of SLO Transit service alternatives is organized by the type of change proposed. Changes to service frequency are discussed first, followed by potential changes to service hours. Then, options for introducing microtransit service to San Luis Obispo are presented, followed by routing alternatives. The various alternatives are then compared using the new performance standards recommended in WP2. For each alternative, the impacts on ridership and operating costs are estimated. Ridership and cost estimates assume implementation in FY 2025-26 and are based on the following parameters:

1. The projected SLO Transit FY 2025-26 operating budget, as presented in the City of San Luis Obispo 2023-25 Financial Plan Supplement, was used to estimate the operating costs of each existing service assuming no change to service levels ("status quo" scenario). The per-hour and per-mile costs were then used to estimate the cost impacts of the various alternatives, per the following equation:

   Change in SLO Transit Marginal Operating Cost = $50.22 X Change in Vehicle Service Hours
   + $2.23 X Change in Vehicle Service Miles

   For the alternatives evaluations which follow, operating cost estimates represent "marginal" costs. In other words, fixed costs are excluded from the analysis unless identified specifically. The reason for looking at marginal costs of potential changes or improvements is that fixed costs (such as administrative staff salaries, utilities and supplies) will not change if service levels are increased or decreased. However, fuel/maintenance costs (cost per mile) and driver salary costs (costs per hour) will increase incrementally as vehicle hours and miles are increased. Fixed costs and capital costs will be included in the discussion when the Draft Financial Plan is prepared.

2. Ridership estimates are based on projected full-year SLO Transit FY 2023-24 ridership, expected population growth in San Luis Obispo County during the next two years, ridership data from peer systems, and standard transit demand elasticity factors, depending on the alternative. Elasticity is an economic term which measures the change in behavior of one variable in response to the change in a related variable. For example, if service levels are doubled, historical data has shown that ridership will not double, but rather increase by around 47 percent. Elasticity factors vary for different variables such as headways, total travel time or transfer time. Variation has also been found in urban areas vs. suburban areas or during peak or non-peak periods. *The Transit Cooperative Research Program (TCRP) Report 95 Traveler Response to Transportation System*

Changes Chapter 9 – Transit Scheduling and Frequency is a good resource for transit elasticity factors.

3. Service was assumed to include 180 academic year weekdays, 81 non-academic year weekdays, 52 Saturdays/holidays, and 52 Sundays, unless otherwise noted.
4. The assumed average cash fares received per boarding on each route are shown in Table 1. The average cash fare values were calculated by dividing the total annual cash fare revenue received on the route during FY 2022-23 by total annual boardings. The average cash fare estimates do not account for fees received from Cal Poly.

Table 1 : SLO Transit Average Cash Fare per Boarding by Route
FY 2022-23

	Boardings	Cash Fares	Average Cash Fare per Boarding
Route 1A	50,349	$51,823.37	$1.03
Route 1B	11,452	$9,381.51	$0.82
Route 2A	72,298	$72,317.92	$1.00
Route 2B	12,215	$12,348.40	$1.01
Route 3A	85,585	$27,594.63	$0.32
Route 3B	53,979	$14,563.33	$0.27
Route 4A	153,525	$11,662.94	$0.08
Route 4B	68,567	$4,780.27	$0.07
Laguna Tripper	7,032	$2,048.69	$0.29
Systemwide	**515,002**	**$206,521**	**$0.40**

Source: SLO Transit

SERVICE FREQUENCY ALTERNATIVES

The Transit Innovations Study recommended increasing service frequency to improve service quality and increase ridership. Additionally, more frequent service was one of the most requested improvements during the onboard passenger survey (42 percent of respondents), corroborating that improving service frequency would likely benefit SLO Transit ridership. This section considers alternatives to increase SLO Transit service frequency. The options discussed demonstrate the wide range of potential impacts that can result from increasing service frequency to differing extents. The service frequency alternatives are summarized in Table 2.

Table 2: SLO Transit - Service Frequency and Span Alternatives

	Change in Annual Service						
	Ridership	Service Hours	Service Miles	Marginal Operating Cost	Cash Fare Revenues [2]	Operating Subsidy	Additional Buses Needed
Status Quo[1]							
Route 1A	55,900	5,300	50,700	$379,100	$57,500	$321,600	
Route 1B	20,000	3,100	29,900	$222,300	$16,400	$205,900	
Route 2A	80,300	5,300	57,900	$395,100	$80,300	$314,800	
Route 2B	22,100	3,100	33,200	$229,600	$22,300	$207,300	
Route 3A	94,700	6,300	82,400	$499,900	$30,500	$469,400	
Route 3B	65,700	4,900	61,700	$383,500	$17,700	$365,800	
Route 4A	152,800	5,500	47,800	$382,600	$11,600	$371,000	
Route 4B	70,900	4,000	31,000	$269,900	$4,900	$265,000	
Laguna Tripper	10,100	200	2,000	$14,500	$2,900	$11,600	
Old SLO Trolley	1,600	300	1,800	$19,100	$600	$18,500	
System Total	*574,100*	*38,000*	*398,400*	*$2,795,600*	*$244,700*	*$2,550,900*	
Service Frequency and Span Alternatives - Change from Status Quo [3]							
Increase Route 4 Frequency During Academic Year							
Increase Route 4A Frequency - 8:00 AM - 10:00 AM	4,200	300	2,300	$20,200	$300	$19,900	1
Increase Route 4B Frequency - 3:00 PM - 5:00 PM	3,900	300	2,100	$19,700	$300	$19,400	1
Net Impact (Combined 4A and 4B)	*8,100*	*600*	*4,400*	*$39,900*	*$600*	*$39,300*	*1*
Double Service Frequency on Routes 1, 2, 3, 4 (A & B)							
Full Service Day, Year-Round	208,300	33,500	347,000	$2,455,000	$83,500	$2,371,500	8
8:00 AM to 6:00 PM, Weekdays, Year-Round	119,700	19,600	234,200	$1,505,800	$48,000	$1,457,800	8
Full Service Day, Weekdays, Academic Year	153,600	20,900	231,700	$1,565,500	$61,600	$1,503,900	8
Double Service Frequency on Rts 1A, 2A, 3A, 4A							
Full Service Day, Weekdays, Academic Year	89,600	11,300	133,800	$865,400	$35,900	$829,500	4
Double Service Frequency on Routes 3A, 3B, 4A, 4B							
Full Service Day, Weekdays, Academic Year	101,200	11,600	136,100	$885,600	$40,600	$845,000	4
Extend Weekday Evening Service on A Routes							
Extend Service to 12:00 AM - Academic Year	5,100	1,000	10,900	$74,500	$2,000	$72,500	0
Extend Service to 10:00 PM - Non-Academic Year	2,200	700	7,000	$50,700	$900	$49,800	0
Expand Service on B Routes							
Operate B Routes on Weekends - 7:45 AM - 8:00 PM	39,600	3,200	46,000	$263,100	$15,900	$247,200	0
Operate 3B and 4B on Weekends	29,400	1,600	25,300	$136,700	$11,800	$124,900	0
Extend Routes 1B and 2B until 10:00 PM - Weekdays, Academic Year	4,000	1,400	14,500	$102,600	$1,600	$101,000	0
Provide Academic Year Service Levels Year-Round	16,300	2,300	26,400	$174,300	$6,500	$167,800	0

Note 1: Status quo operations are based on FY 2023-24 ridership through 3/31/24 and expected annual population growth. Service estimates are based on FY 2022-23 operating parameters. Cost estimates are based on the projected FY 2025-26 SLO Transit budget and the SLO Transit cost model.

