Appendix C

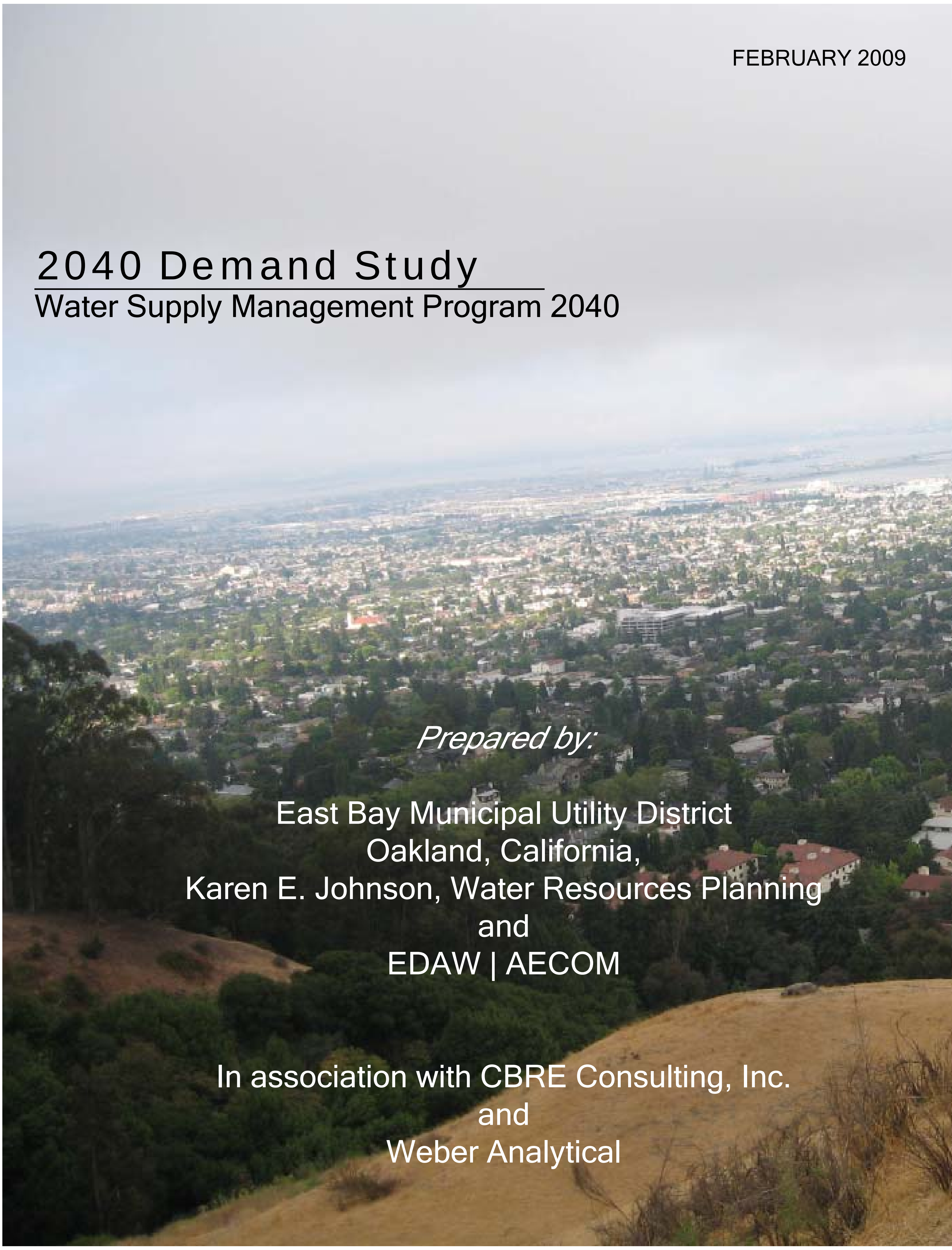
2040 Demand Study

Final April 2012

FEBRUARY 2009

2040 Demand Study

Water Supply Management Program 2040



Prepared by:

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Karen E. Johnson, Water Resources Planning
and
EDAW | AECOM

In association with CBRE Consulting, Inc.
and
Weber Analytical

East Bay Municipal Utility District

Water Supply Management
Program 2040

2040 Demand Study

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Chapter 1: Introduction

East Bay Municipal Utility District (District or EBMUD) is committed to periodically update its water demand projections. Consistent with that commitment, the 2040 Demand Study (Demand Study) has been completed as an element of the Water Supply Management Program 2040 (WSMP 2040). This report describes the updated demand projections and provides background information on the methodologies and data resources used to develop these projections.

Objectives

The primary objective of the 2040 Demand Study was to project average annual water demands of the distribution system out to the year 2040. The demand projections are an essential element for a myriad of District projects including:

- Need for Water Analysis to aid in quantifying District's water supply needs,
- Raw water facilities needs,
- Treatment plant and distribution system facilities improvements, and
- Customer water supply assessments.

The objectives were met by developing a land use data management system and associated software tools (Demand Model) to calculate future potable water demands. Demand projections were calculated using existing District water consumption data for base year 2005, organized by land use in a geographical information system (GIS) database. Unit factors were developed which reflect consumption under average water year conditions and production requirements. Adjustments were then made to the unit factors to reflect changing conditions. The Demand Model, a GIS application, automates the calculation of most of these steps so future updates can be accommodated more readily.

Previous Studies

The District adopted the Water Supply Management Program in 1993 (1993 WSMP) as a long-term planning guide to provide for an adequate water supply at year 2020 level of development, with rationing limited to 25 percent of normal water demand levels during a worst case drought. The 1993 WSMP included demand projections with a methodology based on population projections derived from data by the Association of Bay Area Governments (ABAG).

In 2000, the District-wide Update of Water Demand Projections (2000 Demand Study) was prepared as an element of the Pressure Zone Planning Program which cumulated in the Distribution System Master Plan (October 2006). To allow for a more rigorous, spatially based projection of demands, the 2000 Demand Study methodology was based on local planning agency land use policy and unit factors. Calendar year 1996 was used as the base year for the 2000 Demand Study because it represented the last year of complete production and consumption data availability.

Planning Periods

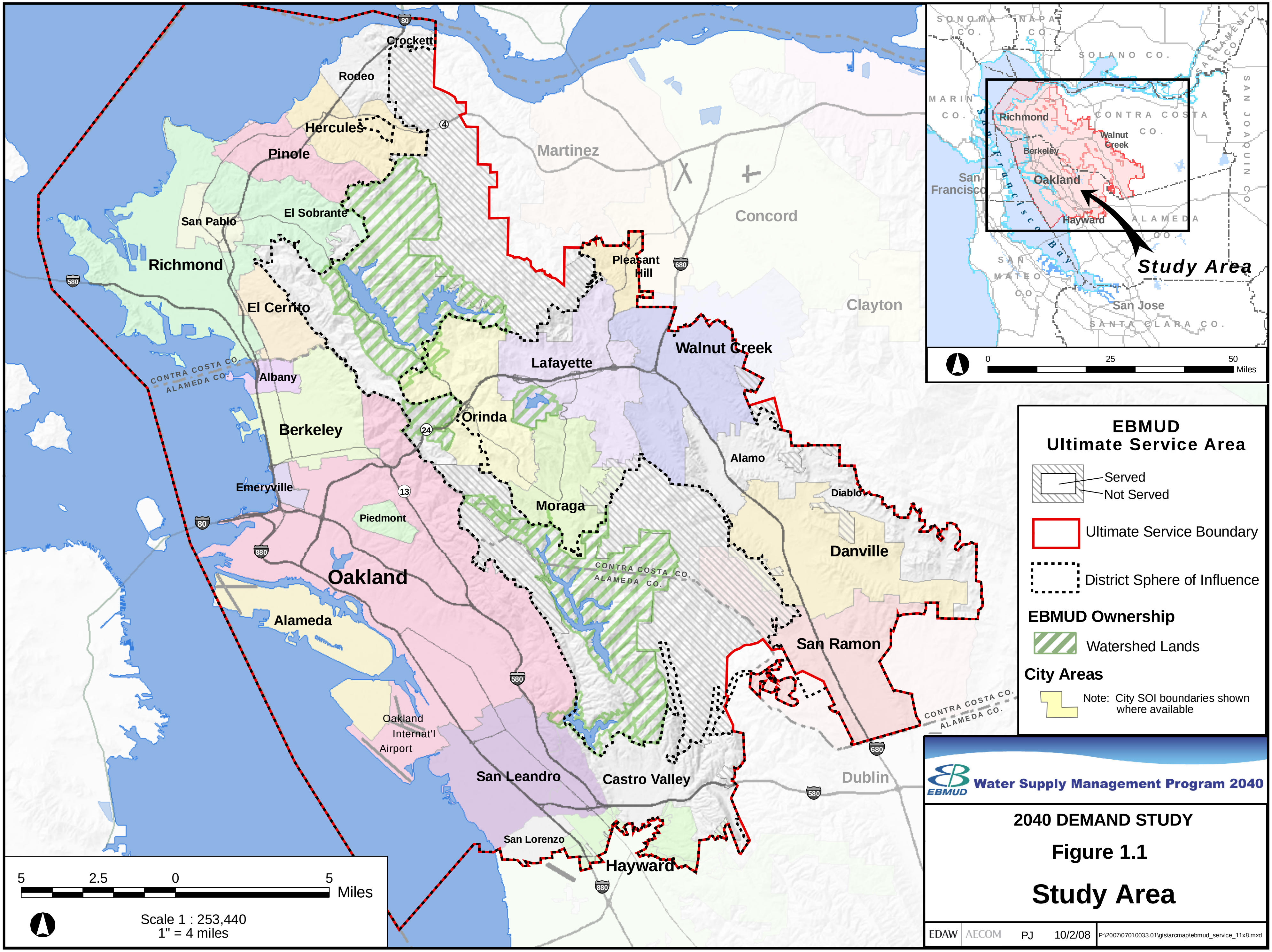
In the current demand study, calendar year 2005 was selected as the base year for defining existing land uses and the start point for projecting water demands. 2005 was selected because it was the last year of complete data availability that did not experience distributions system anomalies. For example, the WSMP 2040 was initiated in March 2007 and year 2006 was the latest year available for a complete set of consumption and production data. But because of the Claremont Tunnel maintenance outage in 2006, customers were asked to reduce consumption for several months and supplies were rerouted resulting in pressure zone flows not reflective of more typical distribution patterns. A side advantage in selecting 2005 is that it allows for 5-year planning intervals through 2040.

The WSMP 2040 selected a planning horizon of 2040, thus providing a 35 year demand projection window that provides a practical upper limit of land use planning information for reliable facility planning. Five-year incremental planning periods were established at 2010, 2015, 2020, 2025, and 2030 for projecting future demands. The planning increments allow for the planning and prioritization of new distribution system facilities. Year 2035 was not included because of the lack of specificity from planning agencies towards the end of the planning horizon.

Study Area and Boundaries

The District's Ultimate Service Boundary (USB) is the study area boundary for the Demand Study. The USB was established by the District to define its limit of future annexation for the extension of water service. The District's water service planning does not include areas outside of this boundary at this time. A Sphere of Influence (SOI) is established by the respective Local Agency Formation Commissions (LAFCO) of Alameda and Contra Costa counties. The SOI represents LAFCO's designation of the geographic area where the District is the logical water service provider. The formulation of the SOI has previously undergone public review and California Environmental Quality Act (CEQA) analysis. The USB encompasses a slightly greater area than the SOI. The primary difference between the two boundaries is associated with large areas of District watershed lands and rural hilly areas outside of the SOI but within the USB.

