DRAFT FINAL REPORT

Commuter Rail Assessment

Prepared for:
Santa Barbara County Association of Governments

Prepared by:
Wilbur Smith Associates
in association with
PB Transit & Rail Systems

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SANTA BARBARA COMMUTER RAIL ASSESSMENT

INTRODUCTION

This report contains ridership forecasts and capital and operating cost projections for a commuter rail service between Oxnard and Goleta. The analysis focused on implementation in 2030, and considered earlier implementation options as well. Costs and revenues are stated in 2005 dollars. If a commuter service were started by 2010, the lower ridership would produce less revenue than in later years, but operating costs would be lower as fewer cars per train would be needed. A greater subsidy per passenger would be required for service in the earlier years. However, there might be some capital cost savings in the initial years because the full complement of rolling stock would not be required until the higher ridership levels are attained in 2030.

The study investigators were planners and engineers from Wilbur Smith Associates (WSA) and PB Transit & Rail Systems (PB). WSA's effort focused on the service concept definition, ridership and revenue forecasts, and operating cost estimates. PB provided unit costs for capital costing. WSA is completing the Commuter Rail Strategic Assessment for the Metrolink commuter rail system serving Oxnard and the greater Los Angeles area. Per the direction of the Santa Barbara County Association of Governments (SBCAG), the study team employed the methodology for ridership forecasting developed for the Metrolink study.

The analysis that follows is a conceptual level planning analysis, which leveraged existing tools and methodologies to estimate what a peak hour commuter rail service between Oxnard and Goleta might cost to start, the ridership it might attract, and the continuing operating subsidy it would require. The purpose of the study is to facilitate the alternatives analysis of improvements to U.S. 101 in Santa Barbara County (the 101 In Motion study). Accordingly, this analysis is best considered a "first cut" assessment of commuter rail potential. Answers to important questions, such as the extent of capacity improvements and the requirements of the freight hauling railroad with which a commuter service would share the line, can only be approximated, given the time frame and budget for this study. A more detail analysis of ridership and costs would be necessary for implementation of commuter rail service.

SERVICE CONCEPT

The service concept envisions two northbound commuter trains during the morning peak period, and two corresponding southbound trains during the evening peak. Trains would run between Oxnard on the south and Goleta on the north. One train would not be sufficient to attract a reasonable ridership base, but the forecasts do not justify three trains. Two trains would be sufficient to accommodate projected volumes in each of the years studied. Should ridership growth justify additional trains beyond the projections, service expansion would need to be considered in conjunction with Amtrak and Metrolink service levels at the time.

Initial evaluation of the service concept looked at both Diesel Multiple Unit (DMU) rolling stock and standard commuter cars with diesel locomotives (as operated by Metrolink). DMU equipment typically has a lower operating cost for services with low ridership, but as ridership increases, the volume requires more capacity and the cost differential diminishes. DMU equipment would be more likely to require a specialized maintenance facility, whereas standard commuter equipment might be maintained by Metrolink under contract. The 2030 ridership estimates are sufficient to warrant standard commuter trains. Therefore, there was no further consideration of DMU rolling stock.

For this analysis, use of five existing Amtrak Surfliner passenger stations was assumed. These are located at Goleta, Santa Barbara, Carpinteria, Ventura, and Oxnard. These stations are served by Amtrak's Surfliner trains. Amtrak's Coast Starlight train also serves Santa Barbara and Oxnard. An additional station at Rice Avenue, just east of Oxnard, is assumed for illustrative purposes only. Such a station could provide surface parking at a lower cost than in Oxnard, where a parking structure to serve new riders might be needed[1]. A new station irrespective of exact location would be for commuter rail purposes only; it would not be an Amtrak stop.

A start-up schedule that can be attained with no significant change to current passenger operations was assumed. The schedule is shown in Table 1. Current Amtrak and Metrolink schedules are also shown in Table 1. The schedule shows the northbound commuter trains arriving in Santa Barbara at 7:40 AM and 8:25 AM. Southbound trains would leave at 4:35 PM and 5:25 PM. The running time between Oxnard and Santa Barbara is approximately 45 minutes[2]. It is assumed that repeat commuters with multi-ride tickets could use Amtrak Surfliner schedules for travel between common points, under a plan similar to the Rail 2 Rail program now in effect for Metrolink and Amtrak services. Such an arrangement would be helpful for riders who have a need for mid-day travel[3].

The commuter train schedules are designed to meet Amtrak Surfliner and Metrolink trains at existing sidings, thereby minimizing requirements for new passing sidings. The second southbound train could leave later than 5:25 PM, as there will be no conflicts with northbound either Surfliner or Metrolink trains at that time. Current Surfliner and Coast Starlight schedules were used in developing the commuter train schedules. These are likely to change over time.

[1] To be conservative in its cost estimates, this study assumes that parking improvements generated for the new commuter rail service would be incremental to existing or programmed improvements.

[2] Amtrak Surfliner schedules between Oxnard and Santa Barbara allow 50 minutes to one hour, with schedules that include recovery time for unforeseen delays. These trains operate between San Luis Obispo or Goleta and Los Angeles or San Diego, and can encounter delays anywhere along their route.

[3] The concept behind something like Rail 2 Rail is that the commuter rail sponsoring agency pays Amtrak for the cost of carrying its riders. The payment level is negotiated between the agency and Amtrak. The payments to Amtrak become an operating cost for the commuter rail agency.

