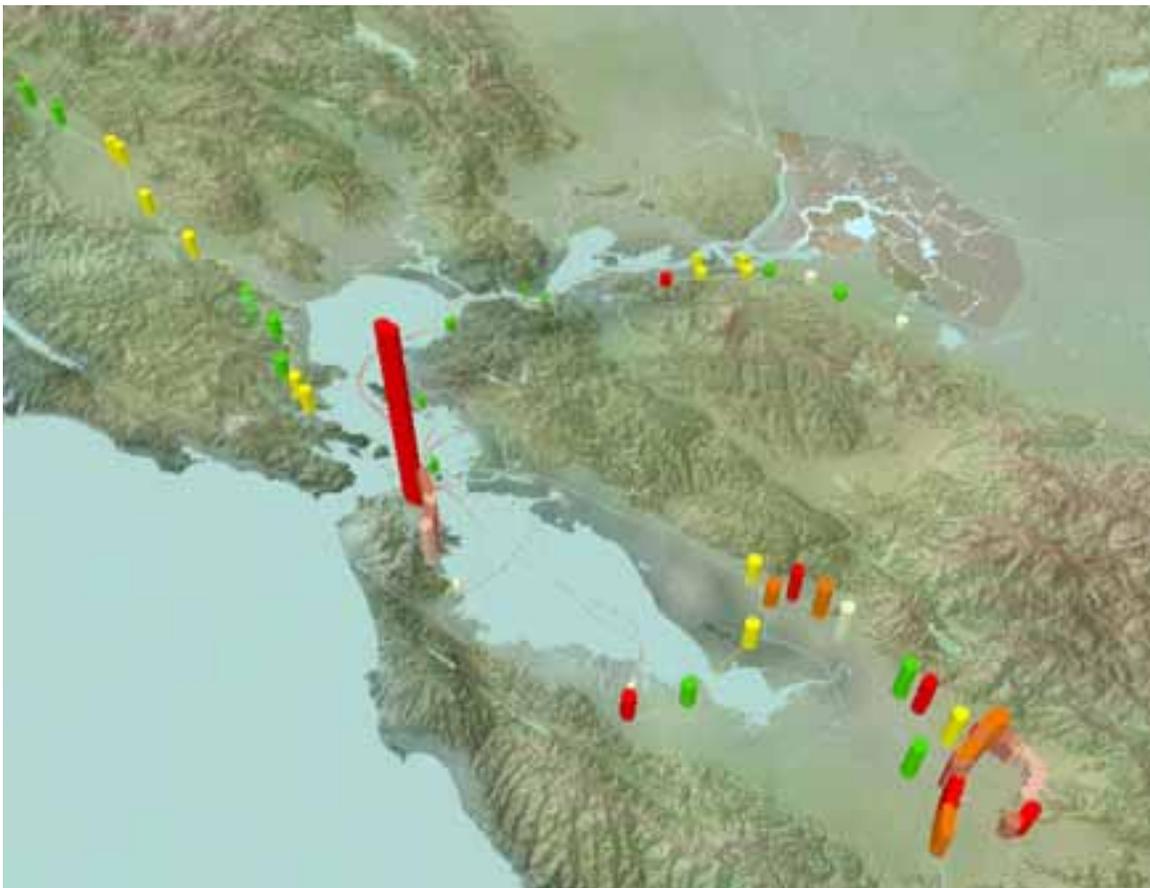


*GIS for TOD:
Transit Oriented Development in the Bay Area*



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Abstract:

GIS for TOD:

Transit Oriented Development in the San Francisco Bay Area

This research paper describes how GIS has been used to study and implement a regional vision for Transit Oriented Development (TOD) by the Metropolitan Transportation Commission (MTC) within the nine-county San Francisco Bay Area. The potential for TOD in the region was originally studied by using computer databases to map land use within a half-mile radius of existing and potential future rail and ferry transit station locations. Now, MTC has adopted a TOD policy that requires certain thresholds of development to be planned around stations prior to the release of regional discretionary funding for transit capital expansion projects. This paper will explain the role of GIS as the analytical foundation guiding the implementation of MTC's TOD policy, to explain it in outreach sessions, and to support the analysis leading to the formulation of the thresholds contained in the policy.

Introduction

Since 2004, the Metropolitan Transportation Commission (MTC) has been engaged in efforts to attract more development, and thus more residents and employees, to locations that feed into the regional transit system. MTC, in its role as the transportation planning, financing and coordinating body for the nine-county San Francisco Bay Area, has the responsibility to ensure that not only do people have mobility choices throughout the region, but that the transit systems of the region attract sufficient riders to help cover their operating costs. GIS has been indispensable to MTC in undertaking these efforts, because of its ability to synthesize large amounts of data into usable map and database formats, and present these to audiences in an elegant and easy-to-read format.