Figure 1.1, Study Area, presents city SOIs within the study area, county boundaries, the District SOI, and the USB, or study area boundary. Unincorporated areas include Castro Valley and the Eden Area (including San Lorenzo) in Alameda County; and Crockett, Rodeo, El Sobrante,



EBMUD Water Supply Management Program 2040

2040 DEMAND STUDY

Figure 1.1

Study Area

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Kensington, Alamo, and Blackhawk in Contra Costa County. Portions of the cities of Walnut Creek, Pleasant Hill, and Hayward are within the study area.

There are 123 individual pressure zones within the service area including 30 served by pressure regulators. These pressure zones reflect areas of the system with a common elevation for pumping and storage requirements. For this analysis, the pressure zones were grouped into 11 study regions called Demand Model Regions (DMR or regions) reflecting similar climates and historical spatial designations. These are presented on Figure 1.2, Demand Model Regions.

The District service area also has a unique spatial division at the Oakland and Berkeley Hills. District data are often separated into West of Hills (WoH) and East of Hills (EoH) because of differences in climatic conditions and consumption patterns. There are four regions EoH and seven regions WoH; the associated cities and unincorporated areas are listed in Table 1.1, Communities within Each Demand Model Region.

Organization of the Report

This report presents the progression of the demand projection analysis from development of its components to the resulting projections. Report chapters are briefly described below. Appendices provide more detailed supporting documentation of the information presented in the report.

Chapter 1 – Introduction. This chapter presents definitions including objectives, study area boundaries, and planning periods.

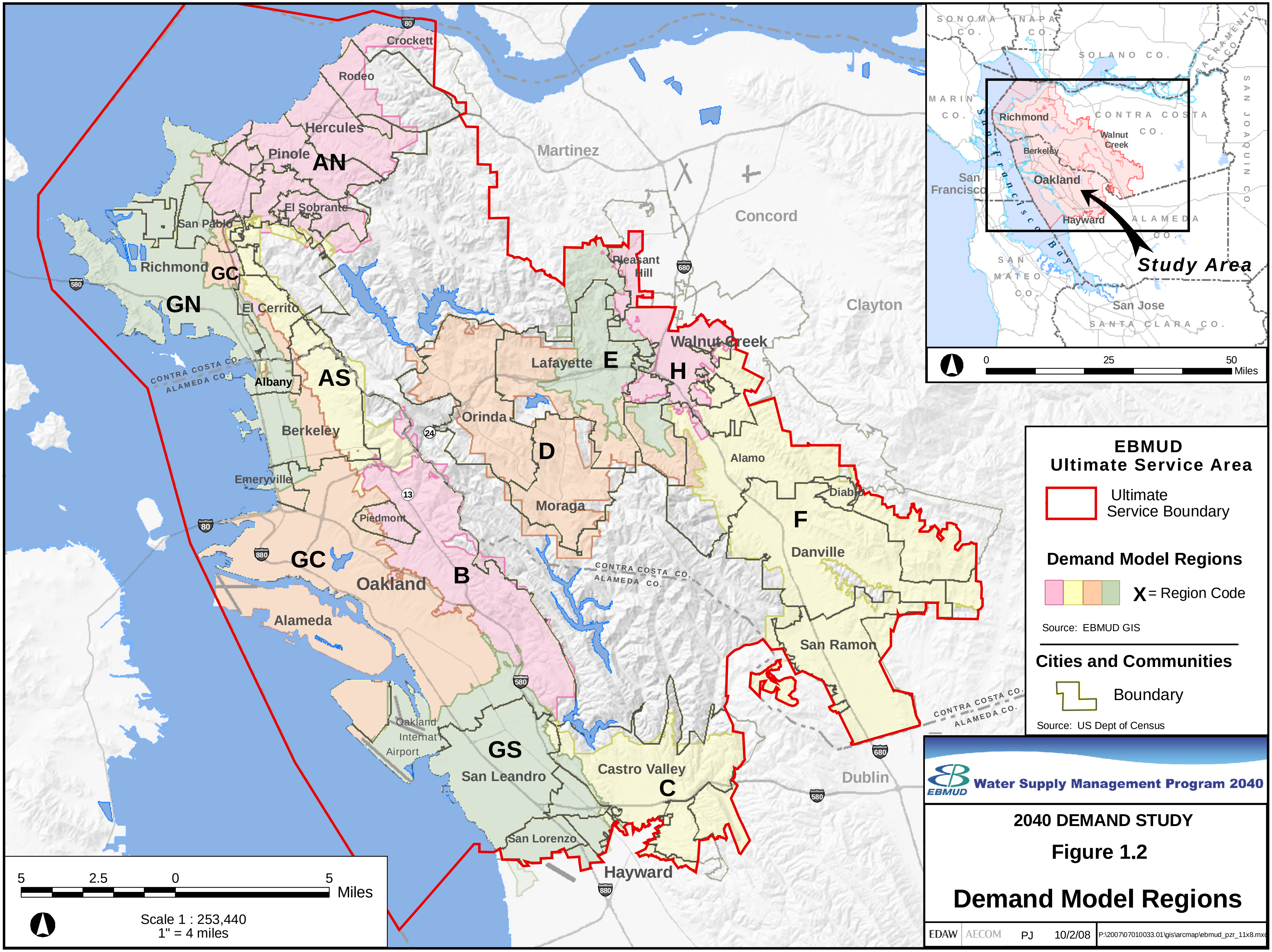
Chapter 2 – Projection Methodology. Chapter 2 provides a description of the basis of planning for the analysis and an overview of the projection methodology.

Chapter 3 – Land Uses and Trends. This chapter describes existing and future land uses and summarizes land use activities and trends.

Chapter 4 – Base Year Water Demands. Base year (2005) water demands are described in this chapter as they pertain to the development of land use unit

Table 1.1
Communities within Each Demand Model Region

Demand Model Regions East of Hills:	
D	Orinda, Moraga, western Lafayette, Walnut Creek
E	Lafayette, Walnut Creek
F	Danville, San Ramon, Alamo, Diablo
H	Walnut Creek, small area of Pleasant Hill
Demand Model Regions West of Hills:	
AN	Pinole, El Sobrante, Hercules, Rodeo, Crockett
AS	Berkeley Hills and eastern downtown Berkeley, El Cerrito
B	Oakland Hills
GN	Richmond, San Pablo, Albany, west Berkeley, north Emeryville, El Cerrito
GC	Oakland, Alameda, central Berkeley western downtown, El Cerrito
GS	San Leandro, San Lorenzo, Eden area, southern Oakland
C	Castro Valley, Fairview, small part of Hayward



EBMUD Water Supply Management Program 2040

2040 DEMAND STUDY

Figure 1.2

Demand Model Regions

EDAW AECOM PJ 10/2/08 P:\2007\07010033.01\gis\arcmap\ebmud_pzr_11x8.mxd demands for each land use category on a per acre basis. The normalization, or averaging, of base year demands is summarized in this chapter along with unmetered water usage, water that leaves the distribution system without being measured.

Chapter 5 – Future Adjustment Factors. The land use unit demands (LUDs) for existing conditions were adjusted to reflect future changes in land use and consumption pattern trends. The methodology and data sources are described in this chapter.

Chapter 6 – Water Demand Projections. The final results of the analysis of 2040 water demand projections are presented in this chapter.

Appendices. Appendices provide more detailed information on the following topics: abbreviations and glossary; meetings with planning agencies; economic and demographic data analysis; normalization analysis; and future adjustment factors.

Chapter 2: Projection Methodology

Chapter 2 provides a description of the basis of planning for the demands analysis, an overview of the projection methodology, and a description of the Demand Model tool.

Basis of Planning

The basis of planning, or starting point assumptions, for existing water demands was:

- use of calendar year 2005 as the base year;
- reliance on consumption data for each customer meter from the District's database; and
- normalization and averaging of consumption data so that a comparative analysis can be performed.

The meter data provides a spatial distribution of demands since the data are geographically coded to retain the location. The use of spatially distributed consumption data provided a rigorous database for the demand analysis.

The basis of planning for the projection of demands was:

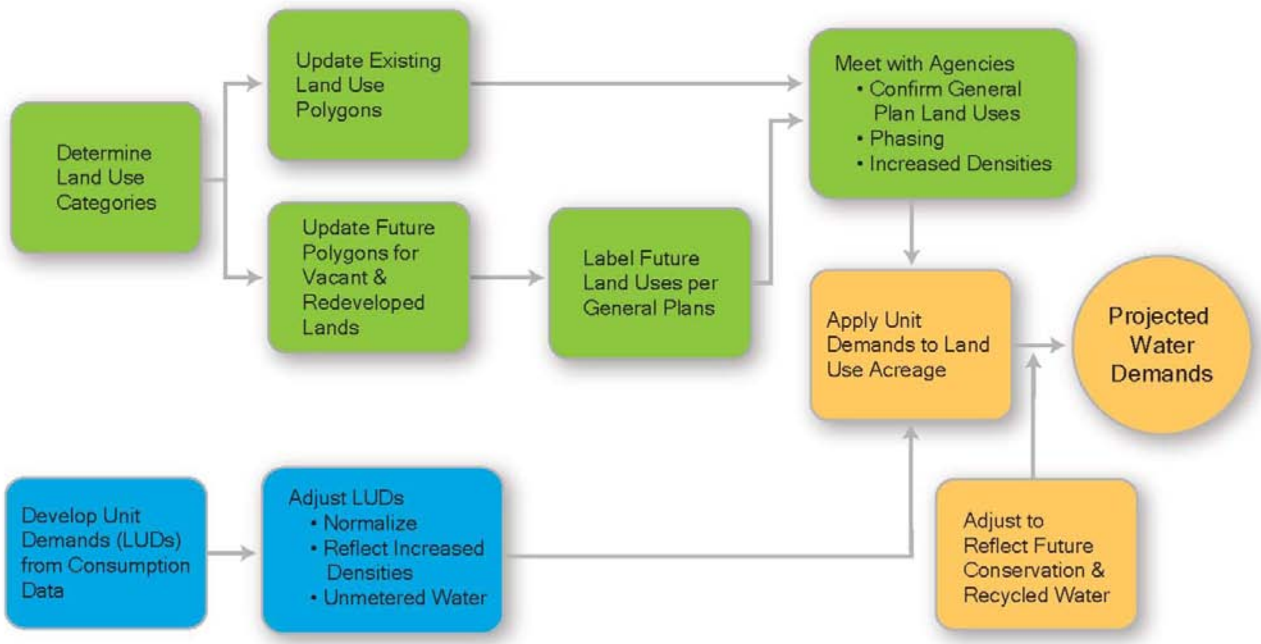
- use of approved general plans and solicited input from each community within the study area; and
- development of land use unit demands (LUDs), a measurement of water demands per acre, based on existing demands adjusted for future conditions.

Specifically, general plan land use maps, which are a part of the Land Use Element of each general plan, identified potential future land uses on which future water demands were based. Staff met with each of the community planning agencies to solicit their best estimate of phasing of future development.

