Optimizing Transit Ridership Through Balanced Investment in TOD and Parking

Case Study: BART Strategic Stations Assessment

BART's suburban stations are evolving from park-and-ride points to opportunity sites for transit-oriented development (TOD). BART planners are exploring strategies that effectively allocate station-area land to TOD, while preserving reasonable access for patrons who depend on station parking. As an initial step, BART is developing a corridor-level strategy for station asset management that will:

- optimize ridership
- achieve BART's targets for reduced auto share as station access mode

The initial corridor assessment evaluates trade-offs between parking supply and TOD along BART's A-Line. The line includes nine stations extending from the Lake Merritt station in Oakland to the current end-of-line station in Fremont, as illustrated in Figure 1. The station-area strategies emphasize varying levels of TOD, parking supply and bus service.

The range of prospective strategies were defined through a series of discussions with an international expert panel, local jurisdictions, local transit service providers, BART staff and consultants. The alternative scenarios include:

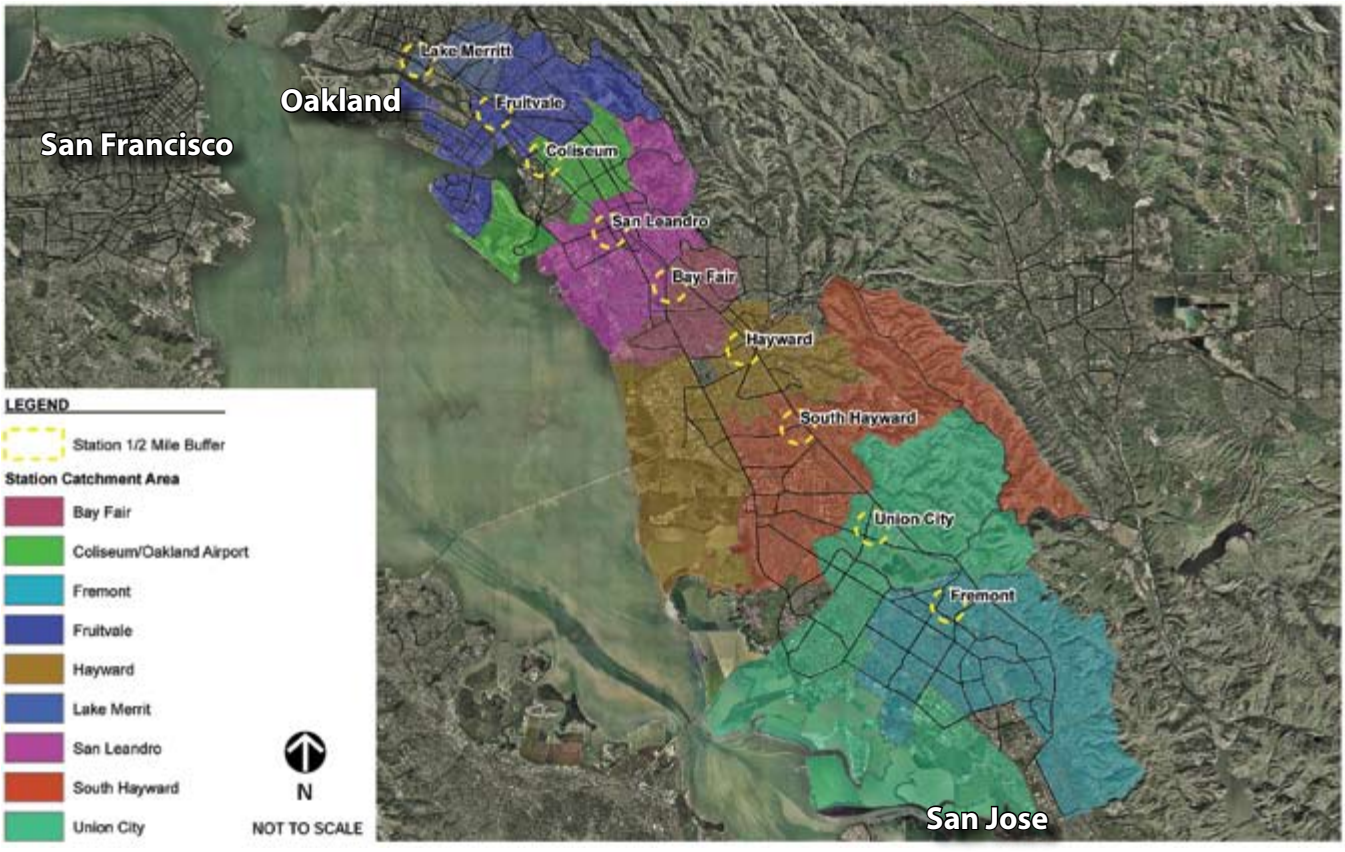
1) a 2030 Base Case developed by the Association of Bay Area Governments Smart Growth that includes Smart Growth land use intensification around most stations,