Table 1
Illustrative Schedule with Commute Service

Southbound – Read Down												Northbound – Read Up										
102	**104**	**106**	**768**	**774**	**784**	**798**	**C2**	**C4**	**11**	**796**		**C1**	**C3**	**799**	**763**	**14**	**769**	**775**	**113**	**115**	**117**	**785**
AM	**AM**	**AM**	**AM**	**AM**	**PM**	**PM**	**PM**	**PM**	**PM**	**PM**		**AM**	**AM**	**AM**	**AM**	**PM**	**PM**	**PM**	**PM**	**PM**	**PM**	**PM**
---	---	---	6:35	9:03	1:45	3:47	4:20	5:10	---	6:50	Goleta	7:51	8:36	10:22	11:46	---	3:15	5:44	---	---	---	9:51
---	---	---	6:49	9:21	1:59	4:05	4:35	5:25	6:17	7:05	Santa Barbara	7:40	8:25	10:11	11:35	12:48	3:04	5:33	---	---	---	9:40
---	---	---	7:04	9:37	2:15	4:21	4:50	5:40	---	7:21	Carpinteria	7:25	8:10	9:54	11:14	---	2:45	5:10	---	---	---	9:18
---	---	---	7:26	9:58	2:40	4:42	5:09	5:59	---	7:42	Ventura	7:07	7:52	9:34	10:54	---	2:19	4:49	---	---	---	8:57
5:27	6:05	6:44	---	---	---	---	---	---	---	---	Montalvo	---	---	---	---	---	---	---	6:10	6:55	8:35	---
5:42	6:20	6:59	7:40	10:12	2:57	4:56	5:20	6:10	7:08	7:56	Oxnard	6:55	7:40	9:20	10:40	11:55	2:06	4:35	5:55	6:39	8:14	8:38
---	---	---	---	---	---	---	5:25	6:15	---	---	Rice Avenue	6:50	7:35	---	---	---	---	---	---	---	---	---

Notes: Commute service shown as trains C1 through C4.
100-series trains are current (2005) Metrolink schedules.
700-series trains are current (2005) Amtrak Surfliner schedules.
Trains 11 and 14 represent long distance Coast Starlight trains.

Metrolink Montalvo station is located off the Coast Line, and could not be served by Santa Barbara commuter trains.
Metrolink trains operate to and from Los Angeles, as do Amtrak Surfliner trains.

PRELIMINARY RIDERSHIP FORECASTS

The ridership forecast employed a ridership forecasting methodology developed for the ongoing Metrolink Commuter Rail Strategic Assessment. In brief, the methodology first identifies the work trips that occur between areas around origin stations and areas around destination stations, and then applies a mode share which commuter rail could reasonably be expected to capture. The ridership is them adjusted to reflect the anticipated impact of increasing congestion on the parallel highway system.

Methodology and Data Source

The basis for ridership forecasts was the projected peak hour home to work trip volume between traffic analysis zones (TAZs) in the commuter service area. The data were obtained from the SBCAG regional transportation model. TAZs around each potential commuter station were grouped to represent the station service area, and the forecasted peak hour movements between the station service areas were adjusted to represent total AM home to work trips.

Commuter Rail Mode Share

Research for the Metrolink study and the other commuter rail studies has established a typical "capture rate" or mode share for commuter rail trips between stations of varying distance, and with varying levels of service. For these forecasts, capture rates currently being experienced on Metrolink services[4] were applied to the total peak period home to work travel to determine the number of probable rail commuters. The rates were based on a correlation of Metrolink ridership to train frequency (i.e. with the more trains, people are more drawn to the service), and ridership to travel distance (i.e. people are more drawn to commuter rail for longer trips than for shorter trips). The rates range from less than one percent for short trips to about 10 percent for trips in the 40 to 50 mile range. These rates assume a high level of integration with local transit or employer shuttle services to move train riders to work centers[5]. Application of the capture rates to the morning work trips produced the forecast of morning commuter train ridership. Total ridership would be double the morning figures.

Congestion Adjustment Factors

The ridership forecasts then were adjusted to reflect ridership under three conditions: current congestion levels, increased highway congestion levels, and congested highways with high occupancy vehicle (HOV) lanes between Carpinteria and Goleta and express bus service between the counties. Current congestion levels assume that travel times would be the same as they are today. Increased congestion levels assume that travel times would take longer. Congested highways with HOV lanes and express bus service assume that commuters could shorten their travel time by availing themselves of HOV lanes by carpooling and express buses that would operate in those lanes.

[4] WSA used capture rates for Metrolink service to locations outside central Los Angeles. Capture rates to Los Angeles are higher because parking is more limited and more costly, and there is a higher propensity to use commuter rail as an alternative to driving.

[5] This analysis does not estimate the cost to local agencies of this integration. However, these costs are addressed in other studies that are part of the alternatives analysis of improvements in the U.S. 101 Corridor in Santa Barbara County.

No specific data on future auto travel times from Oxnard to Santa Barbara were available to this study's investigators that would enable them to anticipate the effect of U.S. 101 congestion on ridership. However, the team had recently done analysis of congestion of highways parallel to Metrolink, as part of the Metrolink Commuter Rail Strategic Assessment. The team developed adjustment factors for the ridership that reflect the effect on ridership of more congested conditions (longer travel times). This study assumed that conditions in future years on U.S. 101 between Oxnard and Santa Barbara would be roughly similar to those between Oxnard and the San Fernando Valley. Accordingly, roughly similar congestion factors were applied. These factors for the increased congestion scenario were 1.1 for 2010, 1.2 for 2020 and 1.3 for 2030, which were multiplied by the ridership in those years. No factors were applied for the current congestion scenario.