Overview of Projection Methodology

The methodology used to project water demands relies on the development of a land use database and the determination of LUDs. LUDs are adjusted to reflect future conditions, applied to acreages of land uses to calculate demands, then adjusted for planned conservation and non-potable water usage. An overview of the demand projection methodology is provided on Figure 2.1, Overview of Water Demand Projection Methodology. The methodology summarized here and in Figure 2.1 is described in detail in remaining chapters of this report.

Figure 2.1 Overview of Water Demand Projection Methodology



Land Uses

The 2040 Demand Study began with the GIS land use database from the previous 2000 Demand Study. This database includes mapped polygons encompassing similar land uses. The land use database was updated by changing existing land uses to match 2005 aerial photographs and changing future land uses to match the most current general plan land uses provided by the planning agencies. Land use categories were determined in the 2000 Demand Study based on the general plan land use categories of each city and county in the study area. The update necessitated the creation of new land use categories, one for residential densities greater than 100 dwelling units per acre and several for various densities of mixed uses (residential development with retail uses on the ground floor).

Meetings were held with each of the city and county planning agencies to confirm general plan land use designations for future development, identify redevelopment areas, and identify phasing of future development in five year increments from 2005 to 2030 plus 2040. These time frames are discussed under Planning Periods in Chapter 1. Phasing of development was an important step because the general plan planning horizons reflect a hypothetical buildout date for the purposes of impact analyses. The phasing dates from the 2000 Demand Study were updated by the planning agencies to the best of their knowledge, reflecting their understanding of developer interest and city policy guiding development. For a full list of land use categories and more information on planning agency input, see Chapter 3.

These planning agency meetings occurred during a time of economic expansion and the timing of development plans reflects the sentiment of those times. Subsequently, the economy began a period of recession in December 2007[1] and although the demand projections reflect development planned for in the general plans, the timing of the development (and associated demand) will likely be realized slower than what is projected in this study. In addition, the continuation of the current drought and the mandatory conservation imposed by the District (since the latter half of 2008) may reduce future demands. The magnitude and duration of reductions to projected demands during the planning horizon of this study is dependent on myriad factors such as the continuation of the drought, conservation/rationing policies, and the state of the economy.

Land Use Unit Demands

As presented in Figure 2.1, the projection methodology is based on land uses, described above, and the development of land use unit demands. A LUD is a unit of measurement of consumption, for this analysis, in gallons per day per acre (gpd/ac). A LUD is generated for each existing land use polygon by using the District's Demand Model, a GIS based software tool described later in this chapter, created to aid in the calculation of water demand projections. 2005 consumption data that are geographically referenced to meter locations are normalized for average conditions (including weather, economic, etc.) to become existing demands. These existing demands were determined for each land use polygon and divided by the area of the polygon to determine the polygon LUD. The polygon demands and acreages were aggregated by land use category and region to generate existing average LUDs per land use per region. Additional information on existing LUDs can be found in Chapter 4.

Future demands were calculated by applying adjustment factors for future conditions to each polygon. If the existing land use is not anticipated to change, the adjustment factor was applied to the 2005 polygon LUD. If the land use was anticipated to change by 2040, then adjustment factors were applied to the mean LUD of that polygon's land use category and region. Adjustment factors for future conditions were created for two types of land use conditions.

Reuse of an underutilized building typically results in an increase in demands.

[1] National Bureau of Economic Research, December 11, 2008. (http://www.nber.org/cycles/dec2008.html)

- One, existing land uses that are not anticipated to change but consumption patterns may change over time to reflect changing demographic and economic conditions. These characteristic changes may result in greater numbers of people per households and employees per acre; increased usage of lands in general such as higher occupancy rates and more intense uses (particularly as vacant developable lands become rare); and infill development of small parcels.
- Two, lands that will either be developed as a new use (formerly vacant land) or redeveloped (rebuilt uses resulting in a change to its land use category). Based on observations and input from planning agencies, these new and redeveloped uses typically reflect higher densities of development and greater intensity of use of the land.

Adjustment factors were also developed for normalization (average water year conditions) and unmetered water. The adjustment factors were applied in the Demand Model to each polygon to create future LUDs and future demands in five-year increments to 2040 (except, as noted in Chapter 1, year 2035). Additional information on adjustment factors can be found in Chapter 5.

Conservation and non-potable water adjustments were also made to the demands based on the WSMP projections for conservation and non-potable water. Additional information on conservation and non-potable water use adjustment factors can be found in Chapters 5 and 6.

Example Application

Two examples of the Figure 2.1 process on developing and adjusting LUDs and applying them to land use acreages is provided here for Demand Model Region E (eastern Lafayette). One example is for existing residential land uses (ER2: densities of 3 to 10 dwelling units per acre) that are not anticipated to change land use categories. The second example is of vacant land anticipated to change to the same residential land use category (FR2: densities of 3 to 10 dwelling units per acre) in the future.

For existing development without an anticipated change in land use category, the 2005 consumption for ER2 was used as the base year LUD for each polygon. Adjustment factors, which differ by land use category and region, for unmetered water (9.6 percent), normalization (2.3 percent), and future conditions (10 percent by 2040) were applied to the ER2 polygons to determine the future LUD for each five year increment. The initial average 2040 LUD for ER2 was 1,706 gpd/ac. This polygon demand was then reduced for projected conservation savings (there were no non-potable uses planned for in this example). The final demands per polygon of ER2 land uses were summed to generate ER2 2040 demands for Region E.

The second example is for lands with an anticipated change in land use category from vacant, with no existing demands, to R2. Since the polygon has no existing demand, a LUD reflecting the mean Region E ER2 LUD of 1,398 gpd/ac was used as the base year LUD. Adjustments made for unmetered water, normalization, and future conditions were applied. The future conditions adjustment factor (39 percent increase) was based on consumption patterns of new

ER2 development; new development is typically at a higher density, thus explaining why new uses have a higher LUD. The initial 2040 LUD for new FR2s, based on these adjustment factors, was 2,111 gpd/ac. This polygon demand was then reduced for projected conservation savings (there were no non-potable uses planned for in this example). The second example differs from the first example in that it reflects new construction versus changes to existing land uses that may impact water demands. Additional information on future adjustment factors can be found in Chapter 5.

Demand Tool

The District developed a GIS based application to calculate demand projections, called the Demand Tool. The Demand Tool uses the GIS land use polygons and adjustment factor tables (e.g., adjustments for normalization, future conditions, conservation, non-potable water) to calculate average annual projections 35 years out into the future. In addition, the Demand Tool calculates maximum day and average winter day demand projections based on a user defined maximum day and average winter day factors. In the future, updates to the demand projections can be achieved by updating the GIS land use polygons and the adjustment factor tables and using the Demand Tool to calculate the demand projections.

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Chapter 3: Land Uses and Trends

This chapter presents the analysis of existing land uses and future land uses planned for the District's service area, and associated trends that influence water consumption patterns. Data used for this analysis included 2005 aerial photographs, general plans from local municipalities, meetings with local land use planning agencies, and demographic and economic data.

Land Use Categories

Land uses were categorized based on similar average annual consumption, seasonal consumption patterns, and/or diurnal (24-hour) consumption patterns. Land use categories were developed specifically for the District's demand studies and do not necessarily conform to the District's business classification codes, ABAG categories, or Standard Industrial Classification categories.

All cities and counties in California have a general plan to provide and implement the vision for the development of the community. General plans include a land use element and land use map which describe specific allowable uses and densities. The city general plans include all lands within their SOI and the county general plans include all lands outside of the city limits (unincorporated lands). Each community within the study area used different land use categories in their general plan land use element; therefore it was necessary to standardize the categories. Table 3.1, Land Use Categories, presents the land use categories used for the existing (starting with E) and future (starting with F) land use mapping and analysis. The future land use categories reflect anticipated development or redevelopment of either currently vacant land or existing land uses to different land uses or densities. The abbreviations for land use categories in the table are used throughout this report.

The land use categories developed for the 2000 Demand Study were compared with each of the 20 general plans. The densities of the residential categories were refined and additional mixed uses added to capture the updated land use trends. The following text describes the specific updates to the land use categories.

- The high density residential category of FR5 was changed from 50 dwelling units per acre (du/ac) or greater, to 50 to 100 du/ac. A new category of FR6 was added for densities equal to or greater than 100 du/ac. This increase in residential densities was based on both recent construction of and communities planning for higher density housing.
- The single category of "Mixed Uses" was replaced with four densities of mixed uses (FMUR2 through FMUR5) reflecting different densities of the residential component. This addition accommodated the more prevalent use of mixed uses in recent general plans.

- Separate Office (EO) and Commercial (EC) categories were maintained for existing land uses, but were combined into a single category for future land use. Review of new construction since 1996 showed that commercial (retail, office, services) and industrial uses had similar consumption patterns. Combining the two into future commercial (FC) was more practical since there was little distinguishing the two. However, separate categories were maintained for 'Low Intensity Industrial' (EIL: warehousing, storage, and similar low water consumption uses) and 'High Density Office' uses that exhibit different consumption patterns than EO.

Table 3.1
Land Use Categories

Existing Land Uses	Future Land Uses
ER1: residential 0 to 2.9 du/ac(1)	FR1
ER2: residential 3 to 9.9 du/ac	FR2 and FMUR2 (2)
ER3: residential 10 to 19.9 du/ac	FR3
EMUR3: residential 10 to 19.9 du/ac plus commercial	FMUR3 (2)
ER4: residential 20 to 49.9 du/ac	FR4 and FMUR4 (2)
ER5: residential 50 to 100 du/ac	FR5 and FMUR5 (2)
ER6: residential100+ du/ac	FR6
EIL: low intensity industrial	FIL
EO: office and industrial	FC: office, retail, services, and industrial
EC: retail and industrial	
EOH: high density office	FOH
ER: petroleum refinery	Same as existing
ES: schools	FS
EPI: irrigated turf	FPI
EP: public and quasi-public uses	FP
EHW: high water users(3)	Same as existing
ERW: recycled water(4)	(4)
ERAW: raw (untreated) water(4)	(4)
EV: vacant, developable (no current water use)	Same as existing
EOS: open space (no water use)	Same as existing

(1) For example, ER1 means existing residential land uses at a density of 0 to 2.9 dwelling units per acre (du/ac). FR1 is future residential at the same density.

(2) Future Mixed Use utilizes the same density categories as existing and future residential categories.

(3) Each high water user is labeled separately.

(4) Future recycled and raw water usage was applied to specific polygons without changing the land use categories.

Existing Land Uses

The 2000 Demand Study created spatially referenced land use polygons that spanned the District's service area. Each polygon represented an area of predominant land use that existed in 1996. These 8,000 plus land use polygons were updated to reflect changes in land use that occurred from 1996 to 2005. In addition, 2005 vacant lands were checked for development potential (i.e., an urban general plan land use designation). Land use changes were identified through 2005 aerial photographs, site visits, and discussions with planning agencies.

Most of the polygons generated were greater than five acres. Although this approach produces a high level of resolution of the District's service area, it does not account for infill, the development of small vacant parcels within the (non-vacant) land use polygons. The 2040 Demand Study accounted for future infill development with a future adjustment factor to the LUDs (See Chapter 5).

