

Chapter 7

PREFERRED ALTERNATIVE

INTRODUCTION

The chapter outlines the considerations that led the SMART Commission to decide upon a preferred service option alternative. The five options that were reviewed were:

- λ Healdsburg to downtown San Rafael – a distance of 51 miles;
- λ Cloverdale to downtown San Rafael – a distance of 68.2 miles;
- λ Healdsburg to Petaluma – a distance of 29.5 miles;
- λ Cloverdale to Petaluma – a distance of 47.4 miles; and
- λ Petaluma to San Rafael – a distance of 20.8 miles.

The service area covered by these options appears in Figure 3. The figure also shows the locations of sidings needed to support 45-minute headways at start-up and the subsequent transition to 30-minute headways. These sidings include existing sidings that need to be rebuilt as well as new sidings.

This chapter compares the options in terms of various measures of operating performance and capital cost effectiveness. These measures are derived from the figures shown in Chapters 5 and 6. These chapters showed the five options in terms of total ridership, revenue, operating cost and capital cost. However, these total numbers must be put in context in order to facilitate a decision on which is best for a start-up. For example, while one option may represent a lesser total capital cost than others, it may also have lower ridership and farebox recovery potential at start-up and well into the future.

To represent the relationships among the options more clearly, the options are analyzed using various key ratios. Two of these appeared in previous chapters – farebox recovery and capital cost per mile. When taken together, these ratios and other ratios offer a context for a meaningful assessment of the merits of one option versus another by showing the options in terms of apples-to-apples comparisons. For example, instead of comparing total capital cost numbers for implementing five different systems, one can see the options in terms a common unit of analysis – capital cost per mile.

No single option “wins” across the board on all ratios. However, on balance Cloverdale to San Rafael has the best combination of ratios. This result led the Commission to adopt the Cloverdale to San Rafael as its preferred alternative.

COMPARISON OF OPTIONS

Four ratios that allow for meaningful comparisons are:

- λ Revenue per train-mile;
- λ Cost per train-mile;
- λ Farebox recovery; and
- λ Capital cost per route-mile

Ratios appear below for both the start-up year 2002 and for 2012. The four ratios are commonly utilized for analysis of passenger rail systems.

Revenue per Train-Mile

This measure captures the total revenue earned by the service for each train-mile traveled. Daily revenues were cited in Chapter 5. A train-mile is the unit of measurement generated by a train set moving one linear mile. Daily train-miles per service option were shown in Chapter 4. The ratio is a result of dividing revenues by train-miles. A comparison of this measure by service option reveals which options earn more revenue per linear mile traveled than others. The comparison for 2002 and 2012 appears in Table 7-1.

Table 7-1
Revenue per Train-mile
1999 Dollars

Year	Healdsburg to San Rafael	Cloverdale to San Rafael	Healdsburg To Petaluma	Cloverdale to Petaluma	Petaluma to San Rafael
2002	5.23	5.17	2.81	3.04	4.42
2012	6.83	6.82	3.89	4.57	5.34

On this basis, Healdsburg to San Rafael does best. However, the difference between it and Cloverdale to San Rafael is slight in 2002. They are in effect equal in 2012. Both options clearly out perform the three other shorter distance options. The reason is two-fold. First, they carry more riders, and second, they are carrying riders farther and, therefore, at higher average fares. The three shorter distance options have significant train-mileage. However, ridership and revenue are lower than for the two longer distance options. As a result, their revenues per train-mile are lower. Revenues per train-mile are unaffected by rolling stock type.

Operating Costs per Train-Mile

This measure captures the total operating costs for moving a train set one mile. Operating costs for each option appeared in Chapter 5. Operating costs for were shown for both diesel multiple unit (DMU) equipment and conventional locomotive-hauled equipment. Of these, DMU

equipment had lower operating costs – a result of a lower fuel consumption rate. For this comparison, the operating costs per train-mile used for in Table 7-2 were DMU costs.

Table 7-2
DMU Operating Cost per Train-Mile
1999 Dollars

Year	Healdsburg to San Rafael	Cloverdale To San Rafael	Healdsburg to Petaluma	Cloverdale To Petaluma	Petaluma to San Rafael
2002	24.03	22.34	28.68	25.66	46.90
2012	21.99	19.99	26.81	24.46	40.22

Clearly, the options with greater train-miles have the cost advantage, for costs are spread over more train-miles. In fact, the Cloverdale to San Rafael, having the most train-miles, has the lowest operating cost per train-mile. On the other hand, the Petaluma to San Rafael with the least train-miles has the highest operating cost per train-mile. The result is predictable, given the high fixed cost nature of rail operations. In other words, just because an “Option A” has a fraction of train-miles of an “Option B,” it does not automatically follow that Option A’s costs will be the same fraction of the other Option B’s cost. Both will still require a general manager and significant administrative staff, for example.

Farebox Recovery Ratio

This measure was cited previously in Chapter 5. It appears again here, as it is a typical figure cited along with other performance ratios. Farebox recovery captures the degree to which revenues cover operating costs. The results for all the options appear in Table 7-3. As for operating cost per train-mile comparison, the ratios use DMU costs.