Ridership Forecasts by Year and Scenarios

Commuter train ridership is summarized in Table 2, ranging from a low of 144,500 in 2010 to 466,900 in 2030.

Table 2
Preliminary Ridership Forecasts

Scenario	2010	2020	2030
With HOV/Bus	144,450	186,842	233,451
Current Congestion	262,636	311,404	359,156
Increased Congestion	288,900	373,685	466,903

Recent travel demand modeling for a potential commuter rail corridor in Houston revealed that high occupancy lane improvements would reduce the attraction for commuter rail by about half[6] from no improvement conditions. Accordingly, the forecasted ridership for scenarios assuming HOV/express bus improvements was halved from increased congestion scenarios.

The ridership forecasts were based on specific station-to-station work trips. The "high end" station boardings (ons) and alightings (offs) for year 2030 are shown in Table 3. These assume increased congestion levels and no competitive express bus service or HOV lanes. The share of riders at each station under the lower ridership forecasts would be similar, with the majority or riders using the commuter system between Oxnard or Ventura to Santa Barbara and Goleta.

[6] SH 288 Corridor Feasibility Study, Texas Department of Transportation.

[8] The estimated cost per trip with a monthly pass would be $1.80, calculated as follows: the $75 monthly pass divided by 20 weekdays per month divided by two trips each way equals $1.80 per trip.

Table 3
Morning Ons and Offs in 2030

Stations	On	Off
Oxnard (Rice Avenue and Downtown)	484	0
Ventura	419	0
Carpinteria	3	31
Santa Barbara	13	533
Goleta	0	355
Totals	919	919

Assuming current levels of congestion on parallel U.S. 101, commuter rail would generate 707 ons and offs, or 1,414 passenger trips per weekday in 2030. Assuming HOV lanes and express bus service, commuter rail would generate 460 ons and offs, or 920 passenger trips per weekday in that year.

The commuter rail ridership forecasted for 2030 would only a small fraction of the total work trips from Ventura County to Santa Barbara County. According to the 2000 U.S. Census Journey to work data, there were 9,000 total commuters going northbound between the counties. Of this total, commuter rail, if it existed, could be expected to capture less than 5 percent. These reasons are two fold. First, commuter rail would not serve all commuters residing in Ventura County and working in Santa Barbara County. It would draw riders only from those origins that are comparatively close to stations and going to those destinations that could be reached by a comparatively short walk or connecting transit or private shuttle ride from the destination station. Secondly, it would serve only those commutes occurring during the peak commute periods. The U.S. Census figure counted total work trips, regardless of either time of day or trip frequency during the week (some trips occur less than daily). Therefore, it is reasonable that a commuter service with two morning departures northbound and the reverse in the late afternoon would capture a similarly small percentage of the total work trip market. Indeed this is what is happening in the Los Angeles area today.

Of the origins in Table 3, ridership from Carpinteria is only three, the lowest from any origin. This number is a function of two main factors: a comparatively small number of total work trips during the peak morning commute period bound for Santa Barbara and Goleta and comparatively short travel distances. Total peak period work trips from Carpinteria to Santa Barbara (10 miles) and Goleta (20 miles) in 2030 are anticipated to be about 160, of which commuter rail could be expected to capture about 2 percent. This percentage is consistent with commuter rail shares observed on the Metrolink system for trips of comparatively short distances.

Appendix Table 1 calculates the number of total AM work trips between Oxnard and Goleta that could be attracted to commuter rail in 2010, 2020 and 2030, prior to adjustments for congestion. The year 2000 is shown for illustrative purposes.

REVENUE FORECASTS

Revenue forecasts are derived directly from the ridership forecasts, using an assumed fare structure with 3 travel zones. Most of the riders would be traveling through all three zones (from Oxnard/Ventura through Carpinteria to Santa Barbara/Goleta) so the average fare per trip would be close to the fare for the longest trips. An average 3-zone fare of $3.25 in 2005 dollars was assumed, declining to $2.50 for two zones and $1.75 for a single zone. These average rates reflect a mix of one-way and multi-ride fares typical of other commuter rail systems. The weighted average fare would be $3.20 per trip. This fare is higher than what monthly passes holders per trip ($1.80[8]) for the VISTA Coastal Express bus service operating between the Ventura County Government Center (in Ventura) and Goleta. However, commuter rail typically is able to achieve a fare premium over express bus services for trips of comparable distances. Amtrak's monthly pass for trips between Oxnard and Santa Barbara is $119, or approximately $3 per ride, assuming 40 rides per month.

At this fare level, 2030 revenue would range from $746,600 to $1,493,200 annually. Revenue for each year, at the three congestion scenarios, is shown in Table 4.

Table 4
Revenue Forecasts

Scenarios	Riders	Average Fare	Annual Revenue
Year 2010			
With HOV/Bus	144,450	$3.20	$461,975
Current Congestion	262,636	$3.20	$839,954
Increased Congestion	288,900	$3.20	$923,950
Year 2020			
With HOV/Bus	186,842	$3.20	$597,554
Current Congestion	311.404	$3.20	$995,923
Increased Congestion	373,685	$3.20	$1,195,107
Year 2030			
With HOV/Bus	233,451	$3.20	$746,617
Current Congestion	359,156	$3.20	$1,148,641
Increased Congestion	466,903	$3.20	$1,493,234

Some additional revenue might be expected from advertising or station concessions, but the amount would be small and has not been estimated for this analysis.