Note 2: The average cash fare per boarding by route is detailed in Table 13.

Note 3: Parameters and costs represent change over existing services. Estimates represent marginal costs and do not include fixed costs.

Increase Route 4 Frequency During Academic Year

Routes 4A and 4B serve northeast San Luis Obispo, connecting downtown and the Cal Poly campus with residential areas along Foothill Boulevard, Highland Drive and Grand Avenue. Service is operated on a 45-minute loop, using one bus in each direction. Route 4 is the most popular SLO Transit service; Route 4A is projected to provide upwards of 152,000 passenger-trips in FY 2025-26, and Route 4B is projected to provide 70,000 passenger-trips. Increasing service frequency during peak travel periods would likely further benefit ridership and improve connectivity between downtown and Cal Poly.

Increase Route 4A Frequency – 8:00 AM – 10:00 AM

Ridership is quite high on Route 4A (clockwise direction), particularly on the runs departing the Government Center at 8:15 AM, 10:30 AM and 11:15 AM, all of which were observed to carry more than 50 passengers. Given this high demand, the City could increase service frequency on weekday mornings during the academic year by adding two new runs departing the Government Center at 8:30 AM and 9:15 AM.

Operating the two additional Route 4A runs would increase the City's marginal operating cost by $20,200 per year. An elasticity analysis based on existing ridership during this service period indicates that ridership would be increased by an estimated 4,200 boardings per year, generating $300 in additional cash fares (not accounting for fare revenue agreement with Cal Poly). Note that there could be additional ridership generated by potential passengers that currently do not use the existing service due to crowding. This alternative would require an additional peak bus.

Increase Route 4B Frequency – 3:00 PM – 5:00 PM

Route 4B, which operates in the counterclockwise direction, carries particularly high passenger loads on the 4:00 PM and 4:45 PM runs (50 passengers each). Adding two additional runs departing the Government Center at 4:15 PM and 5:00 PM on weekdays in the academic year could expand capacity and improve convenience during the afternoon peak ridership period. The annual marginal operating subsidy for the two runs would be $19,400 per year, based on the increase to service levels and fare revenue. Adding Route 4B service in the afternoon would require an additional peak bus (though this could be the same bus added for the 4A additional runs in the morning). It is estimated the runs would provide 3,900 passenger-trips per year.

Double Service Frequency on All Regular Routes

A more substantial service increase would be to double service frequency on all regular SLO Transit fixed routes (Routes 1 A/B, 2 A/B, 3 A/B, and 4 A/B). At present, SLO Transit service frequencies are relatively low for an urban transit system, consisting of hourly service on Routes 1, 2 and 3 and service every 45 minutes on Route 4. Doubling service would result in bus service every 30 minutes on Routes 1, 2 and 3A and every 22.5 minutes on Route 4. The increase in ridership would help to achieve sustainability goals. , including the Transit Innovations Study goal to increase transit mode split to 7 percent by 2030. As discussed below, three options for doubling service frequency were considered.

Full Day, Year-Round

Doubling service frequency on all regular SLO Transit routes for the full-service day, year-round would result in a significant increase to the City's marginal operating cost; service levels would increase by 33,500 vehicle service hours and 347,000 vehicle service miles per year, requiring $2.45 million in operating funds. Eight additional vehicles would also be needed throughout the entire service day, which would require the City to expand its existing fleet and hire more bus operators. The drastic increase to service frequency would also have a significant impact on ridership, as elasticity analyses indicate that systemwide ridership would grow by 208,300 passenger-trips per year, equal to a 40 percent increase in ridership on Routes 1 through 4.

The additional fleet would also expand the required capacity of the SLO Transit maintenance facility, with regard to bus storage, charging and maintenance work bays. Accommodating a doubling of frequency could also exceed the capacity of the Downtown Transit Center. At present, the 5-bus capacity of the DTC is adequate to serve the hourly service on Routes 1, 2 and 3 (as well as the other services) by offsetting the "A" buses 30 minutes from the "B" buses. Simply adding new runs 30 minutes off of the existing service times (to provide desirable consistent 30-minute headways) would result in six buses onsite for Routes 1 through 3, as well as up to two buses for Route 4, as well as less frequent buses for the tripper and express services. While the peak number of buses at the DTC could be reduced by changing the schedules for some or all of the additional services, this would result in unbalanced service times and a loss in transfer opportunities.

8:00 AM – 6:00 PM, Weekdays, Year-Round

SLO Transit ridership, like many transit systems, is lower in the early morning and later evening. To ensure the more effective use of resources, the City could double service frequency from 8:00 AM to 6:00 PM on weekdays only. This service enhancement would increase service levels by 19,600 vehicle service hours and 234,200 vehicle service miles annually at a marginal operating cost of $1.5 million. To estimate the ridership impact, elasticity analyses for each route on the proportion of ridership that occurs from 8:00 AM to 6:00 PM. In sum, doubling service frequency during the weekday daytime hours would increase systemwide ridership by 119,700 passenger-trips per year, equal to a 23 percent increase in ridership on Routes 1 through 4. The implications on capital needs discussed for the first of these options would be the same for this option.

Full Day, Weekdays, Academic Year

Most SLO Transit ridership occurs during the Cal Poly academic year. Another means to double service frequency but concentrate resources during periods of high ridership would be to double service frequency on weekdays during the academic year. Annual service levels would increase by 20,900 vehicle service hours and 231,700 vehicle service miles. Elasticity analyses indicate that annual ridership would increase by 153,600 passenger-trips (a 30 percent increase in total ridership for Routes 1 through 4), therefore the net financial impact would be a $1.56 million increase to the SLO Transit marginal operating subsidy. The capital needs to expand the fleet, fleet facilities and passenger facilities would be the same as discussed for the previous alternatives.

Double Service Frequency on All A Routes, Full Weekdays, Academic Year

In consideration of the high operating cost and capital impacts of full doubling of frequency, another option was evaluated that focuses on doubling frequency of the four "A" routes, leaving the "B" routes unchanged. This has the advantage of providing equitable improvement of service across the SLO Transit service area. This option focuses the service improvement across the full weekday span of service, within the academic year only. Ridership impacts were evaluated based on an elasticity analysis of the A routes only, with a reduction included to reflect the proportion of existing A route ridership that transfer to and from the B routes (based on the onboard survey). This option would require an additional 11,300 vehicle-hours and 133,800 vehicle miles of service annually. Ridership would be increased by 89,800 boardings per year. Total operating subsidy would be increased by $829,500 annually, and four additional buses would need to be operated.