In late 2003 and early 2004, when MTC began to embark on a major study seeking to develop strategies to link land use with transportation in the Bay Area, it turned to GIS to provide the data backbone for the study effort. This paper outlines how GIS has fit into MTC's strategies related to focus development around transit, as well as many details of what those strategies are.

What is TOD?

Transit Oriented Development (TOD) is, in the context of this TOD study, development that is not only adjacent to high-quality transit systems, but also supportive of them. High-quality transit systems include rapid bus lines or bus lines with service headways of a bus every 15 minutes or better; passenger rail service including BART, Caltrain, light rail and other services in the Bay Area; and ferry service running on a regular schedule during commute hours.

According to a Best Practices guide to TOD developed by the City of Calgary¹, the benefits that a well-planned TOD can bring to a city include:

- Highlighting transportation alternatives and increasing transit ridership
- Taking advantage of non-peak direction transit capacity
- Decreasing auto dependency and exhaust emissions
- Using serviced land efficiently to help create a more compact urban form
- Making better connections between jobs and housing
- Revitalizing commercial corridors and older communities
- Providing market housing in a variety of forms and price ranges
- Creating opportunities for affordable housing
- Providing increased neighbourhood and travel options for those not owning cars
- Making identifiable and walkable neighbourhoods
- Creating more street activity and a safer station environment
- Acting as a catalyst for private investment and development
- Increasing assessment values of vacant and underused land

The key to this statement is the phrase “well-planned.” According to the State of California²:

“Transit-oriented Development (TOD) is moderate to higher-density development, located within an easy walk of a major transit stop, generally with a mix of residential, employment and shopping opportunities designed for pedestrians without excluding the auto. TOD can be new construction or redevelopment of one or more buildings whose design and orientation facilitate transit use.”

Thus, a well-planned TOD is a development (which for MTC’s purposes can be either existing or new as long as it meets the other criteria) that is supportive of transit, is pedestrian-friendly, and that creates housing and jobs where enough residents and workers use transit on a daily basis to provide the necessary ridership levels for that transit system to recover a sufficient amount of its operating costs.

What is the TOD Study?

As part of the 2001 Regional Transportation Plan, MTC adopted a regional Transit Expansion Program of new investments in public transit expansions, known as 'Resolution 3434'. This collection of rail, bus and ferry projects has an estimated project cost of \$11.8 billion (see Table 1). The Commission had previously adopted evaluation criteria for the proposed transit expansion projects that were ultimately included in Resolution 3434; land use and station access were key components. In addition, the Commission approved a 5-point Transportation and Land Use Platform in December 2003 that included a commitment to develop a new transit oriented development (TOD) policy outlining more specifically the requirements for providing supportive land use plans and policies along Res. 3434 corridors, in order to generate new transit riders and make the region's transit investments more cost-effective.

The TOD Study thus represents the fulfillment of that commitment; to examine the topic of transit oriented development within the Bay Area, in order to develop a policy to guide local jurisdictions as they seek to meet the requirement to provide supportive land use for new transit expansion projects.

Table 1: Projects and funding amounts within Resolution 3434

Project	Project Cost (2004 \$; in millions)
AC Transit Berkeley/Oakland/San Leandro Bus Rapid Transit: Phase 1	167
Major Corridors Enhancements - Bus Rapid Elements	97
BART/Oakland Airport Connector	254
Tri-Valley Transit Access Improvements to BART	445
BART East Contra Costa Rail Extension (eBART)	390
BART Fremont to Warm Springs	678
BART: Warm Springs to San Jose/Santa Clara	4,149

Caltrain Express: phase 1 ** OPEN FOR SERVICE**	128
Caltrain Express: Phase 2	482
Caltrain Electrification	602
Caltrain Downtown Extension/Rebuilt Transbay Terminal	1,817
Capitol Corridor Phase 1 Expansion	158
Capitol Corridor: Phase 2 Enhancements	96
Regional Express Bus **Phase 1 OPEN FOR SERVICE**	102
MUNI Third Street Light Rail Transit Project Phase 2 - New Central Subway	694
Altamont Commuter Express (ACE): service expansion	128
Sonoma-Marin Rail	288
Dumbarton Rail	300
Downtown/East Valley: Santa Clara/Alum Rock Corridor and Capitol Expressway LRT Extension to Nieman	550
Expanded Ferry Service Phase 1: Berkeley, Alameda/Oakland/Harbor Bay, and South San Francisco to San Francisco, Downtown Ferry Terminal Improvements, and Spare Vessels.	100
Expanded Ferry Service Phase 2: Alameda to South San Francisco, and Hercules, Antioch, Treasure Island, Redwood City and Richmond to San Francisco.	139
TOTAL	\$ 11,764

What & where are the TOD Study Zones?