CAPACITY ANALYSIS

The Union Pacific's Coast Line between Oxnard and Goleta currently hosts 6 daily Amtrak round trips. Amtrak operates 3 round trips between Los Angeles and Goleta, 2 additional round trips between Los Angeles and San Luis Obispo, and a single round trip between Los Angeles and Seattle. Metrolink operates 3 commuter round trips from Montalvo to Los Angeles that use the line between Montalvo and Oxnard. In addition, there are approximately 4 round trip through freight movements over this segment of the Coast Line, and local switching activities in

the Oxnard area. Additional freight movements may occur from time to time when necessary to handle overflow traffic from UP's primary route through the San Joaquin Valley.

The route is a single track railroad with passing sidings. It is equipped with centralized traffic control (CTC) signals and train control[9], and the track is rated for passenger operation at 79 miles per hour except where limited by curves or other physical constraints. Sidings are located at Oxnard, Ventura, and Seacliff, with double track through the City of Santa Barbara. Metrolink maintains a station and storage/layover facility at Montalvo, just off the main track of the Coast Line. Amtrak has a storage/layover facility at Goleta. The only significant freight yard is at Oxnard.

The illustrative schedule for start-up service (Table 1) is feasible with the current track and siding structure, and is based on maintaining current Amtrak schedules. However, the ability to operate tightly-scheduled passenger service intermixed with freight operations depends on having sufficient passing locations not only for scheduled meets between trains, but to provide sufficient capacity and flexibility to operate service when inevitable delays occur from time to time. Before concluding any agreement to permit added passenger or commuter service over this route, Union Pacific would insist on provision of sufficient capacity to protect its current and future freight operations. Metrolink, as a prior tenant on the UP trackage north of Moorpark, would also want to be assured of capacity for its long range service plans.

The specific improvements that might be required cannot be predicted with certainty. UP's policy is to require a detailed capacity study, with simulated train operations of existing and projected freight and passenger service by all potential operators. WSA's observations of the route and WSA's understanding of capacity improvements required elsewhere on the UP system for added passenger service suggest that at least one additional siding would be required. The most logical location would be within the longest segment of single track – the 16.7 miles from the end of double track at the City of Santa Barbara to the north end of the Seacliff siding.

Caltrans, the agency that sponsors the Surfliner service, has already investigated potential siding locations, and has identified three viable locations:

- Summerland: A former siding (Ortega) location south of Santa Barbara.
- Sandyland: A potential siding location just north of the Carpinteria station.
- Rincon: A potential siding location south of the Carpinteria station.

The proposed commuter service would overlap Metrolink's service between Montalvo and Oxnard (or Rice Avenue). The illustrative schedule (Table 1) shows the need for trains of the two services to pass in the Oxnard area. This will likely require upgrading and extension of the current Oxnard siding into a second main track to avoid delays to one service or the other. Because meets would occur at Oxnard, provision of a second passenger platform also would be needed.

[9] CTC control systems allow a dispatcher in a remote location to determine train routings and set signals and switches that govern train movements. The UP Coast Line is dispatched from Omaha, Nebraska.

OPERATING COSTS

Operating cost forecasts are based on costs experienced by comparable commuter rail operations, and principally by Metrolink. Costs include train operations and maintenance; payments to UP for dispatching, track maintenance, and use of the route; station maintenance; layover facility maintenance; and sponsoring agency administrative costs. All costs are in 2005 dollars.

Operations and Maintenance: The simplified assumption made for this study is that the sponsoring agency would contract with Metrolink for train operations, routine equipment servicing, and equipment maintenance. Attempting to duplicate Metrolink maintenance facilities on a smaller scale for only two train sets would not be cost-effective. Metrolink's current operating and maintenance cost is $41.31 per train mile (excluding payments to railroads and maintenance of Metrolink-owned track). A similar cost is assumed for the Santa Barbara service. The annual cost, with 48,768 train miles, would be about $2 million.

Railroad Payments: UP would expect contributions to capital maintenance of about $1.1 million per year. UP also would expect contributions for dispatching and maintenance of way of $7.30 per train mile. Lastly, UP would expect a rental payment for the use of its track of about $267,000 per year. These estimates are based on what the Ventura County Transportation Commission is paying UP today for Metrolink trains operating between Moorpark and Montalvo.

Station Maintenance: Stations would incur annual costs for cleaning, sweeping, lighting, and landscape maintenance. For purposes of this study, the existing stations are assumed to continue in operation. Parking may need to be expanded at some locations. An allowance of $1,500 per station to cover incremental costs associated with the commuter service is assumed[10]. With 5 stations, the annual cost would be $7,500. A new station at Rice Avenue, which would not be shared by Amtrak Surfliner trains, would cost an estimated $10,000 to maintain. Thus, the total station maintenance cost would be $17,500 per year.

Support Facility Maintenance: Maintenance of the mid-day storage track at Goleta and the overnight storage/service facility at Rice Avenue in Oxnard will be an added expense. Assuming operation of these facilities by Metrolink as part of an overall operating agreement, the annual maintenance costs are estimated at $10,000 per year.

General and Administrative Expenses: The commuter service will need to be sponsored and administered by a public agency. Costs will be incurred for management, contract oversight, fiscal reporting, legal representation, and similar functions associated with the operation of the commuter service. The services could be provided by a separate agency staff, or contracted through an existing county or regional agency. The consultant's estimate of these costs is $500,000 per year.