Double Service Frequency on Routes 3A, 3B, 4A, 4B, Full Weekdays, Academic Year

Another approach to a partial increase in service frequency would be to focus additional service on the two best performing of the four main routes, specifically Routes 3 and 4 (both A and B directions), for the full span of service in the academic year. This option would increase service by 11,600 vehicle-hours and 136,100 vehicle-miles per year. Considering the impact of no availability of direct transfers between Routes 3 and 4 and Routes 1 and 2, ridership would be increased by 101,200 boardings per year. Operating subsidy would be increased by $845,000 annually, and four additional buses would need to be in operation at peak times.

SPAN OF SERVICE ALTERNATIVES

The next set of SLO Transit alternatives focus on the "span of service," or the hours that transit services operate. Passengers requested multiple changes to the SLO Transit span of service during the onboard passenger survey; the most requested service improvements were later evening service (54 percent of respondents), more frequent service (42 percent), additional Saturday service (39 percent), and additional Sunday service (32 percent). The span of service alternatives are also summarized in Table 2.

Extend Weekday Evening Service on A Routes

To provide residents with a later-night transit option, two alternatives for extending service on Routes 1A, 2A, 3A, and 4A were considered.

Extend Service to 12:00 AM – Academic Year

Currently, the last departures on weekdays during the academic year on the A Routes occur at 9:15 PM (Routes 1A and 2A), 10:15 PM (Route 3A) and 10:30 (Route 4A), terminating the last runs 45 minutes later. Extending service on all four A Routes until midnight would add Route 1A and Route 2A departures at 10:15 PM and 11:15 PM and Route 3A and 3B departures at 11:15 PM. Based on late evening ridership on transit services at other California universities, this additional service is estimated to increase ridership by 5,100 boardings per year. While it would not require additional vehicles to operate, the increase in service hours and miles would result in an increase in operating cost of $74,500 per year.

Extend Service to 10:00 PM – Non-Academic Year

During the non-academic year, the last runs start at 7:15 PM on Routes 1A, 2A, and 3A and 7:30 PM on Route 4A. Extending service until roughly 10:00 PM would require operating two additional runs on Routes 1A, 2A and 3A, and three additional runs on Route 4A. An evaluation of ridership by hour in the academic versus non-academic year as well as ridership patterns in typical small urban areas indicates that these additional runs would generate 2,200 passenger-trips per year. Annual operating costs would be increased by $50,700. No additional buses would be required.

Expand Service on B Routes

Operate B Routes on Weekends – 7:45 AM – 8:00 PM

The four counterclockwise B routes do not operate on weekends. As a result, service is limited to the large one-way A routes. While the fact that some key corridors are served by more than one A route (such as DTC – Foothill Boulevard or DTC – Madonna Road) still provides some direct bi-directional service, other trips can require a long travel time around the majority of the one-way A loop. As an example, a trip between the DTC and Broad/Santa Barbara requires a 34-minute in-vehicle travel time on Route 4A, compared to only seven minutes when Route 4B is operating. In addition, some stops (such as the Amtrak Station) are served only on B routes and thus do not have any service on weekends. The reduction in service also effectively reduces the available frequency of service.

Operating all four B routes on Saturdays and Sundays (as well as holidays on which weekend service is provided) would incur an annual operating cost of $263,100. An evaluation of the weekday versus weekend ridership on the A routes during the same service span as well as the existing weekday B ridership by route indicates that overall ridership would increase by 39,600 passenger-trips per year. Note that no additional buses would be required to provide this service expansion.

Operate Routes 3B and 4B on Weekends

Another option would be to focus the additional B Route weekend service on Routes 3 and 4, which have the highest ridership. This would result in an annual marginal operating cost increase of $136,700 and an increase in annual ridership of 29,400. This option performs the best out of all the weekend options.

Extend Routes 1B and 2B until 10:00 PM – Weekdays, Academic Year

While Routes 3A and 4B provide departures up until 10:00 PM on weekdays during the academic year, the last Route 1B and Route 2B departures of the day currently is provided at 5:45 PM, reducing the convenience of transit services for the southern portions of San Luis Obispo by increasing travel times, reducing frequency and eliminating service to some stops. Consistent B route service could be provided throughout the city by operating an additional 4 daily trips of Routes 1B and 2B on academic weekdays, with the last departures at 9:45 PM.

An analysis of ridership on existing services on weekday evenings during the academic year indicates that operating these additional runs would serve approximately 4,000 additional passenger-trips per year.

While additional buses would not be required, annual operating costs would be increased by $102,600 annually.

Provide Existing Academic Year Span of Service Year Round

Cal Poly administration has indicated plans to expand class offerings and associated student activity levels in the summer. While specific details have yet to be defined, it is worthwhile to evaluate the cost and baseline ridership impacts of providing the same span and level of service currently offered in the academic year over the entire year. This would increase annual vehicle-hours by approximately 2,400 and annual vehicle-miles by approximately 26,400. Baseline additional ridership is estimated based on existing average productivity in the non-academic year (7.1 passenger-trips per vehicle service hour), yielding a total increase of 16,300. Note that there may be additional increases in ridership generated by an increase in summer Cal Poly activity. Overall, annual operating costs would be increased by $174,300. No additional fleet would be required. This option also has the benefit of providing more consistent year-round driver schedules, which has the potential to increase driver retention.

ROUTING AND MICROTRANSIT ALTERNATIVES

Another set of alternatives were considered regarding route realignments and the provision of microtransit service. These alternatives are summarized in Table 3.

Implement Evening Microtransit Pilot in Southeast San Luis Obispo

Microtransit is a relatively new form of demand response public transit. Through the use of technology and phone apps, it is possible for a passenger to request a ride "on-demand" within certain areas and certain times. The benefit of microtransit is that it is not limited to a set route with set stops, but rather passengers can be picked up at their curb and dropped off at the curb of their destination. This allows homes on the outlying edges of neighborhoods to be served more directly. The disadvantage of microtransit is that if there is high demand for service, there could be a 30-minute or longer wait for a ride. Passengers who depend on public transit to travel to work or appointments at specific times may find microtransit less convenient.

Microtransit has been successful in areas that are not easily served by a fixed route, low productive fixed routes or during the evenings and weekends, when there is less demand. Generally, SLO Transit Routes are very productive and therefore, it is not cost effective to replace the fixed routes with on-demand microtransit. However, the option of microtransit in the evening, when demand is typically lower, was explored.