The set of zones to be examined in detail as a part of the TOD study was built on sets of census blocks. These blocks were selected when 75% or more of each block fell into an area meeting the following set of criteria:

- ½ mile distance from existing or future rail station, light rail stop, cable car stop or ferry terminal
- ¼ mile distance from existing bus route with headways of at least one bus every 15 minutes
- Zones planned to receive higher levels of development intensity under the Regional Smart Growth Vision blueprint developed in 2002.

285 TOD Study Zones were ultimately created, encompassing 16,274 total Census Blocks (out of 76,199 blocks in the nine-county region). Each individual zone was based on a set of US Census 2000 blocks, generally centered around a transit station, bus corridor or other area where the agency had reason to believe that transit-oriented development might succeed in the future if given a little help. Each TOD Study Zone was meant to represent about a half-mile walk-shed from the transit facility, though in practice this varied greatly from zone to zone due to variations in shape and size of census blocks. TOD Study Zones were distributed throughout all nine counties of the

region (see Figure 1), encompassing any area where high-quality transit service currently exists or could be reasonably expected to exist in the future (including some areas where the only current commitment to future transit is to study potential options, such as Napa County, where commuter rail has been studied but may never be built). The idea was to compile information for as many areas as possible initially, to better inform later decisions as to which areas to focus further stages of the study on.

Figure 1: Distribution of TOD Study Zones throughout the Bay Area.



GIS Analysis: Indicators, study zones & results

The TOD Study was the largest use of GIS data by the agency to date when it was begun by MTC in 2004. The first step was to analyze existing population and employment data for the 285 TOD Study Zones (see Figure 2).

For the year 2000, this data was analyzed to produce statistics on existing population, employment, housing characteristics, resident age, income and employment type for each potential TOD area. Additionally, a set of recent aerial photos was purchased for the region, which were used as a basemap to produce maps of each TOD study zone indicating existing and future transit facility locations.

For future years, a methodology was produced to assign housing and employment projections to each TOD study zone. Additionally, general plan land use designations were overlaid with the TOD Study Zones, so that some idea could be had of what local governments already had in mind for each area. Though general plan land use data resolution and quality varies greatly among the 101 cities and nine counties of the region, it was distilled into categories such as low-density residential, medium-density residential, mixed-use, etc. for the purposes of the study, and any information on plan density minimums and maximums was preserved at the best resolution available, for continuity throughout the process.

Finally, all of this data was distilled to produce theoretical “Best Case Scenarios” for each TOD Study Zone, which gave the theoretical maximum level of development given existing plans, policies and land uses. These numbers were used as an input into the next stage of the Study.

Figure 2: Selected results of TOD Study Zone analyses.

- **23.0% of the Year 2000 population of the region lives in TOD Study Zones served by existing or future transit. This could rise to 32.2% by 2030.**
- **In absolute terms, this could mean 1,192,275 more people living in those areas. This represents a 76.4% growth in their population over 30 years.**
- **Of this growth, 70.1% will be around existing transit, while 29.9% will be around transit services that have not yet been constructed.**

Sources:

MTC TOD Study, Census 2000, MTC/ABAG Smart Growth Vision. See Appendix 1 for more.

How did GIS help to formulate the Policy?