An example of existing land use polygons is presented in Figure 3.1, Example of Existing Land Use Polygons. The figure on the left has the aerial photograph underneath; the figure on the right shows the polygon boundaries (red lines) and water meter locations (dots). Due to the scale of the mapping effort, some unique uses within a land use polygon could not be isolated.

Figure 3.1 Example of Existing Land Use Polygons

Existing land uses within the study area are presented on Figure 3.2, Existing Land Uses: 2005. Identified in yellow is the predominant land use of ER2 (3 to 9.9 du/ac). Table 3.2, Base Year Land Use Acreage by Region, presents a tabulation of acreage of each land use.

Table 3.2
Base Year Land Use Acreage by Region

Land Use	AN	AS	B	C	D	E	F	GC	GN	GS	H	Total
Residential												
ER0	0	0	0	0	5,136	1,437	0	0	0	0	0	6,573
ER1	419	468	1,241	768	4,021	1,625	6,147	4	0	11	1,387	16,092
ER2	6,728	3,880	6,267	4,854	583	994	10,001	11,539	4,470	7,322	2,246	58,884
ER3	664	288	94	366	570	484	488	1,400	719	830	227	6,131
EMUR3	0	0	0	0	0	0	0	4	0	0	0	4
ER4	0	29	4	0	0	0	0	99	10	27	97	267
ER5	0	1	1	0	0	0	0	26	4	0	0	32
ER6	0	0	0	0	0	0	0	5	4	0	0	9
Non-Residential												
EIL	163	4	37	36	72	41	49	2,933	2,440	1,067	23	6,865
EO	196	31	152	21	67	72	474	1,645	786	1,220	154	4,818
EC	767	319	130	385	166	205	605	2,565	1,128	1,341	434	8,044
EOH	0	7	0	0	0	0	307	225	32	11	66	647
ER	15	0	0	0	0	0	0	0	1,560	0	0	1,575
ES	288	195	295	146	248	68	315	698	274	315	87	2,928
EPI	685	511	510	292	626	364	1,938	1,449	633	906	247	8,160
EP	84	94	176	123	165	67	271	303	239	113	173	1,808
EHW	633	242	0	0	0	0	0	720	83	1,334	0	3,013
ERW	7	0	0	0	0	0	577	270	184	198	0	1,235
ERAW	0	65	148	0	0	0	0	1	0	0	0	214
EV	1,048	358	844	275	1,943	663	1,474	862	658	243	102	8,470
EOS	6,480	1,961	2,885	3,491	5,391	2,340	10,812	2,791	4,585	2,892	525	44,152
Total Acreage	18,178	8,453	12,784	10,758	18,987	8,359	33,459	27,539	17,807	17,830	5,767	179,921

Note: Total 2005 acreage does not include all open space lands in the hills, and at or under San Francisco Bay within USB as depicted in Figure 1.1, Study Area.

High-volume and non-potable water users were identified by the District based on consumption data and grouped separately to prevent the skewing of the calculation of mean LUDs. High water users were determined by reviewing annual metered consumption data for the top 25 water users, and finding a gap between the very highest water users and remaining customers. High water users were categorized as land use EHW, and non-potable water users as ERW for recycled water users and ERAW for raw water users.

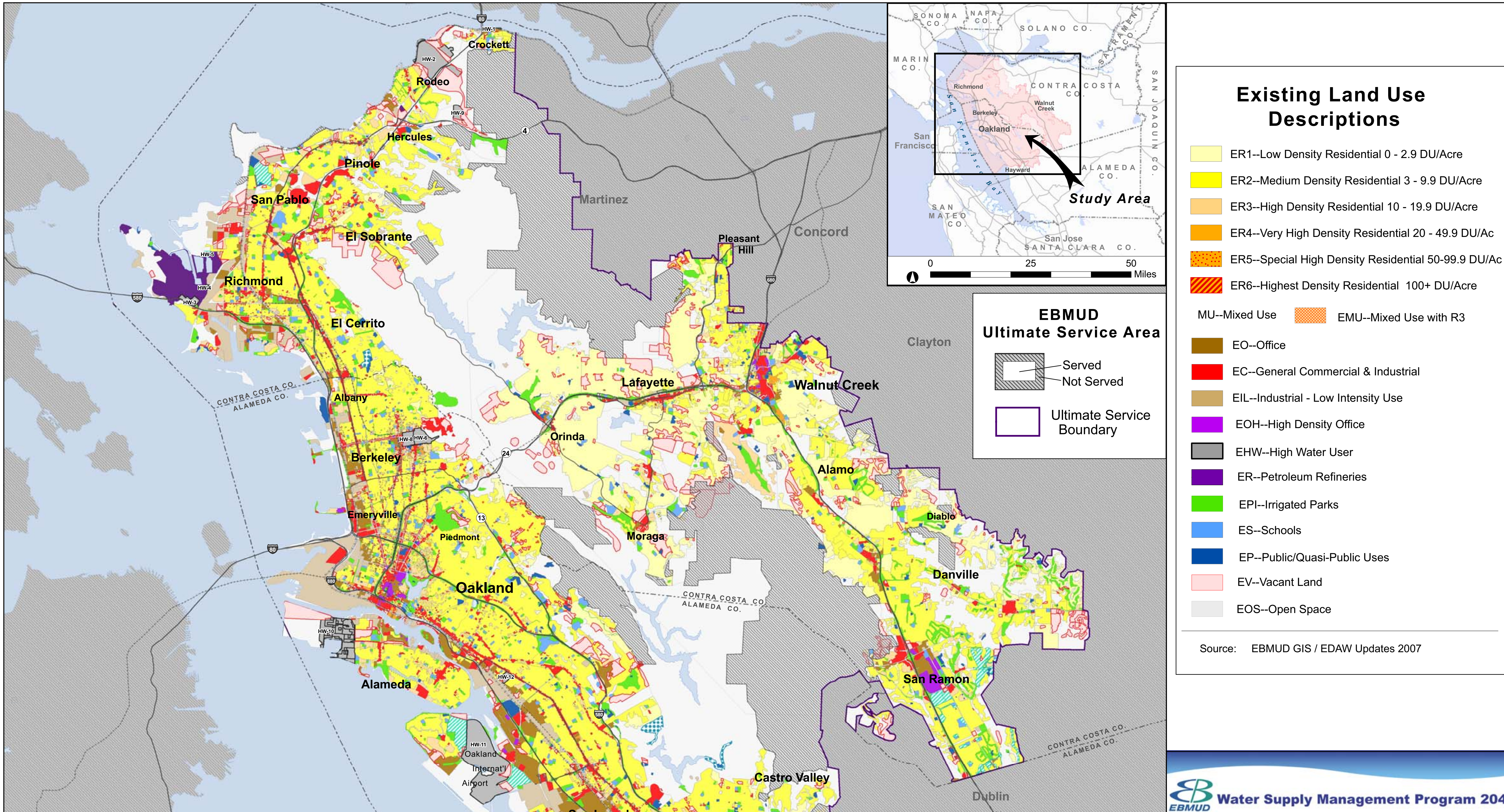

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Figure 3.2

Existing Land Uses: 2005

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The District's USB is approximately 180,000 acres, of which 8,500 acres are currently vacant but planned for development by 2040. As discussed previously, vacant lands were designated for an urban use, while open space lands were not (with the exception of wide transportation corridors). As presented in Table 3.2, the largest single land use is low to medium density residential (ER2: 3.0 to 9.9 du/ac) at 58,900 acres, followed by open space (EOS) at 44,150 acres, and low density residential (ER1: 0.1 to 2.9 du/ac) at 16,100 acres. Additional open space lands in the hills and under the San Francisco Bay are technically within the USB boundary but not included in the calculations there are negligible demands associated with the open space category.

Future Land Uses

During the mapping of existing land uses, areas that appeared to be vacant and developable (according to the general plans) and currently unirrigated, were labeled Existing Vacant (EV). Existing land uses that were anticipated to experience a change in use, or an increase in the density of the current land use (called densification), were identified from the following sources.

- Published planning documents, including community general plans that identify specific change areas (e.g., Growth and Change Areas identified in the Oakland General Plan).
- Observed changes that are currently in progress (e.g., expansion of retail commercial in downtown Walnut Creek).

New, higher density development along San Pablo Avenue is replacing underutilized lands.

- Discussions with planning agencies that identified new development, reuse, and densification areas.

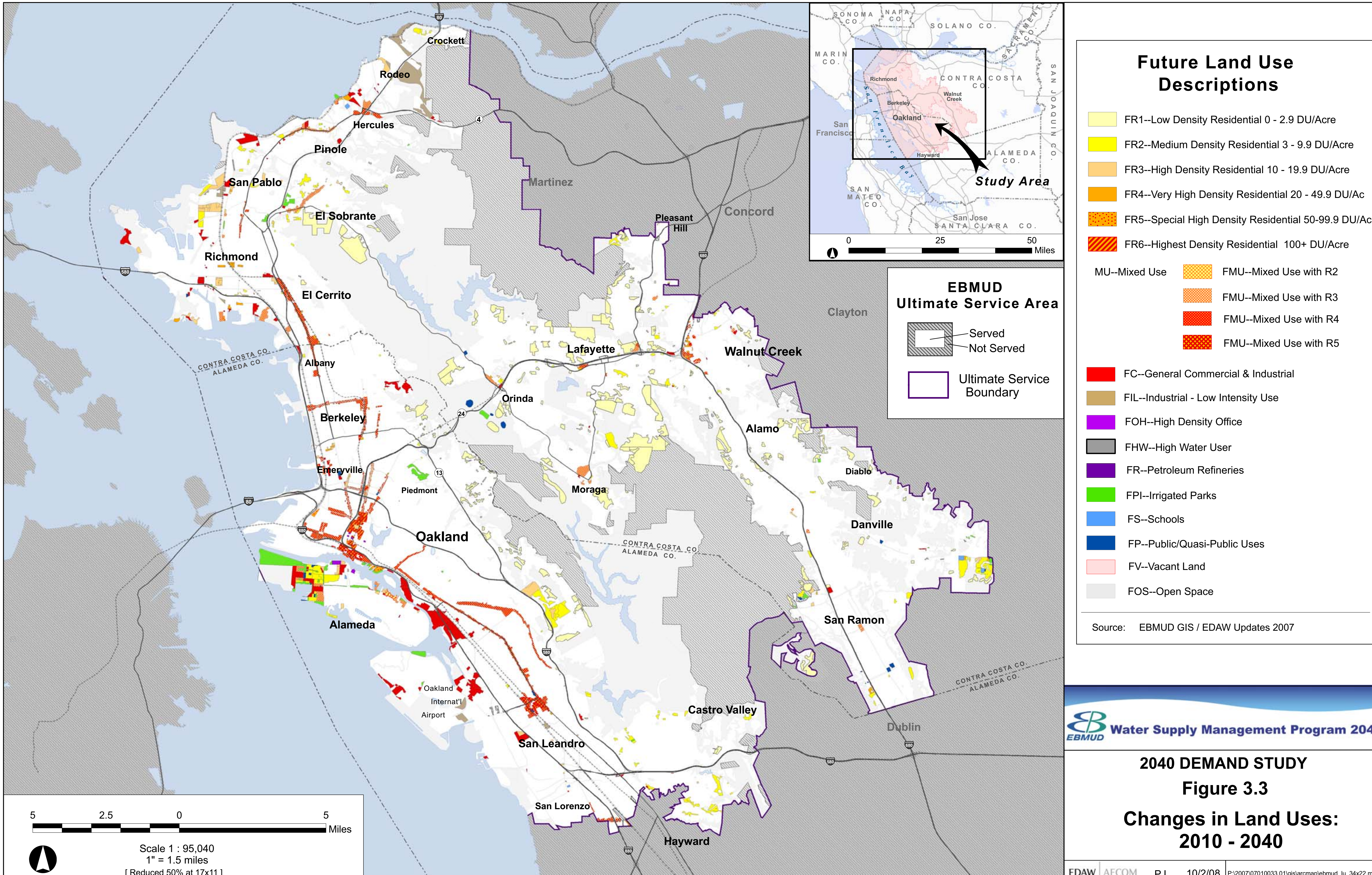
Once vacant or redeveloped land use polygons were identified, land use maps from the general plans (or specific plans) were used to identify land use categories designated for each developable polygon. Although land use designations state the potential use of the land, it is not necessarily the actual current use. Thus, land use maps were used to determine future changes to vacant and redeveloping land uses; not what currently exists.