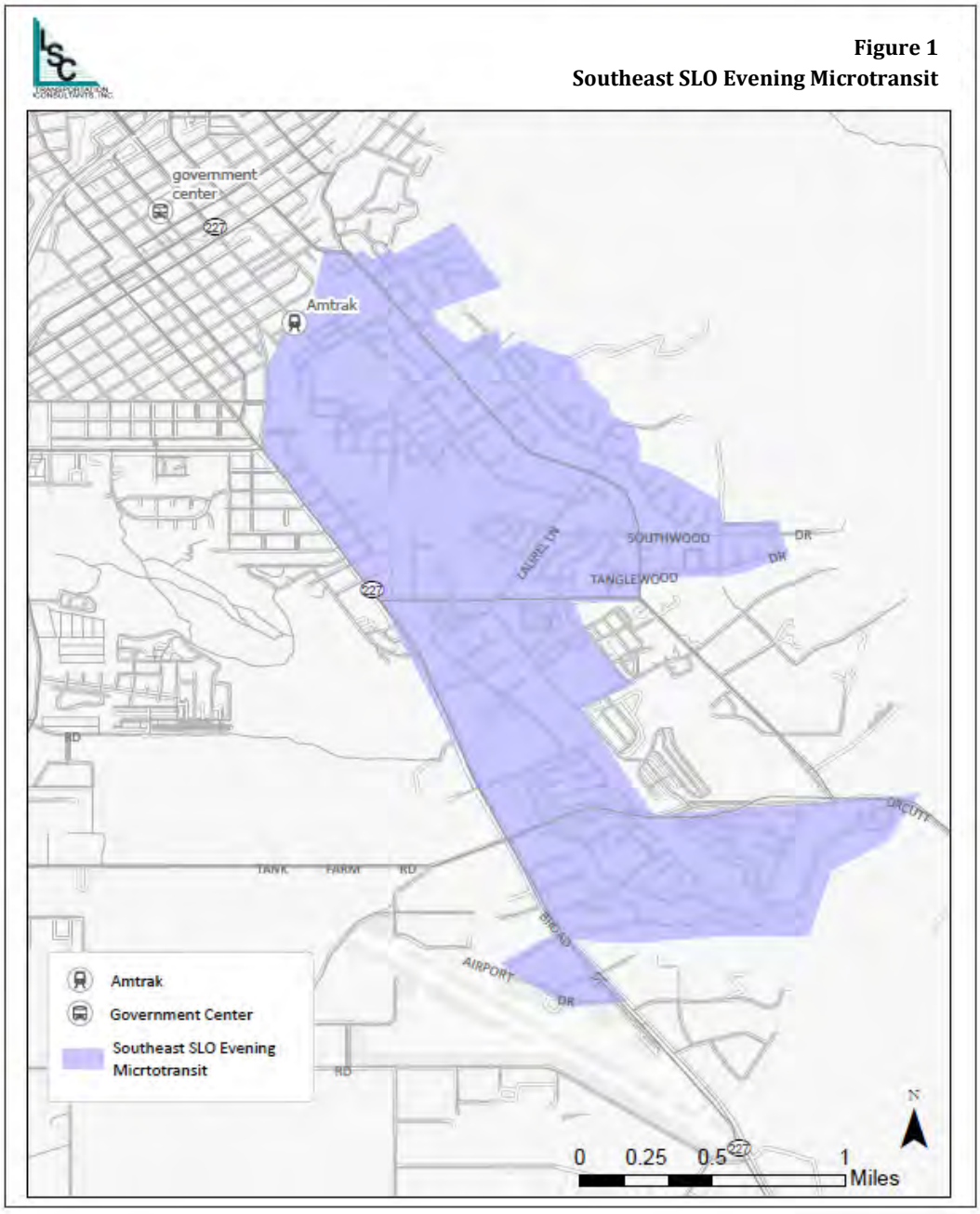
As part of this alternative, replacing Route 1A with microtransit service between the hours of 7 PM and 9 PM on a year-round basis was reviewed. Currently, Route 1B ends service at 6:30 PM. Therefore, hourly service is only available in the clockwise direction between 7 PM and 9 PM. Routes 1A and 1B serve residences in southeast San Luis Obispo as well as the San Luis Airport. Figure 1 presents an example microtransit service area.

In order to serve the level of transit demand currently seen on Route 1A during the evening hours, two vehicles would be needed to provide service between 7 PM and 9 PM and only one vehicle would be

needed during the 9 PM hour. This would cost an additional $33,600 annually in operating costs (including the costs of the annual technology license). As SLO Transit does not currently have small vehicles in their fleet, two vans would also need to be procured to operate this service.

Given the fact that curb to curb service would be available, around 250 more homes could be served directly with microtransit than with the fixed route. Therefore, there would be a small increase in ridership over the existing Route 1A evening ridership by around 100 trips per year. As development progresses along Tank Farm Road, this microtransit service area could be expanded. However, as demand for service increases, another vehicle would be required, further increasing costs.

Figure 1
Southeast SLO Evening Microtransit



Implement Late Night Microtransit Pilot - Academic Year

Microtransit could be more widely applied to the entire city as a "Late Night" service. SLO Transit services are not available past 11 PM and only Routes 3 and 4 operate this late during the academic year. The general geographic extent of a potential city-wide late night microtransit service area is displayed in Figure 2. As part of this alternative, microtransit would be available between 10 PM and midnight during the academic year. In order to maintain a reasonable level of cost, this alternative assumes that three vans would be used for an annual operating cost of $122,800 if service is provided only on weekdays during the academic year and $160,600 if service is provided 7 days a week during the academic year (only two peak vehicles would be required). Ridership was estimated by reviewing ridership by hour on other microtransit services. For the weekday scenario around 4,700 trips are estimated. If late night microtransit were operated 7 days/week, roughly 7,100 trips could be carried.

If implemented, this should be a one-to-two-year pilot program. Again, three vans would need to be procured, if the current contractor is used. Alternatively, some areas have had success in procuring a separate contractor who specializes in microtransit to operate as a "turnkey" service. Under this scenario, the City would not have to purchase new vehicles or the microtransit software, as it would be included in the total cost of the contract.

Reinstate Route 6X

Prior to COVID, Route 6X was operated on Thursday evenings during the academic year, connecting the Cal Poly Campus with the Downtown Transit Center on Thursday evenings (which the Farmers Market is in operation) from 6:00 PM to 9:00 PM. One bus was used to operate a loop route every half hour. Ridership averaged 2,600 passenger-trips per year. Considering the historic ridership and the changes in overall transit ridership since 2020, a reinstated service is estimated to serve 2,200 passenger-trips per year. The annual operating cost would be relatively modest, at $7,200 annually.

Reinstate SLO Tripper

Prior to the pandemic, the SLO Tripper route consisted of 2 AM and 2 PM runs per school day connecting the Transit Center with SLO High School. If this route were reinstated, the current operating cost would be $18,500 per year. San Luis Coastal Unified School District data indicates that the High School enrollment has increased by 3 percent since 2019. Applying this factor to the 2019 ridership, this service would carry approximately 7,100 passenger-trips per year and require an operating cost of $17,200. An additional bus would need to be operated.