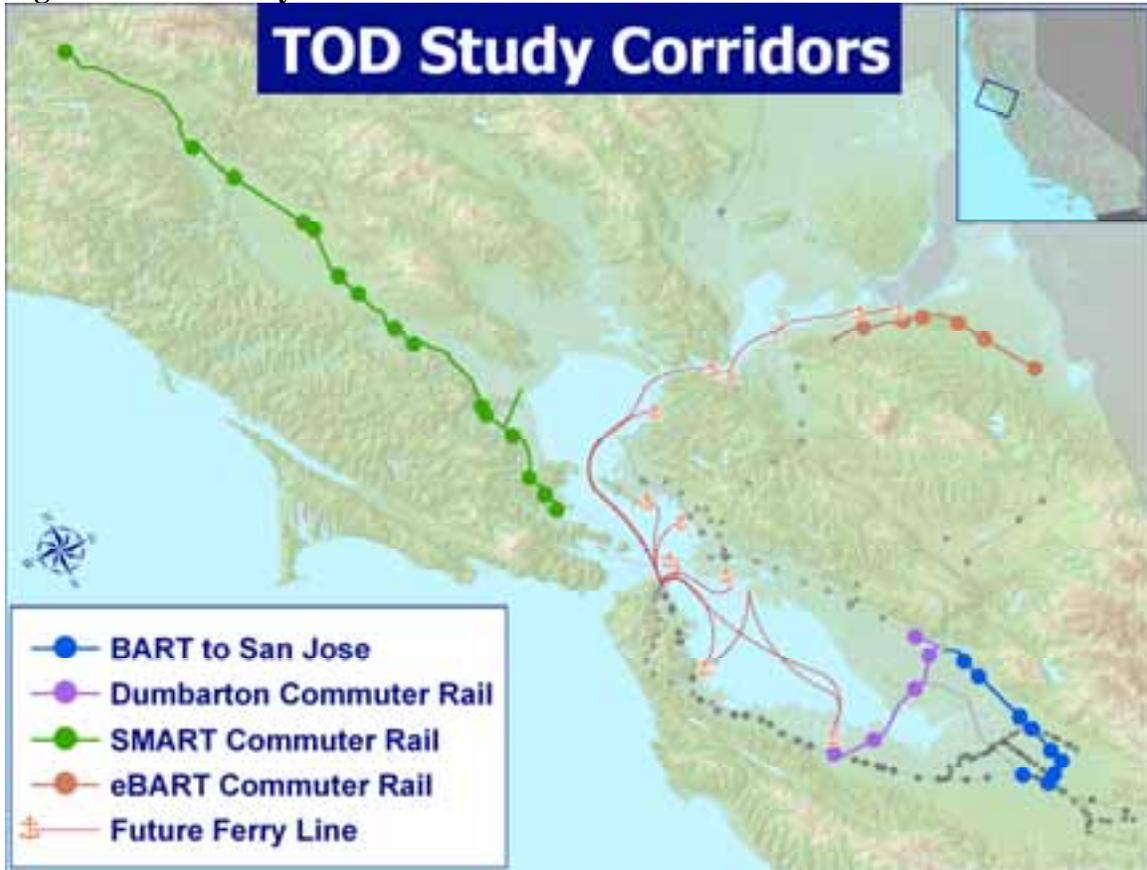
The numbers from the theoretical Best Case Scenarios for each zone were used to determine what levels of development might be possible around future ferry terminals, commuter rail stations, light rail stops, and BART stations. Thresholds were then developed for each of these mode types, in coordination with regional partners (see Table 3). When the MTC TOD Study team met with representatives of other jurisdictions, they

were able to bring with them GIS maps and tables produced using GIS data in order to provide a common frame of reference within which to balance the discussions.

From the larger set of 285 TOD Study Zones, five Study Corridors were selected for a more in-depth analysis of how a TOD Policy might pan out at the corridor level for various modes. These Study Corridors included: eBART (commuter rail from the current BART line terminus at Pittsburg/Bay Point to the small eastern Contra Costa County delta town of Byron); BART to San Jose (a full BART extension, using BART technology from the current terminus at Fremont south into downtown San Jose, terminating at the Santa Clara Amtrak station); the Dumbarton Rail Project (a transbay commuter rail alignment, from the Union City BART station to the Redwood City Caltrain Station across an existing rail bridge in the South Bay); SMART (Sonoma-Marín Area Rail Transit, a commuter rail line from the Larkspur ferry terminal all the way to Cloverdale, at the very northern edge of the region near the Sonoma/Mendocino county line); and the future ferry system (as outlined in the Water Transit Authority's proposal for future service). (See Figure 3.)

For the purposes of the GIS analysis and the TOD study, an existing end station is included as part of the transit corridor for the purposes of calculating the corridor thresholds, though optional stations will not be included in the calculation. For instance, the existing BART Pittsburg/Bay Point station is included in the corridor analysis for the eBART project, since both services will share that station as a transfer area when eBART opens.

Figure 3: TOD Study Corridors.



What does the TOD Policy look like?

MTC has developed a TOD policy that defines "supportive land use plans and policies" for new transit expansions under Resolution 3434. The policy proposes that each corridor meet an overall planning threshold for population and jobs within a half-mile of all new transit stations. This corridor approach allows a great deal of flexibility for different stations to accommodate different levels of development and allows local jurisdictions to determine how best to meet the overall development threshold. The policy also calls for corridor working groups to convene from the various jurisdictions and transit agencies in a corridor to determine how best to meet the population and job thresholds, in addition to the preparation of comprehensive station area plans for each new transit station.