Total annual operating costs for the service are summarized in Table 5. Capital rehabilitation for rolling stock, the layover facilities (discussed in the following section), and the Metrolink

[10] Per 2005 Shore Line East commuter rail budget, Connecticut Department of Transportation.

Central Maintenance Facility in Los Angeles where rolling stock will be maintained is not included. These costs could total an additional $600,000 per year.

Table 5
Annual Operating Costs

Cost Items	Unit Cost	Unit Measure	Cost
Train Operations & Equipment Maintenance	$41.31 per train mile	48,768 train miles	$2,014,606
UP Capital Maintenance	$22,222 per route mile	48 route miles	$1,066,667
UP Operations	$7.30 per train mile	48,768 train miles	$356,006
UP Interest Rental	$5,555.56	48 route miles	$266,667
Shared Station Maintenance	$1,500 per station	5 stations	$7,500
Rice Station Maintenance	$10,000 per year	1 year	$10,000
Support Facility Maintenance	$10,000 per year	1 year	$10,000
General & Administrative Costs	$500,000 per year	1 year	$500,000
Total Annual Cost			$4,231,446

CAPITAL COSTS

Start-up capital costs for the commuter rail service can be extensive. Start-up costs will include rolling stock and locomotives, storage and layover facilities for the rolling stock, station improvements (principally additional parking at existing stations), and track capacity improvements negotiated with the railroad as a condition of operation. Some maintenance facility capital costs might be required by Metrolink as a condition of providing equipment service, although it is probable that these can be covered through the annual operations and maintenance charges. The following capital costs appear in 2005 dollars. These should be considered order-of-magnitude costs estimates.

Rolling Stock and Locomotives: The commuter service will require two train sets, each consisting of a locomotive, three passenger coaches, and a cab-coach[11]. Four-car trains are required for the projected high ridership in 2030[12]. Capital costs are expected to be $26.3 million. Costs, shown in Table 6, are based on current prices quoted to commuter agencies for Metrolink-compatible equipment. The cost includes an allowance for procurement costs (transportation, inspection, and testing).

[11] A cab coach is a standard passenger coach equipped with an engineer's cab that contains duplicate locomotive controls. This permits the train set to be operated in either direction without need to turn the equipment.

[12] 919 passengers in two trains at 140 seats per car yields a need of 3.3 cars per train set. Thus a four-car train is required.

Table 6
2030 Rolling Stock and Locomotive Costs

Cost Items	Unit Cost	Total Cost
2 – Diesel Locomotives[13]	$3,500,000	$7,000,000
6 – Passenger Cars	$2,000,000	$12,000,000
3 – Cab Cars (1 spare)	$2,300,000	$6,900,000
Procurement Allowance		$400,000
Total Cost		$26,300,000

This analysis assumed conventional Metrolink bi-level rolling stock rather than Diesel Multiple Unit (DMU) self-propelled equipment because the choice is more economical at the ridership levels expected by 2030. A Metrolink four-car train set on a per-seat basis costs about $21,000. The published price per-seat of a five-car Colorado Railcar DMU is $24,000. The five-car DMU set providing for 468 seats could accommodate the estimated ridership, but with very few seats to spare under the increased congestion scenario. A conventional four-car train set would have a seated capacity of at least 560, providing room for ridership growth. An added benefit of the conventional equipment is that the locomotives and cars could be maintained by Metrolink at its Central Maintenance Facility in Los Angeles, assuming an agreement to do so could be negotiated[14]. Such an agreement would obviate the need for a multi-million dollar maintenance facility for DMUs in Oxnard. Conceivably, Metrolink would decline maintenance of DMUs because its Central Maintenance Facility is not equipped for this specialized equipment.

Station Improvements: All of the stations (except the Rice Avenue station) are in place and in use for Surfliner services. This analysis assumes conservatively that parking for Santa Barbara rail service commuters would be incremental to existing parking and programmed improvements. Thus, additional parking will be needed at the Oxnard and Ventura stations, where nearly all the users of the service will board their morning trains. Carpinteria, Santa Barbara, and Goleta are destination stations and should not require added parking[15]. If a Rice Avenue layover track is constructed, it may be advisable to consider a separate station at this location where structure parking would not be required. Metrolink and Santa Barbara commuter trains will need to pass in the Oxnard area, requiring provision for two trains in the station at the same time. This will require a second passenger platform and a pedestrian overcrossing. It may also require shifting some of the UP freight yard trackage. Costs for station improvements are shown in Table 7 totaling $22.7 million. The table assumes a Rice Avenue station primarily serving commuters from the Camarillo area. The costs include factors for start-up and testing (1 percent); construction contingency (25 percent); and add-on allowances for engineering design, environmental impact investigation, construction management, change orders during construction, a project reserve account for costs outside normal contingencies, project sponsor costs related to implementation, and station art (39 percent).

[13] The analysis assumes that a short-tern replacement locomotive can be acquired on a short-term lease agreement basis from Metrolink. Thus, no spare locomotive is assumed for the Santa Barbara service.

[14] This analysis assumes that Metrolink could swap equipment sets between its Ventura County Line service and the Santa Barbara service in the Oxnard area, thus ensuring the equipment can move to and from the Central Maintenance Facility with minimum deadheading.

[15] The study recognizes that there may be some riders from Carpinteria, Santa Barbara and Goleta seeking to go southbound in the afternoons, but their numbers and attendant parking requirements are likely to be minimal.