2) an Enhanced TOD case that further intensifies land use around each station,

3) an Enhanced TOD and Access scenario that increases parking and bus service at several stations in conjunction with the Enhanced TOD land use intensifications.

DIRECT RIDERSHIP MODELS

To assess the effects of TOD on ridership and access mode share, the study developed and applied a series of Direct Ridership Models. The models quickly and accurately forecast the individual effects of TOD, parking supply and bus service on BART boardings and modes of access and egress. They are based on statistical analysis of existing BART ridership, to correlate station-by-station ridership with station-area parking, bus service, TOD households and employment, and other factors.



The following direct ridership models were developed for the BART system:

Predicted Effect	Influential Factors	Correlation (R^2)
AM Peak Period Boardings via Auto Access	• Station parking spaces • Catchment population	0.70
AM Peak Period Boardings via Walk, Bike, Transit Access	• Households within ½ mile of station • Number of peak hour feeder buses	0.85
AM Peak Period Alightings	• Employment within ½ mile of station • Number of peak hour feeder buses	0.95
Egress % Transit Mode Share	• Number of peak hour feeder buses • Station parking spaces	0.39

TOD VS PARKING -- RELATIVE EFFECTS ON RIDERSHIP

Until recently, BART required that 100% of the existing parking be replaced when TOD is developed at a station. The costs associated with replacing all parking spaces can be a deterrent to developing TOD's. Conversely, TOD can provide benefits to both communities and the BART system that may exceed the benefits associated with parking spaces. To evaluate the ridership effects of replacing parking spaces with TOD, a "balance point" evaluation was performed using the direct ridership equations. The balance point represents the parking replacement rate required to maintain the existing number of boardings when adding TOD at the station. On average, the BART direct ridership models indicated that a parking replacement rate of about 80% would be sufficient to retain current AM peak ridership levels, as long as the density of the transit-oriented development placed on the site equaled about 75 dwelling units per acre.

The BART-specific direct ridership models also predicted the following effects of alternative planning strategies:

- **Base Case -** The ABAG 2030 Smart Growth land use projections result in a 23% increase overall corridor population, including a 54% increase in households within one-half mile of A-Line stations. Without any increases in BART parking or feeder bus service, this growth would result in a 15% increase in BART's AM peak period boardings on the line, and a 17% increase in daily boardings. It would lead to a reduction of auto access mode share from 67% presently to 61% in 2030.

- **Enhanced TOD -** A more intense station-area development strategy, it would increase station-area households in 2030 to 63% above 2000 levels. With 23% growth in corridor population and no increases in parking and feeder bus service, this scenario would produce a 17% increase in AM boardings, a 20% increase in daily boardings and a reduction in auto access mode share to 60%.

- **Enhanced TOD and Station Access -** When the Enhanced TOD land use strategy is coupled with expanded station access, including a 13% increase in parking and a 20% increase in feeder bus service, the result will be a 24% increase in AM boardings, a 26% increase in daily boardings, and a 60% auto access share.

CONCLUSIONS

Direct Ridership Models can quantify the relationship between ridership and station-area land use, parking and levels of feeder transit service. They also predict changes in mode of station access and egress. When used to evaluate alternative strategies for optimizing BART ridership, they indicate that current ridership levels can be maintained if station areas are transformed into TOD residential development at a density of 75 dwelling units per acre, as long as 80% of station parking is replaced. They also indicate that intensification of land use at BART stations can increase ridership even without any expansion to station parking, but that parking increases are needed in order to keep pace with population growth beyond the immediate station vicinity.

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