These corridor-level thresholds vary by mode of transit, with more capital-intensive modes requiring higher numbers of housing units and jobs (see Table 2). The corridor thresholds have been developed based on: potential for increased transit ridership; existing station sites in the Bay Area; local general plan data; predicted market demand for TOD-oriented housing and jobs in each county; and an independent analysis of feasible development potential in each transit corridor.

Table 2: Corridor Thresholds by Mode in MTC’s TOD Policy.

THRESHOLDS, DEFINED BY HOUSING UNIT AVERAGES PER STATION AREA					
Project Type	BART	Light Rail	Bus Rapid Transit	Commuter Rail	Ferry
Housing Threshold	3,850	3,300	2,750	2,200	750
<p><i>Each corridor is evaluated for the Housing Threshold. For example, a four station commuter rail extension (including the existing end-of-the-line station) would be required to meet a corridor-level threshold of 8,800 housing units.</i></p> <p><i>Threshold figures above are an average per station area based on both existing land uses and planned development within a half mile of all stations. New below market rate housing is provided a 50% bonus towards meeting housing unit threshold.</i></p>					

To meet the corridor level thresholds requires that, within a half mile of all stations, a combination of existing and planned land uses can meet or exceed the overall corridor threshold for housing for that particular mode type. To be counted toward the threshold, planned land uses must be adopted through general plans, and the appropriate implementation processes must be put in place, such as zoning codes. General plan language alone without supportive implementation policies, such as zoning, is not sufficient for the purposes of this policy. Ideally, planned land uses will be formally adopted through a specific plan (or equivalent), zoning codes and general plan amendments along with an accompanying programmatic Environmental Impact Report (EIR) as part of the overall station area planning process. For all planned future housing, minimum densities (not maximum or average) will be used in the calculations to assess achievement of the thresholds.

MTC’s TOD policy addresses the question of affordable housing by specifying that new below-market housing units will receive a 50 percent bonus toward meeting the corridor threshold (i.e. one planned below-market housing unit counts for 1.5 housing units for the purposes of meeting the corridor threshold). Below market for the purposes of the Resolution 3434 TOD policy is affordable to 60% of area median income for rental units and 100% of area median income for owner-occupied units.

Though MTC and its partner regional agencies will provide as much guidance as possible, the local jurisdictions in each corridor will have the final determination on any job and housing placement, type, density, and design decisions necessary to meet the thresholds.

Where could a TOD policy be most effective?

The TOD policy will be the most effective where it can be used to influence development patterns in favor of sufficient density of development near transit. The TOD policy will apply to all transit expansion projects funded under Resolution 3434, with the exception of projects that have advanced into the construction phase or already been completed.

MTC’s adopted Transportation/Land Use platform provides for conditioning the programming of regional discretionary funds (i.e. those under the Commission's control) on adherence to the policy. This includes all transit expansion projects receiving funding from federal, state, or regional sources.

The effectiveness of the TOD policy lies in the nature of MTC’s discretion, which provides differing levels of conditioning at each stage of a project as it advances from environmental and design work, right-of-way acquisition and into construction. Discretionary funds may be programmed and allocated for environmental and design related work, in preparation for addressing the requirements of the TOD policy. Regional funds may be programmed and allocated for right-of-way acquisition in advance of meeting all requirements in the policy, if land preservation for TOD purposes is essential. No regional funds will be programmed and allocated for construction until the requirements of the policy have been satisfied.

Table 3: Resolution 3434 Transit Extension Projects Subject to Corridor Thresholds

Project	Type	Threshold is met with current development?
BART East Contra Costa Rail Extension	Commuter Rail	No
BART – Downtown Fremont to San Jose / Santa Clara	BART extension	No
AC Transit Berkeley/Oakland/San Leandro Bus Rapid Transit: Phase 1	Bus Rapid Transit	Yes
Caltrain Downtown Extension/Rebuilt Transbay Terminal	Commuter Rail	Yes
MUNI Third Street LRT Project Phase 2 – New Central Subway	Light Rail	Yes
Sonoma-Marin Rail	Commuter Rail	No
Dumbarton Rail	Commuter Rail	No
Expanded Ferry Service Phase 1: Berkeley, Alameda/Oakland/Harbor Bay, and South San Francisco to SF <i>(Note 1)</i>	Ferry	No
Expanded Ferry Service Phase 2: Alameda to South San Francisco, and Hercules, Antioch, Treasure Island, Redwood City and Richmond to SF. <i>(Note 1)</i>	Ferry	No
<i>Note 1: The WTA Ferry Expansion "Corridor" for the purposes of the TOD policy consists of all new terminals planned in Phase 1 and Phase 2.</i>		

MTC’s TOD policy will thus be most useful as a coercive tool to persuade jurisdictions managing projects that might not otherwise produce a high level of TOD to step up their planning efforts to plan for an intensified level of development. Some of the projects in Resolution 3434 will already meet MTC’s TOD development thresholds (see Table 3);

this is good news for the region, as it means that some goals have already been achieved. It is for the balance of the projects where the TOD policy will be most effective at influencing planning efforts to produce outcomes that are more favorable to regional efforts to link land use with transportation.