Table 7
Station Improvements

Stations	Unit Cost	Total Cost
OXNARD		
Construct 305 parking stalls in structure parking facility	$23,691 per space, excluding land acquisition[16]	$7,225,698
Construct 2nd passenger platform along upgraded siding	$1,316,156 lump sum	$1,316,156
Construct overhead pedestrian Overcrossing	$3,509,750 lump sum	$3,509,750
Allowance for freight yard track revisions	$1,500,000 lump sum	$1,500,000
Upgrade siding to main track	$3,706,296 lump sum	$3,706,296
VENTURA		
Construct 419 parking stalls in surface parking facility	$6,581 per space, excluding land acquisition	$2,757,347
RICE AVENUE		
Construct station platform and related improvements	$1,316,156 lump sum	$1,316,156
Construct station track (extended lead 500' to layover facility)	$218,750 lump sum	$219,359
Construct 179 parking stalls in surface parking facility	$6,581 per space, excluding land acquisition	$1,177,960
TOTAL STATION COSTS		$22,728,722

Note: Parking costs are total costs, including engineering, design, and contingencies (totaling 75.5 percent of the base cost), but exclude site acquisition costs.

If a Rice Avenue station were not built, riders from Camarillo would board at Oxnard. Provision of structured parking for these riders at Oxnard would cost an additional $4.2 million (179 riders at $23,691 per space, totaling $4,240,655). Accordingly, with no Rice Avenue station, total stations would be $24.2 million.

Goleta Layover Facility: This storage yard will be necessary to store the two train sets during the mid-day period. The current Amtrak storage yard at Goleta will not accommodate additional train sets. The facility will include a 900-foot storage track with signalized turnouts at each end. A preferred location is east of the Goleta station between Fairview Avenue and Ward Memorial Boulevard. The facility also will include road access for service vehicles; fencing, gates, and lighting for security; and electric and water services. Total cost is estimated at $1.7 million excluding land acquisition. Costs are shown in Table 8.

[16] A useful rule of thumb for parking planning is that one acre of land is needed for each 100 parking spaces.

Table 8
Goleta Layover Facility

Construction Cost	$978,399
Start-up and testing at 1%	$9,784
Construction Contingency at 25%	$247,046
Add-on Allowance at 39%	$481,739
Total Facility Cost	$1,716,968

Rice Avenue Layover Facility: This alternative would construct a storage yard to accommodate overnight storage of two train sets at a site east of Rice Avenue, east of downtown Oxnard. The Rice Avenue station would be located on the lead track to this facility. Costs would be comparable to the Goleta facility (see Table 8).

Montalvo Layover Facility: This alternative would expand the current Metrolink Montalvo storage yard to accommodate overnight storage of two train sets. Costs would be comparable to the Goleta facility (see Table 8), whether constructed as an enlargement of the Metrolink yard or as a separate but adjacent facility. Using this location would require a reverse move for several miles to reach the Oxnard station.

Oxnard Yard Layover Facility: This option would make use of an existing track in the UP freight yard east of the Oxnard station, through an agreement with UP. It is assumed that track work and internal road access is available, but the track would need to be provided with fencing, gates, lighting, and utility services. The cost of an Oxnard Yard facility would be just over $1 million. This cost is detailed in Table 9.

Table 9
Oxnard Yard Layover Facility

Construction Cost	$577,497
Start-up and testing at 1%	$5,775
Construction Contingency at 25%	$145,818
Add-on Allowance at 39%	$284,345
Total Facility Cost	$1,013,435

Summerland Passing Siding: This project includes construction of a new 9,000-foot passing siding, with signalized turnouts from the main track at each end. It would be located between the Padaro Lane overcrossing (MP 373.9) and the Padaro Lane grade crossing (MP 375.6). The siding would be on the north side of the mainline to minimize impacts on the residential areas to the south. Construction includes clearing and grubbing, nominal grading, construction of track and turnouts, construction of three small bridges, extension of four culverts, and signalization. The siding would meet UP standards. Total cost of the siding would be $5.8 million. This cost is detailed in Table 10.

Table 10
Summerland Passing Siding

Construction Cost	$3,302,358
Start-up and testing at 1%	$33,024
Construction Contingency at 25%	$833,845
Add-on Allowance at 39%	$1,625,999
Total Siding Cost	$5,795,226

Oxnard Siding Upgrade to Main Track: The potential for trains meeting between Oxnard and Montalvo may require additional passing capacity. The project would improve the ability to have trains meet in the area with minimal delay by extending the siding north from milepost 404.0 to milepost 400.8, just south of the Santa Clara River crossing. Costs include clearing and grubbing, nominal grading, construction of track and turnouts, and signalization. The estimated cost of this capacity improvement is $8.9 million. These costs are shown in Table 11.

Table 11
Oxnard Siding Extension

Construction Cost	$5,068,800
Start-up and testing at 1%	$50,688
Construction Contingency at 25%	$1,279,872
Add-on Allowance at 39%	$2,495,750
Total Siding Cost	$8,895,110

The inclusion of the Oxnard and Summerland passing sidings in project capital costs is in conservative anticipation of potential UP insistence on capacity improvements. Only a detailed capacity assessment can verify if these improvements are required, and the best location for them to meet operating needs of current and future services.

Construction costs for all capital projects were provided by PB, using current construction unit costs for similar projects in California. Siding construction was assumed to be entirely within the existing right-of-way. Land acquisition costs for layover facilities or stations were not estimated, and would be additional to any amounts shown above.