Figure 2
SLO Full City Microtransit

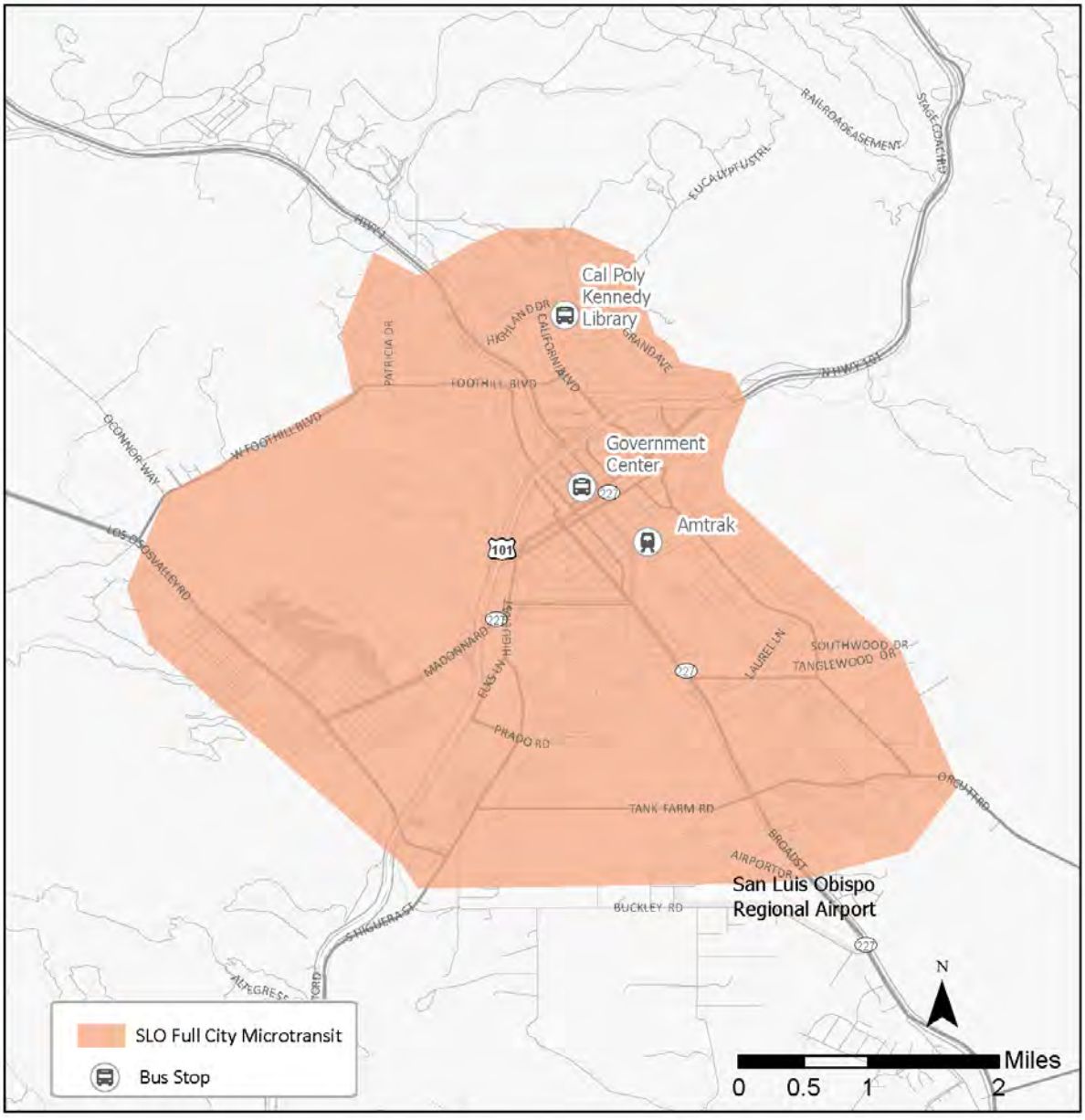


Table 3: SLO Transit - Routing and Microtransit Alternatives

	Change in Annual Service[2]						
	Ridership	Service Hours	Service Miles	Marginal Operating Cost	Cash Fare Revenues [3]	Operating Subsidy	Additional Vehicles Needed
Status Quo[1]							
Route 1A	55,900	5,300	50,700	$379,100	$57,500	$321,600	
Route 1B	20,000	3,100	29,900	$222,300	$16,400	$205,900	
Route 2A	80,300	5,300	57,900	$395,100	$80,300	$314,800	
Route 2B	22,100	3,100	33,200	$229,600	$22,300	$207,300	
Route 3A	94,700	6,300	82,400	$499,900	$30,500	$469,400	
Route 3B	65,700	4,900	61,700	$383,500	$17,700	$365,800	
Route 4A	152,800	5,500	47,800	$382,600	$11,600	$371,000	
Route 4B	70,900	4,000	31,000	$269,900	$4,900	$265,000	
Laguna Tripper	10,100	200	2,000	$14,500	$2,900	$11,600	
Old SLO Trolley	1,600	300	1,800	$19,100	$600	$18,500	
System Total	*574,100*	*38,000*	*398,400*	*$2,795,600*	*$244,700*	*$2,550,900*	
Routing and Microtransit Alternatives - Change from Status Quo[2]							
Implement Evening Microtransit Pilot in Southeast SLO [4]							
7:00 PM - 10:00 PM, Weekdays, Year-Round	100	500	8,800	$33,600	$200	$33,400	2
Implement Late Night Microtransit Pilot - Weekdays, Academic Year [4]							
10:00 PM - 12:00 AM, Weekdays, Academic Year	4,700	1,400	17,500	$122,800	$11,100	$111,700	3
10:00 PM - 12:00 AM, 7 Days/Week, Academic Year	7,100	1,700	21,625	$160,600	$11,100	$149,500	3
Reinstate Route 6X	2,200	100	1,000	$7,200	$900	$6,300	1
Reinstate SLO Tripper	7,100	280	1,430	$17,200	$2,800	$14,400	1
Reinstate Highland Tripper	6,600	230	2,430	$17,000	$2,600	$14,400	1
Revise Routes 1 and 3 in Downtown SLO							
Route 1A	*3,200*	*0*	*1,600*	*$3,500*	*$3,300*	*$200*	*0*
Route 1B	*3,600*	*0*	*-600*	*-$1,400*	*$3,000*	*-$4,400*	*0*
Route 3A	*6,900*	*0*	*0*	*$0*	*$2,200*	*-$2,200*	*0*
Route 3B	*4,000*	*0*	*-3,500*	*-$7,700*	*$1,100*	*-$8,800*	*0*
Total	17,700	0	-2,500	-$5,600	$9,600	-$15,200	*0*

Note 1: Status quo operations are based on FY 2023-24 ridership through 3/31/24 and expected annual population growth. Service estimates are

Note 2: Parameters and costs represent change over existing services. Estimates represent marginal costs and do not include fixed costs.

Note 3: The average cash fare per boarding by route is detailed in Table 13.

Note 4: Assumes a general microtransit fare of $4.00 per one-way trip, or an average fare of $2.36 per passenger. Costs include $4,500/year for app license for one vehicle.