TOD Implementation: Major Issues & Strategies

Now that the TOD Study has spawned a TOD policy, which has been adopted, the main challenge is to implement it. Corridor working groups have been formed for those corridors that are ready to proceed with corridor planning efforts. Station area planning grants have been awarded to help fund planning efforts to assist corridors in developing strategies to meet the development thresholds laid out in the TOD Policy.

The main challenge all along has been obvious for all to see: Though MTC controls funding for transit expansion projects, it must use this as leverage to persuade its regional partners and local jurisdictions to adopt land use plans that encourage the necessary levels of development near existing and future transit. MTC has no statutory land use authority of its own, so it must work with those who do, the cities and the counties, in order to implement this regional vision.

However, in addition to the stick of wielding discretion over regional funding for transit expansion projects, MTC also carries the carrot of its TLC and HIP programs. TLC, or Transportation for Livable Communities, is a program that funnels millions of dollars into planning and capital programs to fund streetscape improvements, bicycle/pedestrian facility enhancements and other transportation infrastructure quality-of-life efforts. HIP, or the Housing Incentive Program, is a reward program that pays individual cities a certain amount of money for each room of eligible developments that are located within a sufficiently close distance of high-quality transit services. HIP funding is then generally used for the same types of improvements as those funded by the TLC Capital program.

In a fragmented region where 101 cities and nine counties are separated by a vast inland sea from one another, where the physical center of the region is indeed inundated with salty bay water, the challenge for MTC is to find consensus among many players with many different agendas and issues. This is true for all of MTC's efforts, not just those related to TOD, which is one of the strengths that it brings to the table. As a major player in regional planning efforts, and one that controls crucial purse strings, MTC has responded to advocacy groups that have called for it to wield its discretionary funding in order to link land use and transportation by doing exactly that. Having thus taken a major step down this path, it now must continue its efforts by convincing local jurisdictions of the wisdom of this path. The TOD study has given it many tools to draw on for this effort.

Ongoing/Future GIS Efforts

As applications are received for MTC's TLC and HIP programs, they are immediately mapped into the GIS system. They are then compared against the existing and soon-to-

open transit systems in the region, as well as examined for other factors such as Environmental Justice. New transit projects will receive TLC and HIP funding to assist them with building livable communities adjacent to their facilities. In this manner, MTC can help to improve the quality of life within the region, one station and one project at a time.

To this end, MTC is currently engaged in a process to make the findings of the TOD study and related efforts more available to citizens who are interested in the process, especially those seeking to live in, visit or build a TOD. As a part of this effort, the agency is writing station area fact sheets for many of the existing and potential future stations in the region. Each fact sheet will feature a map of the station area, statistics (from the work done for the TOD Study) about its existing and future demographics, interesting features nearby, TLC/HIP projects nearby, adjacent transit services and other pertinent information, such as public art projects or a history of the neighborhood. These sheets will seek to provide public information, both as an outreach tool and as a marketing effort seeking to raise awareness of the benefits of living the TOD lifestyle.

MTC is also currently engaged in a parking study, which through the use of eight study areas, seeks to examine existing parking policies and conditions in order to find or produce innovations and new policies that will tailor parking strategies so that they are supportive of Smart Growth and TOD. As MTC has begun implementation of its TOD policies, parking issues have been repeatedly cited by local jurisdictions, transit interests, developers and community interests alike as a major barrier to transit oriented projects in particular. The parking study is building on the GIS data collection and compilation work done as a part of the TOD study as a part of these case study efforts. When complete, this analysis of parking policies will be made available to local jurisdictions and is expected to feed into development of local parking policies for TODs as a part of the Station Area Planning process.

Finally, MTC and its other regional partners are engaged in an update process to the regional Smart Growth Vision, called Focusing Our Vision. This effort seeks to identify priority development areas within the region where infill and transit oriented development have the greatest chance of success, and where regional efforts at densification and infill development will thus be focused. It builds heavily on the work done in the TOD study, and will likely provide a very helpful contribution to the TOD policy implementation effort.