FINDINGS SUMMARY

Implementation in 2030

The proposed commuter service in 2030 would have a fare box recovery ratio ranging from 18 percent to 35 percent at 2030 ridership levels. The variation results from assumptions of congestion, highway improvements, and competitive express bus service. This range is consistent with other commuter rail services in California. Ridership, revenue, and operating costs are shown in Table 12.

Table 12
2030 Financial Summary

Measure	Increased Congestion	Current Congestion	HOV and Express Bus
Ridership	466,903	359,156	233,451
Revenue	$1,493,234	$1,148,641	$746,617
Operating Cost	$4,231,446	$4,231,446	$4,231,446
Operating Subsidy	$2,738,212	$3,082,804	$3,484,829
Subsidy per Psgr.	$5.86	$8.58	$14.93
Fare Box Recovery	35%	27%	18%

Implementation of the service would require capital costs of approximately $67.2 million to provide equipment, facilities, and track capacity. These costs are shown in Table 13. Land acquisition cost estimates ***are not included***.

Table 13
2030 Implementation Capital Cost Summary

Rolling Stock	$26,300,000
Stations, including Rice Avenue	$22,728,722
Rice Avenue Layover Facility	$1,716,968
Goleta Layover Facility	$1,716,968
Summerland Passing Siding	$5,795,226
Oxnard Siding Extension	$8,895,110
Total Capital Costs	$67,152,994

Earlier Implementation

While this analysis focused on implementation in 2030, it developed ridership and financial performance indicators assuming implementation in 2010 or 2020. Financial performance in the earlier years is less robust because of lower ridership, which impacts revenue. In 2010, the service would require train sets with 3 passenger cars (2 coaches and a cab car per train set), while 2020 and 2030 ridership levels would require train sets with 4 passenger cars. This analysis reduced operating costs 10 percent, reflecting a lower operating cost for a 3-car train set configuration in 2010.

Congestion and consequent driving time delays resulting from any construction of potential improvements to U.S. 101 would boost ridership, as drivers would seek alternatives to a slower drive to work. However, once construction ends, ridership would return to the forecasted levels. Forecasted financial performance in 2010 and 2020 is shown in Tables 14 and 15.

Table 14
2010 Financial Summary

Measure	Increased Congestion	Current Congestion	HOV and Express Bus
Ridership	288,900	262,636	144,450
Revenue	$923,950	$839,954	$461,975
Operating Cost	$3,808,301	$3,808,301	$3,808,301
Operating Subsidy	$2,884,352	$2,968,347	$3,346,326
Subsidy per Psgr.	$9.98	$11.30	$23.17
Fare Box Recovery	24%	22%	12%

Table 15
2020 Financial Summary

Measure	Increased Congestion	Current Congestion	HOV and Express Bus
Ridership	373,685	311,404	186,842
Revenue	$1,195,107	$995,923	$597,554
Operating Cost	$4,231,446	$4,231,446	$4,231,446
Operating Subsidy	$3,036,339	$3,235,523	$3,633,892
Subsidy per Psgr.	$8.13	$10.39	$19.45
Fare Box Recovery	28%	24%	14%

Capital Costs for implementation in 2010 would be reduced because the ridership would only require 3 cars per train set. Thus, $4.1 million of the projected 2030 capital cost could be deferred until 2020, when 4 cars per train set would be needed. Other capital costs would be the same for each year. While ridership and thus demand for parking will be less in 2010, ridership will expand over time and the spaces eventually will be utilized in later years. It probably would not be cost-effective to construct smaller parking facilities for the initial service in 2010 and make incremental additions in later years. The reduced rolling stock costs for 2010 implementation are shown in Table 16.

Table 16
2010 Rolling Stock and Locomotive Costs

Cost Items	Unit Cost	Total Cost
2 – Diesel Locomotives	$3,500,000	$7,000,000
4 – Passenger Cars	$2,000,000	$8,000,000
3 – Cab Cars (1 spare)	$2,300,000	$6,900,000
Procurement Allowance		$330,000
Total Cost		$22,230,000

NEXT STEPS

The foregoing analysis was a first cut to see the ridership which a commuter rail service between Oxnard and Goleta might attract, and how much the service would cost to build and operate. If policy makers should decide that the service concept is worth further investigation, the following next steps are suggested.

More Detailed Ridership Assessment

Ridership was estimated using an approach borrowed from the ongoing Metrolink Commuter Rail Strategic Assessment and work trips generated by SBCAG. This was done to get a sense relatively quickly and inexpensively of what the ridership might be in future years. A refinement to this approach using the SBCAG models will be used in the next round of screening.

Rail Line Capacity Improvements

Amtrak, Union Pacific, and Metrolink may well be implementing more rail service on segments of the largely single-track Oxnard-Goleta corridor. A layering on of a commuter rail service in the corridor will create an additional demand for capacity. This analysis assumes various capacity improvements to accommodate future passenger and freight traffic, but a more rigorous approach will be needed. An operations simulation, which accounts for all the types of traffic that might run on the corridor in any given year, would provide the insight needed for crafting capacity improvements that match the capacity demand. A simulation would be costly to perform, however, and is beyond the scope of the 101 In Motion corridor study.

Station Site Selections and Alternative Service Concepts

This analysis assumed existing and illustrative station locations solely for the purpose of estimating a preliminary ridership and order-of-magnitude capital costs of a particular service concept. That noted, there may be better choices. Further study should evaluate specific station sites and alternative service concepts in greater detail. For example, it might explore whether the service should originate in Camarillo rather than in Oxnard, or whether three round trips rather and two may be on balance a superior service concept.