After the land use polygons were updated for future development in accordance with general plans, draft existing and future land use maps were developed and presented to the planning agencies for review. Figure 3.3, Changes in Land Uses: 2010 - 2040, presents lands that are expected to change their land use designation after 2005. Figure 3.3 shows graphically that the majority of new uses EoH are anticipated to be low density residential while the majority WoH are anticipated to be within the general commercial category. Tabulation of 2040 land use acreage, for both existing and new development, is provided in Table 3.3, 2040 Land Use Acreage by Region. 2005 Residential and 2005 Non-Residential acreages in Table 3.3 represent lands that will not change land use designations after 2005. Existing land uses that will change designations are included in the acreage of New Development Residential and New Development Non-Residential.

Table 3.4, Comparative Land Use Changes, presents a comparison of existing land uses between 1996 and 2005; and changes planned from 2005 to 2040. Total study area acreage decreased between 1996 and 2005 because the GIS database boundary used in 2005 (within the District USB) did not extend as far into the hills and under the Bay as it did in 1996. The majority of land use changes between 1996 and 2005 occurred from the development of vacant lands to new developments. Some changes stemmed from the refinement of the 1996 land use polygons, such as the identification of small acreage polygons, e.g. churches and hospitals, resulting in increased acreage of EP with a decrease in EO. Other changes occurred through general plan re-designations of vacant lands to open space or other urban uses.

In comparing 2005 total acreage with 2040 acreage, two 2040 acreage columns must be added: total 2040 Acreage, representing existing land uses that are not anticipated to change land use designations, and total 2040 New Development which represents existing land uses that have changed designations or development of vacant lands. Total study area acreage for 2005 and 2040 is 179,921. As presented in the column titled Change 2005 to 2040, most of the existing land uses are expected to retain their 2005 land use designation, except for commercial/ industrial uses. The negative numbers in this column indicate a decrease in the total acreage of a particular land use due to conversions to other uses, many of these new uses are mixed uses, as discussed below. Combining the EO and EC categories, 24 percent of existing acres (12,862) will be redeveloped for other uses such as mixed uses. Mixed uses are mostly residential with commercial (retail, services, and/or office) on the lower floor(s).

As presented in Table 3.4, the greatest acreage of new development planned for is associated with FR1 (2,439 acres), FMUR4 (1,834 acres), and FC (1,827 acres). Of 13,466 acres of new development, 8,470 acres will be converted from vacant lands while the remaining 4,996 acres are planned for redeveloped existing uses with a change in land use designation. Of these new development acres, 2,881 acres are associated with mixed use developments, an increase



2040 DEMAND STUDY

Figure 3.3

Changes in Land Uses: 2010 - 2040

Table 3.3
2040 Land Use Acreage by Region

Land Use	AN	AS	B	C	D	E	F	GC	GN	GS	H	Total
2005 Residential												
ER0					5,136	1,434						**6,571**
ER1	398	468	1,241	738	4,021	1,624	6,145	4		11	1,380	**16,030**
ER2	6,697	3,879	6,267	4,854	583	994	9,994	11,348	4,410	7,258	2,228	**58,514**
ER3	645	286	94	366	570	483	485	1,331	677	795	216	**5,947**
EMUR3								4				**4**
ER4		29	4					76	10	27	97	**244**
ER5		1	1					26	4			**32**
ER6								5	4			**9**
New Development Residential												
FR0					1,362	447						**1,810**
FR1	118	255	528	27	439	79	945			2	46	**2,439**
FR2	197	41	282	275	49	104	333	303	95	11	42	**1,732**
FR3	78	3	138	2	4		43	103	363	33	1	**769**
FR4	24				3	6	24	11	94	10	28	**201**
FR5		2						55	7		6	**70**
FR6								192				**192**
FMUR2							7	35				**42**
FMUR3	239	8			121	18	19	195	114	0	20	**735**
FMUR4	69	48	0		2	24		994	356	269	72	**1,834**
FMUR5								103	4	154	9	**270**
2005 Non-Residential												
EIL	140	4	37	36	65	41	36	2,235	2,226	1,017	13	**5,851**
EO	169	22	33	21	66	58	474	1,286	714	1,026	128	**3,996**
EC	696	278	130	377	136	193	599	1,719	734	1,104	371	**6,338**
EOH		6					307	225	32	11	66	**646**
ER	15								1,509			**1,524**
ES	287	195	295	146	240	68	315	693	262	315	87	**2,903**
EPI	682	511	510	292	616	364	1934	1,439	619	906	247	**8,121**
EP	84	94	167	123	162	67	266	301	231	111	169	**1,774**
EHW	632	243						60	83	1,333		**2,351**
ERW	7						577	270	184	198		**1,235**
ERAW		65	148					1				**214**
EOS	6,480	1,961	2,885	3,491	5,389	2,340	10,812	2,791	4,585	2,892	525	**44,150**
New Development Non-Residential												
FIL	339						3	7	58	97		**504**
FC	107	55	1	4	11	15	22	1,000	370	226	16	**1,827**
FOH								46				**46**
FS	12						31	7		4		**54**
FPI	59		22	4			45	624	7	3		**764**
FP	1				12		42	48	4	13		**120**
FOS								3	51	3		**57**
Total Acreage	18,178	8,453	12,784	10,758	18,987	8,359	33,459	27,539	17,807	17,830	5,767	179,921

Table 3.4
Comparative Land Use Changes

Land Use Category	2005 Land Uses					2040 New Development[2]	
	1996 Acreage	2005 Acreage	Change 1996 to 2005	2040 Acreage [1]	Change 2005 to 2040		
Residential							
ER0	6,719	6,573	-2%	6,571	0%	FR0	1,810
ER1	13,733	16,092	17%	16,030	0%	FR1	2,439
ER2	60,236	58,884	-2%	58,514	-1%	FR2	1,732
						FMUR2	42
ER3	5,808	6,131	6%	5,947	-3%	FR3	769
EMUR3		4		4	0%	FMUR3	735
ER4	247	267	8%	244	-9%	FR4	201
						FMUR4	1,834
ER5		32		32	0%	FR5	70
						FMUR5	270
ER6		9		9	0%	FR6	192
Non-Residential							
EC	7,343	8,044	10%	6,338	-21%	FC	1,827
EO	6,371	4,818	-24%	3,996	-17%		
EOH	682	647	-5%	646	0%	FOH	46
EHW	3,177	3,013	-5%	2,353	-22%		
EIL	7,467	6,865	-8%	5,851	-15%	FIL	504
EP	988	1,808	83%	1,774	-2%	FP	120
EPI	10,237	8,160	-20%	8,121	0%	FPI	764
ER	2,106	1,575	-25%	1,524	-3%		
ES	2,954	2,928	-1%	2,903	-1%	FS	54
ERAW		214		214	0%		
ERW/EHW		1,235		1,235	0%		
EOS	40,811	44,152	8%	44,150	0%	FOS	57
EV	13,370	8,470	-37%		-100%		
Total	**182,248**	**179,921**		**166,455**			**13,466**

(1) "2040 Acreage" reflects 2005 land uses that did not change land use designations. Land uses anticipated to change designations (from another land use category including Vacant) are presented in "2040 New Development".
(2) If summed, totals from columns "2040 Acreage" and "2040 New Development" equal totals from "2005 Acreage".

since the previous 2000 Demand Study of 1,581 acres planned for a general mixed use category.

Not captured in the above tables are densification trends. Small, vacant infill parcels and the redevelopment of underutilized lands that do not change its designated land use (densification) are not captured in the above tables as new future land uses. This is due to the size of an infill parcel or due to the land use category remaining the same. However, densification activities increase water consumption on a per acre basis. The water use unit factors (LUDs) were adjusted to reflect community goals which affect water consumption patterns over time. Trends described in the later sections were used to identify how water consumption patterns for existing uses may change in the future. The results of the correlation between land use trends and water use factor adjustments are presented in Chapter 5 on future land use unit demands.

Meetings with Land Use Planning Agencies

An important part of the District's approach to projecting water demands is the reliance on locally-defined visions of how the respective communities are to grow and change during the 2040 planning horizon. Land uses planned by each community provide the basis for future water demands. The District considers the adopted community general plans, and any subsequent amendments thereto, to be the most reliable indicators of future development policy because they have been subject to extensive public review under the Planning, Zoning, and Development statute (California Government code 65300 et sup), and rigorous environmental documentation under CEQA (California Public Resources Code 21000 et sup) prior to adoption.

District staff and members of the consultant team met with planning agency staff from the study area (USB) communities. The primary purpose of each meeting was to obtain input on land use planning trends observed within their community; review, confirm, and update general plan land use designations; delineate areas undergoing reuse (reusing existing buildings for different purposes) and redevelopment (replacing structures); and indicate the year that developable lands are likely to be developed.

There are 17 cities entirely within the study area, three cities partially served by the District, and eight significant unincorporated areas located within two counties within the study area. Several cities within the study area have general plans with boundaries that extend beyond the District's USB. Demand projections were based on lands within the District's USB or SOI, whichever was greater.

Later in this chapter (under Summary of Land Use Activities and Trends) is a summary of land use activities occurring in the District service area. Information is provided for the 17 cities, the larger of the three partially-served cities (Walnut Creek), and both counties. The County of Alameda was not available to meet with project staff. Meetings were not held with the cities of Pleasant Hill and Hayward because their lands within the District service area are relatively small, 950 acres and 760 acres, respectively. The planning agencies are listed in Table 3.5 and mapped on Figure 1.1. Additional information including contact information, meeting notes, and summary information is available in Appendix B: TM No. 2, Meetings with Planning Agencies.