Reinstate Highland Tripper

An additional tripper that has not been operated since the pandemic is the Highland Tripper. This is a short loop route connecting the Cal Poly campus with the housing areas to the west with three round-trips per school day, and provide additional capacity and service times in the peak AM travel period. Considering the previous ridership and the overall change in Cal Poly ridership since the pandemic, this service would currently carry roughly 6,600 annual passenger-trips. Reinstating this service would increase operating cost needs by $17,000, and would require operation of an additional bus.

Revised Routes 1 and 3 in Downtown San Luis Obispo

As discussed in Technical Memorandum 3, the on-time performance of Routes 2 and 3 is poor. Over a total of 298 runs observed as part of this study, 65 percent of Route 2A runs were more than 5 minutes behind schedule, along with 49 percent of Route 2B runs, 48 percent of Route 3A runs and 47 percent of Route 3B runs. In addition to adding uncertainty to service times on each route, this low level of dependability results in missed transfers to/from other routes.
The following options were evaluated to potentially reduce running time and improve on-time performance:

Both Route 2A and 2B in the outbound direction could be streamlined somewhat by traveling along Higuera Street between Higuera/Nipomo and Higuera/Pismo, rather than using Nipomo Street and Pismo Street. This would reduce the route length by 0.2 miles and save roughly 1 minute of travel time. It would eliminate service to two existing stops (Nipomo at Pismo and Pismo at Archer, that serve 6 passenger-trips per day, or approximately 2,000 passengers per year. Given the limited reduction in travel time, this option is not considered further.

In the inbound direction, both Routes 2A and 2B operate a relatively direct route along Marsh Street to Santa Rosa Street, then travel west on Mill and south on Osos to the transit center. A faster option would be to enter US 101 northbound at the Marsh Street interchange and exit at Osos Street, which would reduce running time by approximately 4 minutes. However, existing stops at Marsh/Archer, Marsh/Broad, March/Osos, and Santa Rosa/Higuera would be missed. These stops serve approximately 13 passengers per day, or 6,200 per year (70 percent on Route 2A and 30 percent on Route 2B). As this option would have a substantial impact on existing ridership and would eliminate much of the service between southwest downtown San Luis Obispo and the Transit Center, it is not considered further.

Routes 3A and 3B between the downtown transit center and Higuera Street/South Street both travel along South Street and Santa Barbara Street. Route 3B also serves the Amtrak Station at the end of Santa Rosa Street, while Route 3A travels along Osos Street. Routes could be shortened by using Pismo Street between Santa Rosa Street and Higuera Street on Route 3A and using Marsh Street on Route 3B. This would reduce Route 3A route length by 0.7 miles and reduce Route 3B route length by 0.9 miles. Service would be eliminated to 7 stops on Route 3A and 8 stops on Route 3B. Total ridership at these stops is currently roughly 31 passengers per day or 7,600 per year, evenly split between the two individual routes. However, given the slower running speeds in downtown compared with High Street and the southern portion of Santa Barbara Street, only roughly 1 minute of travel time would be saved in each direction. This option is not considered further, given the substantial impact on ridership and limited benefit to running time.

Another option would be to reroute Routes 3A and 3B onto US 101 between the Downtown Transit Center and the Madonna Street interchange and shift Routes 1A and 1B onto the exiting Routes 3A/3B routes between Broad Street/High Street and the Downtown Transit Center. This realignment is shown in Figure 2. This would reduce the running time of Route 3A by roughly 5 minutes and Route 3B by roughly 7 minutes, which would significantly improve the on-time performance of Routes 3A and 3B.
Service would be fully eliminated from only a total of four existing stops. Setting aside those stops within a quarter mile walk of other remaining stops, those stops that lose all convenient service consists of the following:

- Broad at Islay (Route 1A)
- Broad at Leff (Route 1B)
- South at King W (Route 3A)
- South at King W (Route 3B)

The stops along Broad Street on Routes 1A/1B in total currently serve 2 passenger-trips per day or 800 per year, while the stops along South Street on Routes 3A/3B currently serve 7 passenger trips per day or 1,000 per year, for a total of 9 daily trips and 1,800 annual trips.

This realignment option would also reduce service between the downtown Transit Center and central downtown San Luis Obispo by rerouting Route 1 out of the area. However, as the current Route 1 schedule is very close to the Route 2 schedule in both directions, this would not significantly reduce the convenience of transit service. This option would also reduce the travel times between southwest San Luis Obispo and the Downtown Transit Center. Improving the dependability of Route 3A/3B would also improve the connections to other routes at the Transit Center. Running times on Route 1A/1B are not expected to change significantly; while the revised Route 1A is 0.3 miles longer than at present, it would avoid congestion in the lower downtown area.

As shown in Table 3, this strategy would not change vehicle-hours of service but would reduce annual vehicle-miles by 2,500. Ridership impact was estimated based on the ridership change associated with improvements in dependability, the changes in in-vehicle travel time, the loss of ridership at the four stops with elimination of service, as well as the shift in existing Routes 3A/3B ridership to Routes 1A/1B. Overall, annual ridership is estimated to increase by a total of 17,700 passenger boardings per year. Considering the operating costs savings generated by the reduction in mileage plus the additional passenger revenues, the net operating subsidy would be reduced by $15,200 per year. No additional buses would be required.

PERFORMANCE ANALYSIS OF SLO TRANSIT SERVICE ALTERNATIVES

To evaluate the relative performance of the alternatives above, key impacts of each alternative were compared. The change from the status quo ridership, marginal operating cost, passengers carried per vehicle hour, and marginal operating cost per passenger were compared. This evaluation gives insight regarding the relative advantages and disadvantages of the alternatives. Table 4 and Figures 2-5 show the relative performance of the service alternatives. Green highlight in Table 4 indicates alternatives which meet performance standards developed as part of Working Paper #2.

Ridership

The impact of the various alternatives on annual ridership is shown in Figure 2. As indicated, the alternatives vary widely, ranging from very little change in ridership associated with providing evening microtransit service in southeast San Luis Obispo (replacing Route 1 service) up to 208,300 passenger-trips per year generated by doubling service throughout the year across the operating day. Excluding the options of doubling frequency, the greatest ridership increase is generated by operating the B routes on weekend days (39,600) followed by operating just Route 3B and 4B on weekends (29,400) and revising Routes 1 and 3 in downtown San Luis Obispo (17,700).