Conclusion

Buried within MTC's TOD policy³ is the following statement:

“The Corridor Working Groups are encouraged to plan for a level of housing that will significantly exceed the housing unit thresholds stated here during the planning process. This will ensure that the Housing Unit Threshold is exceeded corridor-wide and that the ridership potential from TOD is maximized.”

While GIS was able to provide a massive amount of information to MTC as a part of the TOD Study, information that without GIS could not have been collected and synthesized for analysis within anything even remotely approaching a reasonable amount of time, in the end it is the collaborative planning process that makes the final decisions. Though the TOD Policy contains thresholds that give very precise numbers for the amount of housing that should be constructed adjacent to the stations within each corridor, these numbers, like those in all plans, are merely the glimmer in a planner's eye, until forces in the real world come together to begin construction and make them a reality. As they do, GIS will continue to be a valuable asset for MTC and its regional and local partners as they seek to assess, evaluate and plan to build a better Bay Area for the future.

Appendix 1: Further statistics on existing and future demographics for TOD planning areas.

1. What % of the population lives in TOD planning areas currently? In 2030, according to Projections 2003? In the Smart Growth Vision? (ie % of the year 2000 total pop lives in the TOD zones, % in 2030, % in 2020 according to the Vision)

% of **Year 2000** population living in TOD planning areas served by existing or future transit: **23.0%**

% of Year **2030** population (**Projections 03**) living in TOD planning areas served by existing or future transit: **25.6%**

% of Year **2020** population (**SG Vision**) living in TOD planning areas served by existing or future transit: **32.2%**

2. How much TOD opportunity do we see (growth in people living in these zones) in number and percentage terms? (Change between current and 2030, Vision)

Change between Years 2000 & 2030:

Growth in population (**Proj. 03**) living in TOD planning areas served by existing or future transit: 684,097

% growth in population (**Proj. 03**) living in TOD planning areas served by existing or future transit: 43.8%

Growth in population (**SG Vision**) living in TOD planning areas served by existing or future transit: 1,192,275

% growth in population (**SG Vision**) living in TOD planning areas served by existing or future transit: 76.4%

3. How much of the TOD opportunity is around which modes?

(ie what is the rate of growth in zones served by BART, commuter rail, ferry, light rail, BRT, other bus)

Growth in population (**Proj. 03**) living in TOD planning areas served by **BART**: 247,362

% growth in population (**Proj. 03**) living in TOD planning areas served by **BART**: 47.8%

Growth in population (**SG Vision**) living in TOD planning areas served by **BART**: 511,737

% growth in population (**SG Vision**) living in TOD planning areas served by **BART**: 98.8%

Growth in population (**Proj. 03**) living in TOD planning areas served by **Commuter Rail**: 331,088

% growth in population (**Proj. 03**) living in TOD planning areas served by **Commuter Rail**: 64.9%

Growth in population (**SG Vision**) living in TOD planning areas served by **Commuter Rail**: 595,752

% growth in population (**SG Vision**) living in TOD planning areas served by **Commuter Rail**: 116.7%

Growth in population (**Proj. 03**) living in TOD planning areas served by **Ferry**: 35,240

% growth in population (**Proj. 03**) living in TOD planning areas served by **Ferry**: 60.6%

Growth in population (**SG Vision**) living in TOD planning areas served by **Ferry**: 81,840

% growth in population (**SG Vision**) living in TOD planning areas served by **Ferry**: 140.7%

Growth in population (**Proj. 03**) living in TOD planning areas served by **Light Rail**: 258,138

% growth in population (**Proj. 03**) living in TOD planning areas served by **Light Rail**: 44.9%
Growth in population (**SG Vision**) living in TOD planning areas served by **Light Rail**: 390,761
% growth in population (**SG Vision**) living in TOD planning areas served by **Light Rail**: 68.0%

Growth in population (**Proj. 03**) living in TOD planning areas served by **BRT/Enhanced Bus**: 218,566

% growth in population (**Proj. 03**) living in TOD planning areas served by **BRT/Enhanced Bus**: 47.3%

Growth in population (**SG Vision**) living in TOD planning areas served by **BRT/Enhanced Bus**: 342,547

% growth in population (**SG Vision**) living in TOD planning areas served by **BRT/Enhanced Bus**: 74.1%

Growth in population (**Proj. 03**) living in TOD planning areas served by **Other Bus**: 44,402

% growth in population (**Proj. 03**) living in TOD planning areas served by **Other Bus**: 27.8%

Growth in population (**SG Vision**) living in TOD planning areas served by **Other Bus**: 70,564

% growth in population (**SG Vision**) living in TOD planning areas served by **Other Bus**: 44.2%

Please note that these numbers & percentages double-count those zones served by more than one mode, and thus cannot be added up in a cumulative manner. They are meant only to be compared against the totals provided as a response to Question Two. Also, these numbers are calculated for every zone that is now or will be served by that mode, such that the existing population figures include zones that may not currently receive service from a given mode.