Table 3.5
Planning Agencies

Alameda County

- Alameda County
- ✓ City of Alameda
- ✓ City of Albany
- ✓ City of Berkeley
- ✓ City of Emeryville
- City of Hayward
- ✓ City of Oakland
- ✓ City of Piedmont
- ✓ City of San Leandro

Contra Costa County

- ✓ Contra Costa County
- ✓ City of El Cerrito
- ✓ City of Hercules
- ✓ City of Pinole
- ✓ City of Richmond
- ✓ City of San Pablo
- ✓ Town of Danville
- ✓ City of Lafayette
- ✓ Town of Moraga
- ✓ City of Orinda
- City of Pleasant Hill
- ✓ City of San Ramon
- ✓ City of Walnut Creek

✓ **Agency Meeting Held**

Prior to meeting with the planning agencies, District staff and consultants reviewed each agency's general plan documents and noted policies relating to the community's vision of growth, range of densities identified for growth areas and redevelopment, locations targeted for economic or residential development, and long term trends that could affect water demands. This information was incorporated into the creation of land use maps that depicted existing and future land uses for each community. In addition, aerial photographs of each community were prepared and brought to the meetings.

During the meetings, community planners were asked to contribute the following information:

- Confirm or correct mapped existing land uses.
- Confirm, correct, and expand, if necessary, the mapped future, planned land use polygons and categories.
- Identify additional future land use polygons.
- Determine the anticipated timing of development of future land uses, within a schedule of five-year increments from 2010 to 2030 and 2040.
- Discuss the long term character of the community, out to year 2060, as may be reflected in long term land use pattern trends or community vision.

General plans usually have a hypothetical buildout date, used for analyses of environmental impacts associated with full buildout of all lands identified in the general plan. These general plan buildout dates do not necessarily reflect an actual point in time where all lands will be developed or redeveloped, as most communities develop slowly over time and development typically extends beyond these dates. This is particularly true with the continual redevelopment and reuse of existing developed lands. For this analysis, it was important to have the land use agencies identify the anticipated timing of development of each significant area, as they are the most knowledgeable of development activity in their community. However, the meetings were held during a development boom followed later by a recession. Although the total demands still reflect development per the general plans, the timing of development and therefore demands may be slower than that projected in this study.

Since the baseline year was 2005, development constructed since 2005 was identified in the next timeframe: 2010. If the planning agencies identified a polygon that would likely develop incrementally, the polygon was subdivided and each new polygon labeled with the anticipated year of development. In instances where planning agencies would not assign a future development date to a change area, such future development was assumed to occur closer to 2040. Information obtained from the planning agencies was incorporated into the GIS land use database.

Summary of Land Use Activities and Trends

The changes to land use acreages previously identified in Table 3.4, both historical and planned, reflect trends towards higher densities throughout the study area. Underutilized lands are being replaced with higher density uses. For example, portions of parking lots are being converted to other uses such as senior housing; and warehousing, storage, distribution centers, and other underutilized lands are being redeveloped with higher intensity uses. Trends in land use changes which impact existing water demands and demand projections were identified from:

- observed development activity since the 2000 Demand Study;
- comparison of what was planned in 1996 for 2005 versus what was actually built;
- review of general plan documents;
- information obtained in the planning agency meetings; and
- economic, demographic, and real estate data obtained by CBRE Consulting, Inc.

Appendix B, TM No. 2, Meetings with Planning Agencies, provides a summary of general and specific development activities planned for and confirmed by planning agency officials from each community. Other data sources used to identify and document land use trends include: ABAG's document *Projections 2007*, California Department of Finance, Claritas Data, Inc., Economic Sciences Corporation, Real Facts, Inc., California Department of Education, and CBRE Consulting Inc. commercial property data. Appendix C, TM No. 3, Economic and Demographic Data Analysis in Support of Water Demand Forecast Adjustments, contains documentation including data tables and maps of each region. There are limited data sources which forecast to 2040. The ABAG forecasts to 2035 were extended to 2040 by applying the 2000 to 2035 compound annual average growth rate to the 2035 figures.

District-wide Trends

The most prominent trend observed was that smart growth (e.g., compact development along and near transportation corridors) and overall increased densities are occurring and are planned for throughout the study area. Densities of residential lands and the intensity of use on non-residential lands are increasing, with each community planning for higher densities than what currently exists. ABAG indicated that 50 jurisdictions throughout the San Francisco Bay Area applied for grants to be used to help map higher density growth in neighborhoods near bus and rail lines (Ken Kirkey, ABAG, April 2008). Land use planning agency staff indicated in the project meetings that lower density cities are struggling with adding their "fair share" allocation of low income housing; many are adding or planning to add high density residential senior housing in retail parking lots or are allowing commercial uses to convert to mixed uses.

With gas prices fluctuating greatly, time lost commuting, and lack of jobs in the outer suburbs, workers living outside of the study area in the lower priced housing markets of Solano County, eastern Contra Costa County, and San Joaquin County, are moving or considering moving in the future into the more urbanized areas of the study area. A recent New York Times article ("Fuel Prices Shift Math for Life in Far Suburbs", N.Y. Times, June 25, 2008) described the impact of fuel prices on the "exurbs":

> "It's like an ebbing of this suburban tide," said Joe Cortright, an economist at the consulting group Impresa Inc. in Portland, Ore. "There's going to be this kind of

Terms Used in this Report

Infill: small vacant developable and or underutilized lands within existing development polygons

Densification: underutilized land converted to a more intense use without changing its land use designation

Intensification: an increase in the intensity of land uses, typically associated with infill development and redevelopment that does not necessarily result in a change in land use designation

Mixed Use: land use that allows for residential uses typically located above commercial uses in the same building

Redevelopment: used here to describe the replacement of a building or other use of land, with a different use. Not a legal term as in a Redevelopment Agency.

Smart Growth: compact development along and near transportation corridors

> reversal of desirability. Typically, Americans have felt the periphery was most desirable, and now there's going to be a reversion to the center."

With economic growth predicted in this highly diverse study area, and the trend towards workers living closer to their jobs, housing will continue to be in demand during the planning period. An example of this trend is recently passed legislation in California (SB 375, signed into law September 30, 2008), providing government incentives for transportation projects built in denser communities to obtain priority in the distribution of $12 billion to nearly $20 billion a year in transportation funds (L.A. Times, October 1, 2008). The legislation was intended to reduce sprawl. In an American Planning Association publication *California Planner* (September/October 2008), a recent article describing market forces driving the smart growth trend, provided the following quote from Kim Diamond with Pulte homes:

> "Over the past seven years, in cities such as Emeryville and Oakland, Pulte has been building higher-density communities that have better access to public transportation. But recently we're seeing even more new market potential in sites adjacent to transit. For both financial and lifestyle reasons, consumers are demanding homes that are closer to public transportation, job centers, schools, entertainment, and recreation. Even when the rest of the market is suffering, smart growth works."

However, because of the demand for housing and high housing prices, greater numbers of people per household are anticipated than historical patterns. This trend was not documented in demographic projections, but was noted by planning agency staff and appeared in the analysis of historical consumption patterns discussed in Chapter 5.

Other observed trends are as follows:

- Warehousing, storage yards, and other underutilized lands are being replaced by more intense commercial and industrial uses or with high density mixed uses. Industrial uses are decreasing in acreage throughout the service area, particularly in heavy industrial cities like Oakland and Richmond.
- Water supply assessments for District water service indicate higher residential densities being constructed than historical densities.
- Industrial and commercial uses are no longer segregated but are developing together with a variety of uses within new business parks and in older, redeveloping areas.
- Old industrial areas continue to attract mixed uses (lofts and other high density residential with retail on the ground floor) and other types of uses that differ from the original uses, such as retail or small offices in buildings or in neighborhoods where once manufacturing occurred. Buildings are either used differently or are replaced with new structures.

- Difficult site conditions are less of a deterrent to development in communities with high land values; lands subject to the same difficult site conditions are not being developed as quickly in lower value areas.
- Densification of transportation corridors East of Hills is occurring more slowly than West of Hills.
- Downtown districts are exhibiting higher intensity of uses, and accelerated development of vacant infill parcels.
- Trailer parks are slowly being converted to high density housing.
- Underutilized industrial districts are continuing to convert to higher intensity uses (manufacturing mixed with commercial uses) due to demand and land value. Other areas are changing from industrial to high density residential uses.
- Senior housing is being built throughout the service area.
- Conversions of gray fields (strip commercial shopping centers) to higher density mixed uses are occurring.

Key land use trends, observations, and demographic data that influence water demands are described below specifically for each region. Acreages presented are rounded. A map of the Demand Model Regions is provided in Chapter 1 as Figure 1.2. Chapter 5, Future Adjustment Factors, presents data used to quantify these trends.

Constructing new development in parking lots results in higher water demands per acre.

Region AN

Region AN is located in the northwestern service area which encompasses the communities of Crockett, Rodeo, Hercules, El Sobrante, and the City of Pinole. The Hilltop area of Richmond is in region AN along with a sliver of San Pablo and El Cerrito. The area is characterized as more suburban low density uses than other regions West of Hills, with new development at greater densities than historically experienced.

- All new construction, particularly in the Hercules, Pinole, and Richmond Hilltop areas, is at higher densities than that constructed in the past.

- Large lot development areas are still available; small vacant infill lots will likely develop more slowly as the region builds out.
- High density residential uses grew at a faster rate since 1996 than low density residential and is anticipated to continue to densify with over 200 acres designated for FMUR3 (10 to 20 du/ac).
- High water users in AN included a refinery and food processing plant; however, the majority of jobs in this region are in the Health, Education, and Recreation category. The largest percentage increase in jobs by 2040 is anticipated in Financial/Professional Services.
- Availability of new and underutilized office, industrial, and retail lands will keep job densities low before densification occurs at significant levels.
- Significant acreage (340 acres) is designated for FIL (low intensity industrial).
- ABAG projects a population increase of 26 percent and employment increase of 81 percent between 2005 and 2040.

Region AS

Region AS is located in the Berkeley hills and includes parts of the cities of Berkeley, Richmond, El Cerrito, San Pablo, and Oakland, and parts of the communities of Kensington and El Sobrante. The area reflects a very consistent population base with older homes in the hills of El Cerrito and Berkeley with the majority of lands ER2 (3 to 10 du/ac). Region AS also contains UC Berkeley and downtown Berkeley east of Shattuck Avenue, an area with a high density of student housing and dense commercial uses.

- Extensive development plans are in place for downtown Berkeley for high rise office and housing uses, along with a regional cultural center. This type of density will greatly increase water demands on a per acre basis. For example, as explained in Chapter 4, a 90 unit mixed use building (with no commercial uses yet) established in the available space, was built in 2004 and had a very high LUD of 30,350 gpd/ac in 2005. The average ER6 LUDs for GC and GN regions were 10,500 and 17,100 gpd/ac, respectively.
- An additional 250 acres are designated for future low density residential (FR1: 0 to 3 du/ac) within AS by 2040; some of these acres are in the 1991 Oakland/Berkeley hills fire zone which is still building out.
- In Berkeley, Shattuck Avenue is the western boundary of AS, including the University of California Berkeley campus and part of densifying downtown Berkeley. The greatest number of jobs currently and projected are in Health, Education, and Recreation followed by “Other” which includes information and public administration.

- Although there are only 55 acres designated for new non-residential uses (FC which includes offices), it is anticipated that a significant increase in redevelopment of low intensity office use to high rise densities in downtown Berkeley will occur. Within the existing land use designations, the City has aggressive plans for densification of the downtown area with higher office densities and a regional entertainment facility.
- Berkeley's retail sales and retail business permits increased significantly, 7.4 and 13.9 percent, between 1996 and 2005, with a 79 percent increase in existing commercial acreage reflected in the land use database.
- ABAG projects a population increase of 19 percent and employment increase of 28 percent between 2005 and 2040.