Table 7-3
DMU Farebox Recovery

Year	Healdsburg to San Rafael	Cloverdale To San Rafael	Healdsburg to Petaluma	Cloverdale To Petaluma	Petaluma to San Rafael
2002	22%	23%	10%	12%	9%
2012	31%	34%	15%	19%	13%

The two longer route options out perform the three shorter route options for several reasons. First of all, the longer routes benefit from having more riders, a sizable portion of whom are traveling longer distances and, therefore, are paying higher fares. For example, assuming a Cloverdale to San Rafael service option, the average rail trip distance for the top 10 markets served computes to 15 miles. Of those markets just within Sonoma County that would be served by a Healdsburg to Petaluma option, the average trip distance is 11 miles.

On the cost side, the two longer route options are more efficient in terms of utilization of their equipment. For example, for 2002, Cloverdale to San Rafael averages 318 miles per train set,

versus 198 miles per train set for Petaluma to San Rafael. Also, as is typical with longer route structures, fixed costs are a lesser percentage of total costs. For example, general and administrative (G&A) costs total for Cloverdale to San Rafael is about 20 percent, while G&A costs for Petaluma to San Rafael is about 26 percent.

The difference in the two longer distance options' farebox ratios for 2012 partly results from efficiencies in crew utilization due to the higher service level. The options have identical train crew numbers. However, crews running trains in the Cloverdale to San Rafael option would handle 12 percent more train-miles than the crews in the Healdsburg to San Rafael option.

As noted in Chapter 5, the 23 percent farebox recovery ratio for the Cloverdale to San Rafael in 2002 compares favorably with the 20 percent farebox recovery ratio reported by San Diego's Coaster commuter rail service for its start-up year ending in 1996. At the same time, that option's 2012 ratio of 34 percent compares favorably with those of mature commuter rail and bus transit services. Farebox ratios for several commuter rail and bus operations appear in Table 7-4.

Table 7-4
Comparison of Farebox Ratios of Different Transit Services

	Fiscal Year 96-97 (\$ Thousands)		
	Farebox Revenue	Operating Cost	Farebox Ratio
Commuter Rail			
Coaster in San Diego	2,196	9,107	24.1%
Caltrain on SF Peninsula	16,025	43,141	37.1%
Metrolink in Los Angeles	24,370	57,700	42.2%
Bus			
Golden Gate Transit	13,763	43,871	31.4%
Santa Rosa City Bus	1,139	3,962	28.7%
Sonoma County Transit	1,454	5,096	28.5%
Source: Statistical Summary of Bay Area Transit Operations, interviews with Coaster and Metrolink Officials.			

Of the commuter rail options above, Metrolink clearly has the best farebox ratio. However, Metrolink does not count some costs that are in the cost calculations of the five service options. Excluded, for example, are station services, as cities served by Metrolink are responsible for these costs. Caltrain's farebox recovery benefits from a growing "reverse commute" that takes riders from San Francisco and Peninsula stations to Silicon Valley.

Capital Cost per Mile

This comparison appeared in Chapter 6. It is a measure of how expensive an option is to upgrade and equip for commuter operations on a mile-for-mile basis versus other options. The figures for DMU equipment reappear here in Table 7-5.

Table 7-5
Capital Costs per Mile at Start-up
Millions of 1999 Dollars

DMU	Healdsburg to San Rafael	Cloverdale to San Rafael	Healdsburg to Petaluma	Cloverdale to Petaluma	Petaluma to San Rafael
Capital Cost per Mile	2.45	2.03	2.28	1.73	2.70

The Cloverdale to Petaluma is the least expensive to build, when viewed on a cost-per-mile basis. While this option requires about \$13 million more in capital costs than the Healdsburg to Petaluma option without Cloverdale, these costs are spread out over significantly more total route miles, resulting in the lower cost per mile. The most expensive option on a per-mile basis is Petaluma to San Rafael. This result is predictable, since the segment from south of the Ignacio Wye to San Rafael, or 42 percent of the route, has not been in operation since the mid 1980s. Rehabilitation cost of this segment's track alone is more than twice that between Ignacio and Petaluma. While the segment is part of both the Healdsburg to San Rafael and Cloverdale to San Rafael options, it is a lesser percentage of their total route structure. Also, the higher costs of the south are averaged down by lower capital costs per mile of the northern segments in both cases.

PREFERRED ALTERNATIVE

Of the five service options, the two longer distance options, Healdsburg to San Rafael and Cloverdale to San Rafael, have superior operating performance ratios for revenue per train-mile, operating cost per train-mile, and farebox recovery in the start-up year of 2002. Of the two options, Cloverdale to San Rafael has better operating cost per train-mile and farebox recovery. Higher by 1 percent in 2002, Healdsburg to San Rafael's revenue per train-mile is not meaningfully better than Cloverdale to San Rafael's. From an operating performance perspective, therefore, it appears Cloverdale to San Rafael would have the best overall operating performance.

From a capital cost perspective, Cloverdale to Petaluma is least expensive to build on a per-mile basis. Notably, Cloverdale to San Rafael is more expensive, but it is also substantially less expensive than the three remaining options.

Based on these calculations, the Commission concluded that on balance the two longer distance service options were the superior alternatives, and of all options Cloverdale to San Rafael was the best alternative. While it is not necessary to go to Cloverdale to achieve superior results, doing so improves the key ratios by carrying more riders farther and with greater efficiency. It

also offers the possibility of locating a maintenance facility in Cloverdale instead of Healdsburg, which has expressed its preference that the facility not be located there. Also, the Cloverdale terminus offers the potential for the use of the line for recreational purposes, i.e., bicyclists and hikers.