Table 4: SLO Transit - Service Alternatives Performance Analysis

	Net Impact					
	Annual Ridership	Service Hours	Service Miles	Annual Marginal Operating Cost [1]	Passenger-Trips per Vehicle Service Hour	Marginal Op. Cost per Passenger-Trip
Increase Route 4 A/B Frequency During Academic Year						
Increase Route 4A Frequency - 8:00 AM - 10:00 AM	4,200	300	2,300	$20,200	14.0	$4.81
Increase Route 4B Frequency - 3:00 PM - 5:00 PM	3,900	300	2,100	$19,700	13.0	$5.05
Double Service Frequency on Routes 1, 2, 3, 4 (A & B)						
Full Service Day, Year-Round	208,300	33,500	347,000	$2,455,000	6.2	$11.79
8:00 AM to 6:00 PM, Weekdays, Year-Round	119,700	19,600	234,200	$1,505,800	6.1	$12.58
Full Service Day, Weekdays, Academic Year	153,600	20,900	231,700	$1,565,500	7.3	$10.19
Double Service Frequency on Routes 1, 2, 3, 4 (A Only)						
Full Service Day, Weekdays, Academic Year	89,600	11,300	133,800	$865,400	7.9	$9.66
Double Service Frequency on Routes 3, 4 (A & B)						
Full Service Day, Weekdays, Academic Year	101,200	11,600	136,100	$885,600	8.7	$8.75
Extend Weekday Evening Service on A Routes						
Extend Service to 12:00 AM - Academic Year	5,100	1,000	10,900	$74,500	5.1	$14.61
Extend Service to 10:00 PM - Non-Academic Year	2,200	700	7,000	$50,700	3.1	$23.05
Expand Service on B Routes						
Operate B Routes on Weekends Year Round - 7:45 AM - 8:00 PM	39,600	3,200	46,000	$263,100	12.4	$6.64
Operate 3B and 4B on Weekends	29,400	1,600	25,300	$136,700	18.4	$4.65
Extend Routes 1B and 2B until 10:00 PM - Weekdays, Academic Year	4,000	1,400	14,500	$102,600	2.9	$25.65
Provide Academic Year Service Levels Year-Round	16,300	2,300	26,400	$174,300	7.1	$10.69
Implement Evening Microtransit Service in SE SLO	100	500	8,800	$33,600	0.20	$336.00
Implement Late Night Microtransit - Weekdays	4,700	1,400	17,500	$122,800	3.4	$26.13
Implement Late Night Microtransit - 7 days/week	7,100	1,700	21,625	$160,600	4.2	$22.62
Reinstate Route 6X	2,200	100	1,000	$7,200	22.0	$3.27
Reinstate SLO Tripper	7,100	280	1,430	$17,200	25.4	$2.42
Reinstate Highland Tripper	6,600	230	2,430	$17,000	28.7	$2.58
Revise Routes 1 and 3 in Downtown SLO	17,700	0	-2,500	-5,600	NA	-$0.32
Alternatives meeting performance standards shaded in green. Note that alternatives meet standards by increasing ridership at a greater rate than costs, eliminating a service not meeting standards, or increasing ridership while decreasing costs.				Recommended Performance Standards	11.5	$11.23

Note 1: Does not include fixed costs

Figure 3: SLO Transit Service Alternatives - Impact on Annual Ridership

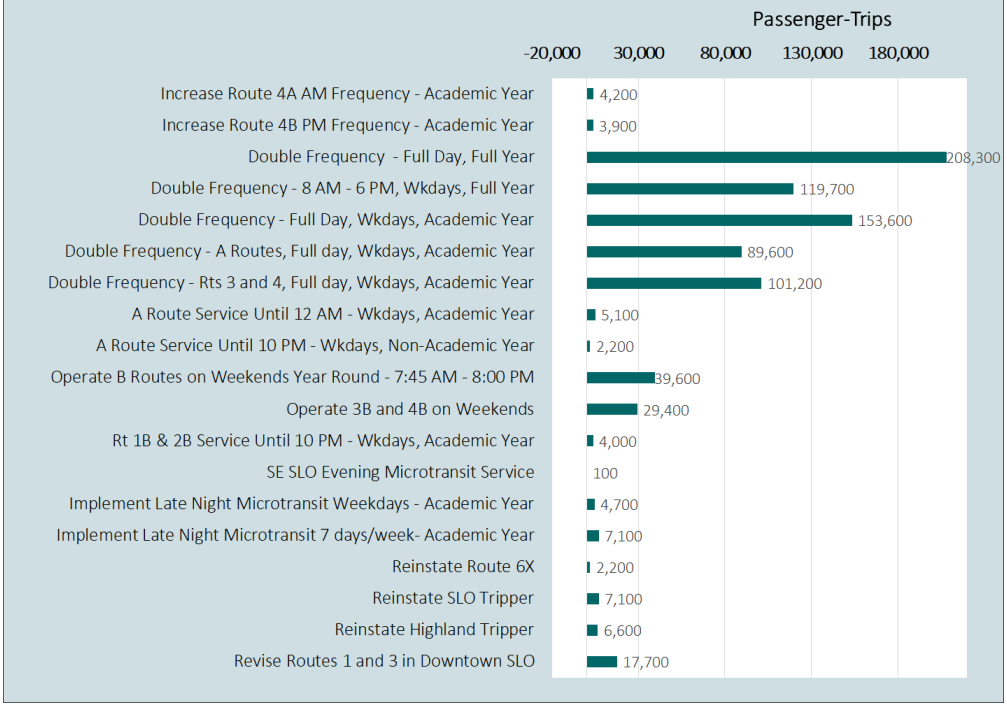


Figure 4: SLO Transit Service Alternatives - Impact on Annual Marginal Operating Cost