4. How much of the opportunity is near existing transit vs. new transit?

Percentage of total growth in population for all TOD study zones served by transit (**Proj. 03**) living in TOD planning areas served by **Existing Transit**: 68.2%

Percentage of total growth in population for all TOD study zones served by transit (**SG Vision**) living in TOD planning areas served by **Existing Transit**: 70.1%

Percentage of total growth in population for all TOD study zones served by transit (**Proj. 03**) living in TOD planning areas ONLY served by **New Transit**: 31.8%

Percentage of total growth in population for all TOD study zones served by transit (**SG Vision**) living in TOD planning areas ONLY served by **New Transit**: 29.9%

Source Data:

Questions 1 & 2:

Total 9-County Bay Area Pop, Year **2000**: 6,783,760

According to Projections 2003, Total 9-County Bay Area Pop, Year **2030**: 8,780,317

According to the Smart Growth Vision, Total 9-County Bay Area Pop, Year **2020**: 8,547,000

Total Year 2000 population living in TOD planning areas served by existing or future transit: 1,561,344

Total Year 2030 (Projections 03) population living in TOD planning areas served by existing or future transit: 2,245,441

Total Year 2020 (SG Vision) population living in TOD planning areas served by existing or future transit: 2,753,619

Question 3:

Total Year 2000 population living in TOD planning areas served by BART: 517,854

Total Year 2030 (Projections 03) population living in TOD planning areas served by BART: 765,216

Total Year 2020 (SG Vision) population living in TOD planning areas served by BART: 1,029,591

Total Year 2000 population living in TOD planning areas served by Commuter Rail: 510,371
Total Year 2030 (Projections 03) population living in TOD planning areas served by Commuter Rail: 841,459

Total Year 2020 (SG Vision) population living in TOD planning areas served by Commuter Rail: 1,106,123

Total Year 2000 population living in TOD planning areas served by Ferry: 58,148

Total Year 2030 (Projections 03) population living in TOD planning areas served by Ferry: 93,388

Total Year 2020 (SG Vision) population living in TOD planning areas served by Ferry: 139,988

Total Year 2000 population living in TOD planning areas served by Light Rail: 574,624

Total Year 2030 (Projections 03) population living in TOD planning areas served by Light Rail: 832,762

Total Year 2020 (SG Vision) population living in TOD planning areas served by Light Rail: 965,385

Total Year 2000 population living in TOD planning areas served by BRT/Enhanced Bus: 462,311

Total Year 2030 (Projections 03) population living in TOD planning areas served by BRT/Enhanced Bus: 680,877

Total Year 2020 (SG Vision) population living in TOD planning areas served by BRT/Enhanced Bus: 804,858

Total Year 2000 population living in TOD planning areas served by Other Bus: 159,604

Total Year 2030 (Projections 03) population living in TOD planning areas served by Other Bus: 204,006

Total Year 2020 (SG Vision) population living in TOD planning areas served by Other Bus: 230,168

Question 4:

Total Year 2000 population living in TOD planning areas served by Existing Transit: 1,103,883

Total Year 2030 (Projections 03) population living in TOD planning areas served by Existing Transit: 1,570,625

Total Year 2020 (SG Vision) population living in TOD planning areas served by Existing Transit: 1,939,169

Total Year 2000 population living in TOD planning areas ONLY served by New Transit: 457,461

Total Year 2030 (Projections 03) population living in TOD planning areas ONLY served by New Transit: 674,816

Total Year 2020 (SG Vision) population living in TOD planning areas ONLY served by New Transit: 814,450

Growth in population (Proj. 03) living in TOD planning areas served by Existing Transit: 466,742

% growth in population (Proj. 03) living in TOD planning areas served by Existing Transit: 42.3%

Growth in population (SG Vision) living in TOD planning areas served by Existing Transit: 835,286

% growth in population (SG Vision) living in TOD planning areas served by Existing Transit: 75.7%

Growth in population (Proj. 03) living in TOD planning areas ONLY served by New Transit:
217,355

% growth in population (Proj. 03) living in TOD planning areas ONLY served by New Transit:
47.5%

Growth in population (SG Vision) living in TOD planning areas ONLY served by New Transit:
356,989

% growth in population (SG Vision) living in TOD planning areas ONLY served by New Transit:
78.0%

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