Region B

Region B is located in the Oakland hills and includes parts of the cities of Oakland and Piedmont. The area is predominately ER2 (over 6,200 acres) followed by ER1 (1,200 acres) in the Oakland hills, including the eastern two-thirds of the City of Piedmont. Region B includes the majority of the Oakland hills fire burn area (1991), with higher density lands between Interstate (I)-580 and Highway 13 south of Lincoln Avenue and west of I-580 south of Mills College.

- Limited new retail and office uses anticipated in the near future along Highway 13 and I-580 corridors, but likely higher utilization of existing commercial lands.
- As the East Bay increases in population, several colleges in the region may increase enrollment and staffing.
- Infill potential for low density residential uses is high, with homes still developing in the fire zone from the Oakland Hills fire of 1991 and on steep slopes throughout the Oakland hills. Over 500 acres are designated for FR1 and almost 300 acres designated for FR2; new development projects are concentrated in reuse areas such as Oak Knolls and Leona Quarry, with infill potential still left in the Oakland hills fire zone, and throughout the region.
- The majority of current and projected jobs in region B are in Health, Education, and Recreation, associated with the various colleges (e.g., Mills, Holy Names, Merritt). In addition, jobs in this primarily residential region are associated with Montclair and Park Boulevard retail districts, neighborhood retail and offices concentrated between Highway 13 and I-580 from Park Boulevard south, and retail and offices scattered throughout the neighborhoods.
- Churches were more rigorously identified in 2005 data, thus explaining an increase in EP acreage over 1996 conditions.

- Low intensity industrial (EIL) acreage declined from 320 to 40 acres between 1996 and 2005 reflecting a denser utilization of high value lands.
- ABAG projects a population increase of 35 percent and employment increase of 47 percent between 2005 and 2040.

Region C

Region C is located in the unincorporated communities of Castro Valley and Fairview and includes a small part of the cities of Hayward and San Leandro. The area is predominately ER2 (over 4,800 acres) with commercial zones in downtown Castro Valley.

- Infill potential and redevelopment of underutilized land uses is high, particularly in the unincorporated Fairview area. Infill projects are currently being built and relatively dense single family homes are being built on steep hillsides in Castro Valley.
- Low density residential acreages increased from 570 to 770 acres between 1996 and 2005.
- Commercial revitalization in this region may not occur for a while but the potential is likely, particularly in the downtown Castro Valley and Bay Area Rapid Transit (BART) station vicinity.
- Approximately 280 acres of new FR2 development is planned by 2020.
- ABAG projects a population increase of 22 percent and employment increase of 43 percent between 2005 and 2040.

Region D

Region D encompasses the cities of Orinda, Moraga, and western Lafayette, including the upper elevations of Walnut Creek's Rossmoor. The area is predominately ER0 (5,000 acres) followed by ER1 (4,000 acres), reflecting the steep sloped rural character of outlying lands. All three cities have vibrant downtown areas with mixed commercial uses.

- Low density residential infill potential is high due to the large, irregularly shaped parcels with densities below that allowed by the general plans and due to the extent of undeveloped lands.
- Vineyards are being added to existing homes and newly constructed homes in ER1 areas, with or without steep slopes.
- Moraga has a large mixed use project planned for lands currently used as a shopping center. This project includes high density residential uses.
- Orinda is planning for some higher density residential and commercial uses in and around Orinda Village.

- There was a 44 percent increase in ER2 lands between 1996 and 2005.
- ABAG projects a population increase of 12 percent and employment increase of 16 percent between 2005 and 2040.
- Jobs in Health, Education, and Recreation are anticipated to increase by 54 percent.

Region E

Region E is located in eastern Lafayette and includes parts of the city of Walnut Creek, including the lower elevation lands of Rossmoor. The area is predominately ER1 (over 1,600 acres) followed by ER0 (1,400 acres). Region E includes most of downtown Lafayette which continues to density over time, and the eastern Mt Diablo Boulevard corridor of commercial uses which are anticipated to redevelop with more intense uses in the future.

- Downtown Lafayette will likely have significant revitalization of the eastern commercial corridor with some additional non-residential projects on Deer Hill Road.
- A decrease in EO demands is anticipated by 2015 as some office uses convert to mixed uses with residential demands.
- Infill of high value residential parcels is occurring with new homes on vacant parcels and second units on developed parcels. There is a high potential for additional densification of these large lot uses.
- Residential development is allowed on slopes less than 35 percent and vineyards are being added throughout the region.
- ABAG projects a population increase of 15 percent and employment increase of 14 percent between 2005 and 2040.
- Financial and Professional Services jobs are anticipated to increase by 23 percent by 2040.

Region F

Region F encompasses the cities of Danville and San Ramon and includes the communities of Alamo, Diablo, and Blackhawk. The area is predominately ER2 (over 10,000 acres) followed by ER1 (6,100 acres) and is characterized as suburban, low density uses with new development at greater densities than historically experienced in the region.

- New construction is at much greater densities than historical development with plans for additional high density developments.
- Most of the 950 acres of new FR1, anticipated at the upper end of the allowable density range, is planned to be developed by 2030.

- Alamo has high potential for infill of large irregularly shaped and steep sloped residential parcels.
- Demands associated with non-residential uses are anticipated to increase due to the availability of underutilized non-residential land uses. This is based on ABAG employment projections and city planning agencies' input on planned intensification of office and commercial uses throughout the region.
- Danville has commercial uses planned for redevelopment to mixed uses with high density residential.
- San Ramon's Bishop Ranch has a significant city center project replacing several two-story office buildings which the city considers dated at such low densities.
- EC acreages and LUDs increased by 72 percent and 30 percent respectively between 1996 and 2005.
- ABAG projects a population increase of 32 percent and an employment increase of 54 percent between 2005 and 2040.
- Financial and Professional Services jobs are anticipated to increase by 69 percent by 2040.

Region GC

Region GC is the largest region in the study area. It is comprised of the City of Alameda, the majority of the City of Oakland, southern Emeryville, central portions of Berkeley (including downtown west of Shattuck), El Cerrito, San Pablo, and portions of Richmond and Piedmont. The area is predominately ER2 (over 11,500 acres) followed by EIL (2,900 acres) and EC (2,600 acres). It provides a significant amount of employment as a regional job center with excellent transportation options. This very urban area is densifying with resistance from residents in some locations, resulting in communities redirecting densification to other areas.

- Downtown Oakland and Berkeley have extensive development plans with very high densities of residential and office uses. Transit oriented development at BART stations and along transportation corridors is resulting in increased residential and commercial uses which is expected to continue according to planning agency staff and general plans.
- The Oakland Airport expansion will result in greater passenger and cargo capacity, thus increasing demands associated with additional passengers, employees, and airport-related industries in the vicinity.
- The Oakland Army Base is currently allowing limited, low intensity private uses of existing buildings, while still in the planning phases for long term redevelopment. This area has extensive lands to be redeveloped during the planning period.

- The small area of Emeryville in region GC near big box retail stores is redeveloping rapidly with four-story multi-family residential housing.
- The Alameda Naval Air Station began construction of private uses reflecting its base conversion plan. Most of the reuse development is anticipated to be constructed by 2030.
- Alameda is adding significant new development with new uses associated with numerous large scale redevelopment projects along the Oakland Estuary and San Francisco Bay, with redevelopment of underutilized industrial and commercial areas planned for more intense uses. This is planned to be accomplished by replacing old uses and structures with new, denser buildings and uses.
- Almost 50 acres have changed land use between 1996 and 2005 to high densities of ER4, ER5, and ER6. Approximately 1,300 acres are anticipated to be developed with mixed uses (primarily FMUR4) between 2015 and 2040. Some of this land will be redeveloped from existing lower density residential uses as well as commercial office, retail, and services.
- 1,000 acres of new commercial land uses are planned for, with the majority of development anticipated to occur between 2015 and 2030.
- ABAG data indicate a population increase by 2040 of over 150,000 people in region GC, increasing to 582,660 in 2040 (34 percent).
- ABAG projects an employment increase of 53 percent between 2005 and 2040. Health, Education, and Recreation jobs are anticipated to increase by 70 percent, followed by Financial/Professional Services and Retail increases of 57 percent.

Region GN

Region GN is located in the cities of Richmond, San Pablo, Albany, western Berkeley and northern Emeryville. The area is predominately ER2 (4,500 acres) followed by EIL (2,400 acres) in a very urban setting.

- The San Pablo Avenue corridor from Oakland to San Pablo has been slowly redeveloping with higher density mixed use projects, particularly in Emeryville, Berkeley, El Cerrito and San Pablo.
- Richmond is experiencing rapid changes as industrial lands redevelop with residential uses at higher densities than historical development in the city.
- Expansion plans for the Chevron refinery in Richmond may increase demands in this region.
- Berkeley is experiencing a revitalization of the old industrial areas with new uses including offices, live-work units, small manufacturing, and extensive retail/service uses.

- Both San Pablo and Richmond cities noted the demographic trend of multigenerational families living in one house which has not necessarily been captured in census data.
- EIL acreage is anticipated to decrease by 2040 with more intense uses planned for by the cities.
- Approximately 350 acres each of FC, FR3, and FMUR4 are anticipated by 2040.
- ABAG projects a population increase of 26 percent and an employment increase of 47 percent between 2005 and 2040.
- Retail and Financial/Professional Services jobs are anticipated to increase by 2040 by 60 and 57 percent, respectively.

Region GS

Region GS is located in the City of San Leandro , the unincorporated areas of San Lorenzo and Ashland, and includes the southern portion of the city of Oakland. The area is predominately ER2 (over 7,300 acres) followed by EC (1,300 acres). Part of the Oakland Airport vicinity is in this region; the remaining Port of Oakland lands are in region GC.

- New development in San Leandro is primarily higher density housing in small pockets of redeveloped, underutilized lands.
- The San Leandro Hospital is planning an expansion which will increase related uses in the vicinity.
- Port of Oakland airport vicinity expansion plans will increase demands in this region, as well as in region GC.
- Redevelopment of lands at and around BART stations is anticipated.
- Over 400 acres are planned for FMUR4 and FMUR5 uses, to be constructed primarily between 2020 and 2030.
- ABAG projects a population increase of 24 percent and employment increase of 61 percent between 2005 and 2040.
- Health, Education, and Recreation; Retail; and Financial/Professional Services jobs are anticipated to increase by 2040 by 90, 73, and 62 percent, respectively.

Region H

Region H is located in Walnut Creek and includes the southwest corner of Pleasant Hill and the unincorporated community of Seranap. The area is predominately ER2 (over 2,200 acres) followed by ER1 (1,400 acres). The northwest and southern areas of the region have low density residential with high density residential and extensive commercial lands in the downtown area extending north along North Main Street.