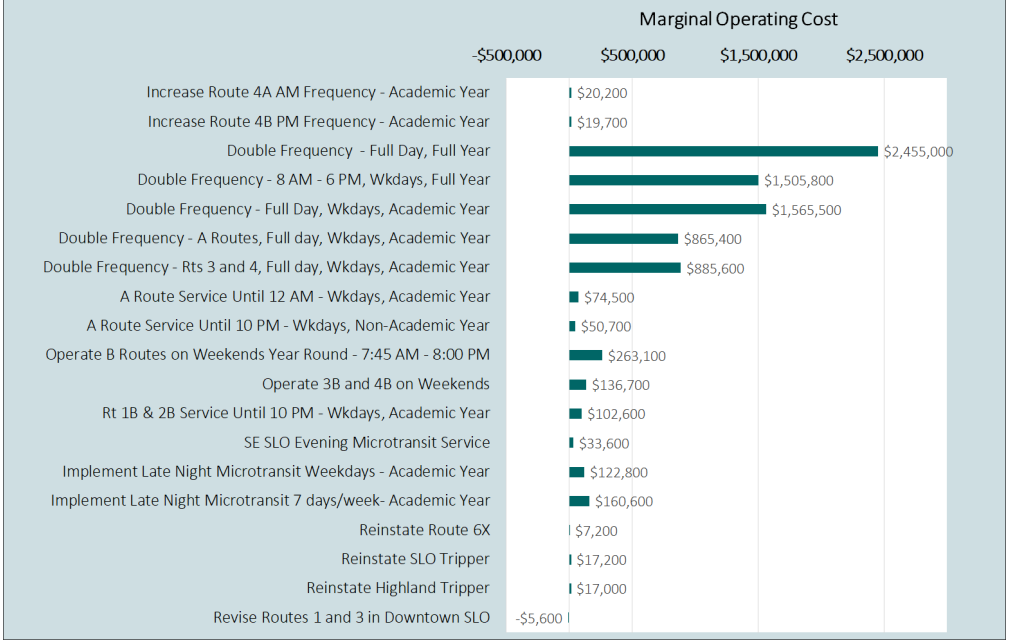
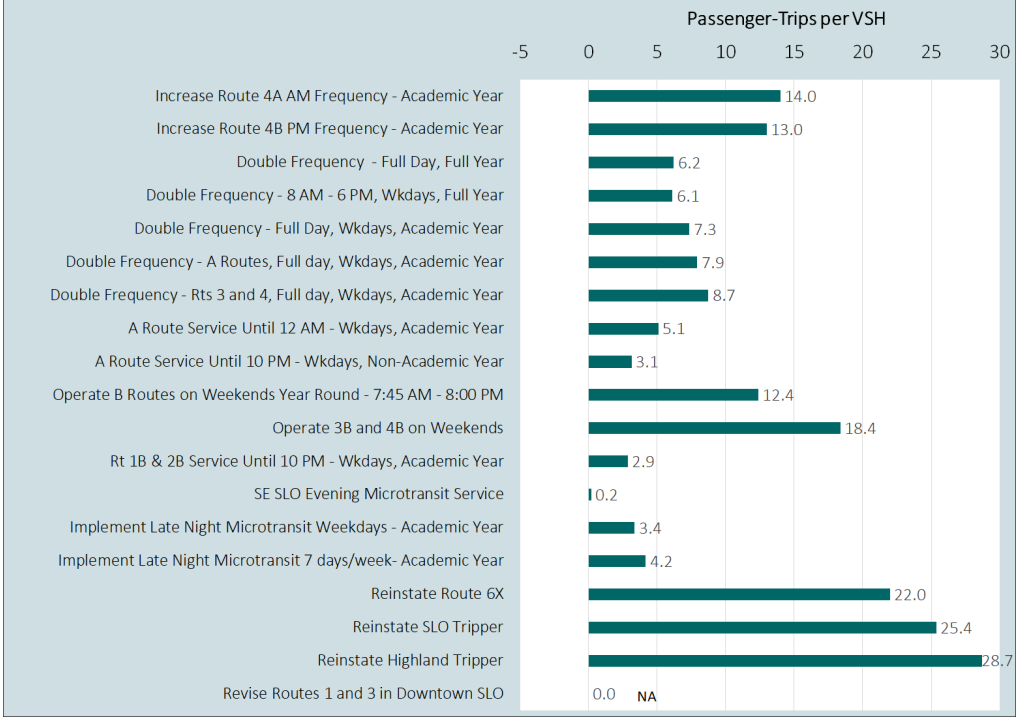


Figure 5: SLO Transit Service Alternatives - Passenger-Trips per Vehicle Service Hour



Marginal Operating Cost

Similar to the ridership impacts, the impact on annual marginal operating costs also vary widely, as shown in Figure 3. At the high end, the full doubling of transit service across all service periods over the year would increase operating costs by $2.45 Million, while limiting the doubling of service frequency to the academic year would cost $1.56 Million, and limiting to daytime hours through the full year would cost $1.5 Million. Doubling frequency on just the A Routes or Routes 3 and 4 (both A and B) would cost on the order of $865,400 and $885,600, respectively.

On the other end, revising Routes 1 and 3 in downtown San Luis Obispo would yield a small overall reduction in annual operating cost of $6,100. Beyond doubling frequency, other service alternatives that are relatively costly are operating B routes on weekends ($263,100), implementing late night microtransit service ($122,800) and operating Routes 1B and 2B on weekday evenings in the academic year ($102,600).

Passenger-Trips per Vehicle Service Hour

A standard measure of the productivity of a transit service is the passenger-trips served per vehicle-hour of service. As shown in Figure 4, the "best" alternative by this measure is reinstating Highland Tripper, which would serve 28.7 passenger-trips per vehicle-hour. This is followed by reinstating the SLO Tripper and Route 6X. Operating Route 3B and 4B on Weekends (18.4), increasing Route 4A morning frequency in the academic year (14.0), increasing Route 4B afternoon frequency in the academic year (13.0) and operating the B routes on weekends (12.4) all meet productivity standards. The options that double

service frequency range from 6.1 to 8.7 passengers per vehicle service hour, with the most productive being doubling service on Routes 3 and 4 in the academic year only. The worst option by this measure is replacing evening Route 1 service with microtransit, which adds vehicle-hours but is not forecast to change ridership very much. Note that the revision of Routes 1 and 3 in downtown San Luis Obispo cannot be evaluated by this measure, as the number of vehicle-hours is not changed.

As discussed in *Working Paper 2*, the standard for this measure is a minimum of 11.5 passenger-trips per vehicle service hour. Those alternatives that meet this standard are reinstating Route 6X, Highland Tripper and SLO Tripper, increasing Route 4A frequency in the morning during the academic year, increasing Route 4B frequency in late afternoons during the academic year, and operating the B routes on weekends year-round, particularly 3B and 4B.

Marginal Operating Cost per Passenger-Trip

A final performance measure is the marginal operating cost per passenger-trip. This is a good measure of the financial performance of the various alternatives, with the better alternatives indicated by a lower value. Figure 5 indicates the "best" alternative by this measure is the revision of Routes 1 and 3 in downtown San Luis Obispo, which saves $0.32 for every additional passenger-trip served (as it reduces costs while increasing ridership). At the other extreme, replacing Route 1 in the evening with microtransit requires a $357 per new trip served, followed by implementing late night microtransit service ($26.13), followed by Route 1B and 2B service until 10 PM ($25.65). Considering the standard of no more than $11.23 per passenger-trip, those that achieve the standard consist of:

- Routes 1 and 3 revisions in downtown San Luis Obispo
- Reinstating pre-COVID services such as Route 6X, Highland Tripper and SLO Tripper
- Increasing Route 4A frequency in the mornings during the academic year
- Increasing Route 4B frequency in the late afternoons in the academic year
- Operating the B routes on weekends year-round, 3B and 4B in particular
- Doubling frequency on all routes for a full-service day, weekdays, during the academic year
- Doubling frequency on the A routes for a full-service day, weekdays, during the academic year
- Doubling frequency on Routes 3A, 3B, 4A and 4B for a full-service day, weekdays during the academic year.
- Provide academic year service levels year-round

Summary

Based on this performance analysis the following service alternatives have the greatest potential to enhance the SLO Transit service and should be carried forward into the plan development process:

- Realigning Routes 1 and 3 in downtown San Luis Obispo.
- Providing B route service on weekend days year-round.
- Increasing Route 4A frequency on weekday mornings in the academic year.
- Increasing Route 4B frequency on weekday afternoons in the academic year.
- Reinstating pre-COVID routes: Route 6X, Highland Tripper and SLO Tripper.

While doubling service frequency would generate substantial ridership benefits, it would require significant new funding sources as well as consideration of capital fleet and facility needs. Doubling frequency on Routes 3A, 3B, 4A and 4B would have the lowest marginal operating cost per new passenger-trip served.