Rolling Stock Selection

The forgoing analysis assumed the use of conventional Metrolink commuter rail equipment, largely due to presumed savings in capital costs. However, DMU equipment does offer some advantages in terms of operating costs. A more rigorous analysis of rolling stock type pros and cons will be included in the next round of evaluation of commuter rail in the Oxnard-Goleta corridor. If Ventura County were to implement DMU service on its Santa Paula branch, there might be capital and operating cost synergies in using DMUs for the new commuter rail service as well. The two services, for example, could use the same maintenance facility and maintenance forces.

Home-to-Station Transit Integration

As pointed out above, the ridership forecasts assume a high degree of integration of the commuter rail service with local transit for moving people from destination stations to Santa Barbara County work centers. Important as well may be transit options for riders from

residential areas to origin stations. The next round of evaluation will look at this issue, identify some alternatives, and estimate their probable costs.

Refined Capital Costs

As noted, the capital costs estimates are order-of-magnitude cost estimates. The next round of evaluation would refine these cost estimates.

Appendix Table 1

Ridership Model: Oxnard-Goleta Commuter Service
Assumes 2 peak hour frequencies

Station Pair	Year 2000 AM Peak Hr Home-Work Trips	Year 2000 AM Home-Work Trips	Distance	Capture Rate	AM Rail Ridership	Year 2000 Daily Rail Ridership	Year 2010 AM Peak Hr Home-Work Trips	Year 2010 AM Home-Work Trips	Distance	Capture Rate	AM Rail Ridership	Year 2000 Daily Rail Ridership	Year 2020 AM Peak Hr Home-Work Trips	Year 2020 AM Home-Work Trips	Distance	Capture Rate	AM Rail Ridership	Year 2020 Daily Rail Ridership	Year 2030 AM Peak Hr Home-Work Trips	Year 2030 AM Home-Work Trips	Distance	Capture Rate	AM Rail Ridership	Year 2030 Daily Rail Ridership
Camarillo-Oxnard	---		9.0	0.002	---	---	---		9.0	0.002	---	---	---		9.0	0.002	---	---	---		9.0	0.002	---	---
Camarillo-Ventura	---		19.2	0.020	---	---	---		19.2	0.020	---	---	---		19.2	0.020	---	---	---		19.2	0.020	---	---
Camarillo-Carpinteria	22	59	35.5	0.080	4.8	9.5	28	76	35.5	0.080	6.1	12.1	33	89	35.5	0.080	7.1	14.3	39	105	35.5	0.080	8.4	16.9
Camarillo-Santa Barbara	180	486	45.9	0.104	50.6	101.2	220	595	45.9	0.104	61.8	123.7	261	705	45.9	0.104	73.4	146.7	307	830	45.9	0.104	86.3	172.6
Camarillo-Goleta	80	216	55.3	0.105	22.7	45.4	105	284	55.3	0.105	29.8	59.6	130	351	55.3	0.105	36.9	73.8	151	408	55.3	0.105	42.9	85.7
Oxnard-Ventura	---	---	10.2	0.003	---	---	---	---	10.2	0.003	---	---	---	---	10.2	0.003	---	---	---	---	10.2	0.003	---	---
Oxnard-Carpinteria	42	114	26.5	0.053	6.0	12.0	54	146	26.5	0.053	7.7	15.5	67	181	26.5	0.053	9.6	19.2	80	216	26.5	0.053	11.5	22.9
Oxnard-Santa Barbara	332	897	36.9	0.083	74.5	149.0	420	1135	36.9	0.083	94.2	188.4	517	1397	36.9	0.083	116.0	232.0	618	1670	36.9	0.083	138.6	277.3
Oxnard-Goleta	151	408	46.3	0.105	42.9	85.7	204	551	46.3	0.105	57.9	115.8	251	678	46.3	0.105	71.2	142.5	297	803	46.3	0.105	84.3	168.6
Ventura-Carpinteria	101	273	16.3	0.009	2.5	4.9	122	330	16.3	0.009	3.0	5.9	140	378	16.3	0.009	3.4	6.8	161	435	16.3	0.009	3.9	7.8
Ventura-Santa Barbara	835	2257	26.6	0.053	119.6	239.2	976	2638	26.6	0.053	139.8	279.6	1127	3046	26.6	0.053	161.4	322.9	1284	3470	26.6	0.053	183.9	367.8
Ventura-Goleta	370	1000	36.1	0.083	83.0	166.0	462	1249	36.1	0.083	103.6	207.3	540	1459	36.1	0.083	121.1	242.3	601	1624	36.1	0.083	134.8	269.6
Carpinteria-Santa Barbara	291	786	10.4	0.003	2.4	4.7	221	597	10.4	0.003	1.8	3.6	176	476	10.4	0.003	1.4	2.9	134	362	10.4	0.003	1.1	2.2
Carpinteria-Goleta	55	149	19.8	0.020	3.0	5.9	37	100	19.8	0.020	2.0	4.0	30	81	19.8	0.020	1.6	3.2	23	62	19.8	0.020	1.2	2.5
Santa Barbara-Goleta	1851	5003	9.4	0.002	10.0	20.0	1757	4749	9.4	0.002	9.5	19.0	1774	4795	9.4	0.002	9.6	19.2	1843	4981	9.4	0.002	10.0	19.9
Total Train Trips					**422**	**844**					**517**	**1034**					**613**	**1226**					**707**	**1414**