- Walnut Creek has and will continue to densify in the study area. Downtown retail and services have changed greatly since 1996. EC LUDs have increased 29 percent since 1996 and ER1 and ER2 LUDs have both increased 16 percent. The increased LUDs are likely associated with infill development and other more intense uses of land.
- The City of Walnut Creek plans to move lower intensity uses out of the downtown area to allow for higher intensity and density uses. This is reflected in changes to EIL acreage. Automobile dealers and auto related businesses are being encouraged by the city to move to different locations to allow for the expansion of retail uses.
- The large lot residential areas outside of downtown Walnut Creek and near Pleasant Hill have infill potential, with an observed densification of large lots occurring through subdivisions, accessory units, and development on steep slopes.
- Over 100 acres of new mixed uses ranging from FMUR3 to FMUR5 are planned with a slight decrease in EO and EC acreages to accommodate these new uses. These high density housing projects have recently been constructed and several are currently under construction near downtown.
- ABAG projects a population increase of 19 percent and an employment increase of 28 percent between 2005 and 2040.
- Financial/Professional Services jobs are anticipated to increase by 37 percent by 2040 followed by Health, Education, and Recreation jobs to increase by 30 percent.

Chapter 4: Base Year Water Demands

2005 or "existing" demands are referred to as "base year" demands. Base year water demands are described in this chapter as they pertain to the development and adjustment of demands for each land use category on a per acre basis. Water demands were adjusted for average annual conditions and unmetered water. Estimates were also made of savings associated with conservation and non-potable water programs.

Base Year Demands and Introduction to Adjustments

The objective of the 2040 Demand Study is to project system input, the quantity of water that enters the distribution system. System input includes treated water delivered from the treatment plant, groundwater inflow to the Claremont Tunnel, and adjustments for changes in distribution storage. By mass balance, system input is equivalent to system output, the water exiting the distribution system. System output is composed predominately of metered consumption and a relatively small fraction of unmetered water. Metered consumption data are associated with land use polygons used to calculate the base year demand (and the projections). 2005 consumption data were selected as the base year for the demand study because at the time, it was the most recent year with a complete data set reflecting typical consumption. Although 2006 data were available, it was not selected because the Claremont Tunnel outage forced irregular operation of the distribution system.

District-wide metered consumption from 1975 to 2006 is presented on Figure 4.1, Historical Metered Consumption. The changes to consumption over time are attributed to variances in weather, economy, demographics, and other factors. The largest changes in consumption coincided with the droughts of the late 1970's and 1980's. By 2005, consumption levels appeared to have recovered

Terms Used in This Report

Consumption: Metered consumption of potable water.

Normalization: To remove the effects of weather and other factors on annual demands.

System Input: Quantity of water that enters the distribution system from treatment plant production and groundwater inflow to Claremont Tunnel, with adjustments made for distribution storage.

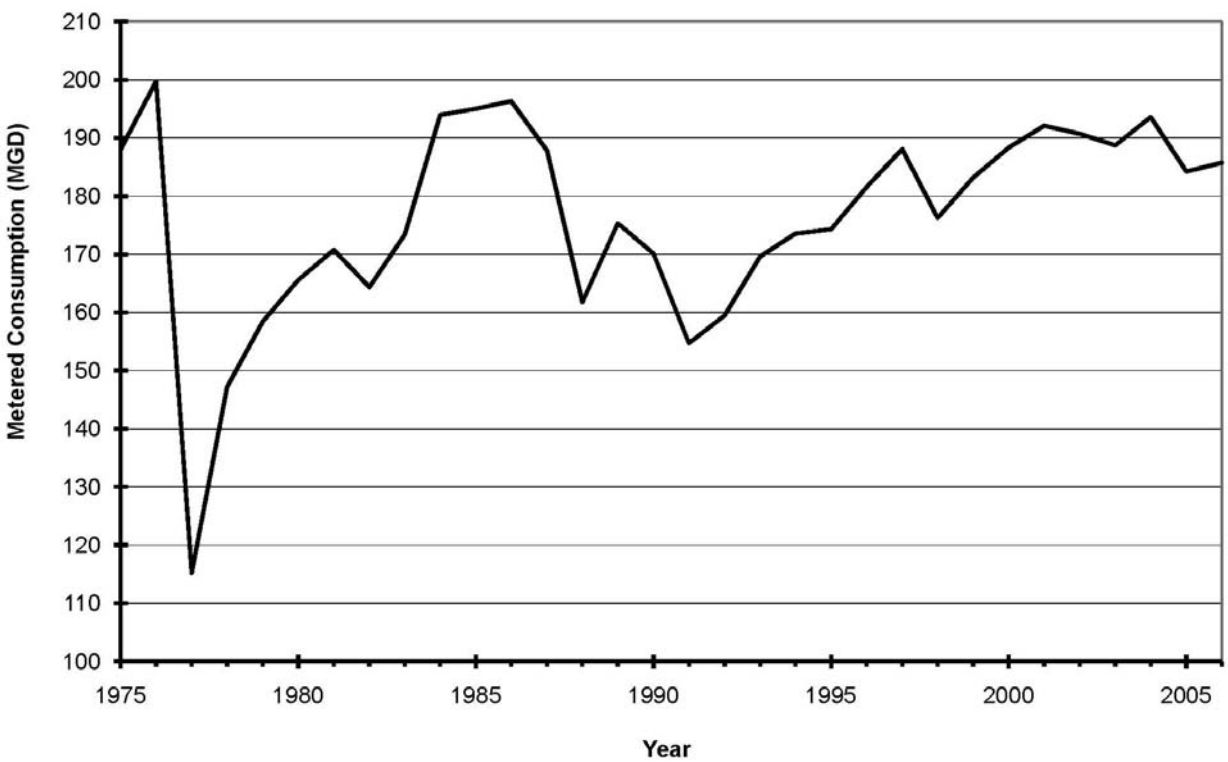
System Input (unadjusted): System input including normalization and unmetered water, but without offsets from non-potable water and conservation savings.

System Input (adjusted): Distribution system demand adjusted for normalization, unmetered water, non-potable usage, and conservation savings.

Unmetered Water: Water that leaves the distribution system without being metered resulting from both authorized and unauthorized sources and activities including District unmetered facility use, system water quality control maintenance activities, fire flow, metering inaccuracies, water theft, leaks (both acceptable and not), pipeline and valve breaks, and potentially other unidentified losses. District uses that are metered are included in consumption.

from past droughts such that the determination of drought rebound effects were not required for this demand study. Although not as dramatic as drought effects, smaller temporal variations in consumption can bias the demand projections by shifting the starting point. These smaller variations in consumption from both weather and non-weather factors were accounted for by applying normalization factors to the consumption data. The District-wide metered consumption for base year was 184 million gallons per day (mgd), but normalization factors were used to account for temporal variations resulting from both weather and non-weather (e.g., economic, demographic, etc.) effects. The District-wide average for normalization was approximately four percent which adjusted base year consumption to 192 mgd for average conditions. The normalization adjustment is described further in the next section, “Normalization of Consumption Data”.

Figure 4.1 Historical Metered Consumption



Note: Metered consumption represents a portion of total District use.

In addition to metered consumption, unmetered water (UMW), the water that is consumed but not recorded by a meter, contributes to the base year demand. UMW, results from both authorized and unauthorized sources, and was indirectly calculated by applying mass balance method to the distribution system. The District-wide average for UMW was 12 percent and with the normalization adjustment, the base year demand is 214 mgd. The determination of UMW is described further in the Unmetered Water section of this chapter.

Normalization of Consumption Data

Normalization is an adjustment for the temporal variations in metered consumption from both weather and non-weather effects. Normalization factors were developed using statistical methods to analyze historical water consumption for dependence on weather related variables. Non-weather effects were captured by averaging the weather normalization results. A detailed account of the development of normalization factors is provided in Appendix D which contains TM No. 4, 2005 Baseline Demand Analysis. A summary is provided here.

Normalization factors were developed for four groups of land uses in each of the 11 regions (defined in Chapter 1 and Figure 1.2). The four group of land use categories are:

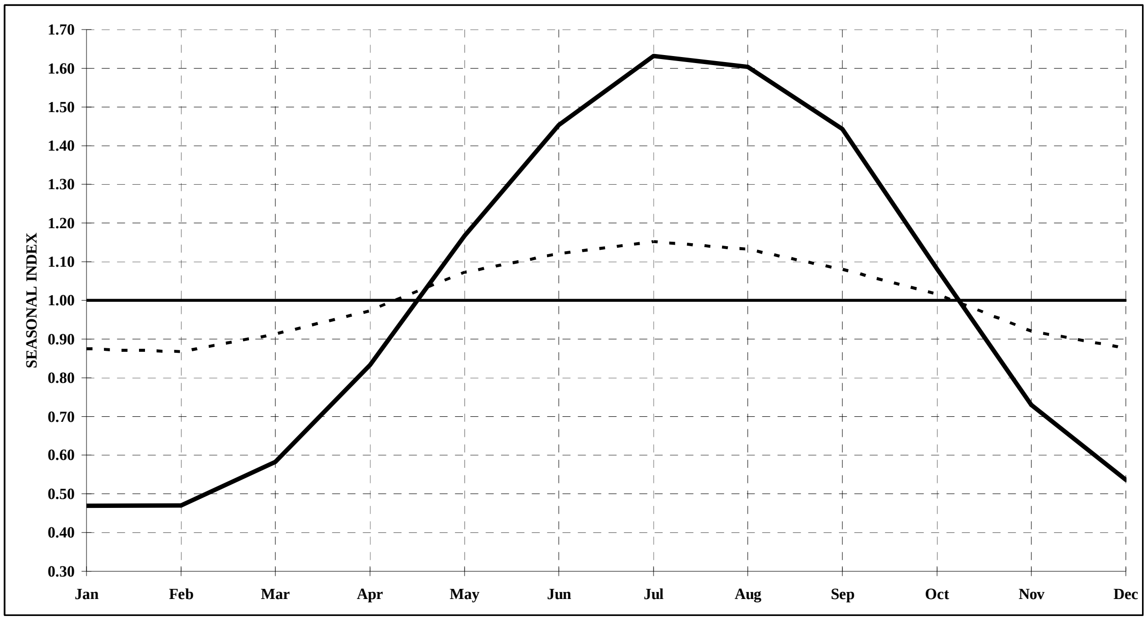
- Low Density Residential (LDR): reflecting land use categories of ER1 and ER2
- High Density Residential (HDR): ER3 through ER6
- Non-Residential (NR): EC,EO, EIL,EP, ES
- Irrigation (IRR): EPI

Weather data (e.g. maximum day temperature, rainfall, and pan evaporation) from six locations throughout the District were analyzed to explain the variations in consumption patterns. Most of the variations in consumption were attributed to seasonality, the seasonal pattern of consumption. An example is irrigation use, which tends to increase during the warmer and dryer months of summer, and decrease during the cooler and wetter months of winter. Seasonality is quantified by the seasonal index, a ratio of the month consumption to the 13 month moving average. Figure 4.2, Examples of Seasonality, provides two examples for Low Density Residential, one in the EoH (region F-Danville, San Ramon) and the other in the WoH (region GN-Richmond, Albany). The EoH (solid line) has significantly greater fluctuations in consumption than the WoH (dashed line), which is consistent with the relatively extreme seasonal weather experienced in the EoH and the temperate weather experienced in the WoH.

The same land uses EoH and WoH have different demands due to weather and other factors.

In addition to weather, there are non-weather factors (e.g., economic, demographic, etc.) that affect consumption patterns. The non-weather effects were accounted for by averaging the weather-only normalization results for years 2000 thru 2006. Individual variables for non-weather factors were not analyzed because data specific to regions and land use groups were not readily available and the non-weather effects (though significant) were minor relative to the weather effects.

Figure 4.2 Examples of Seasonality

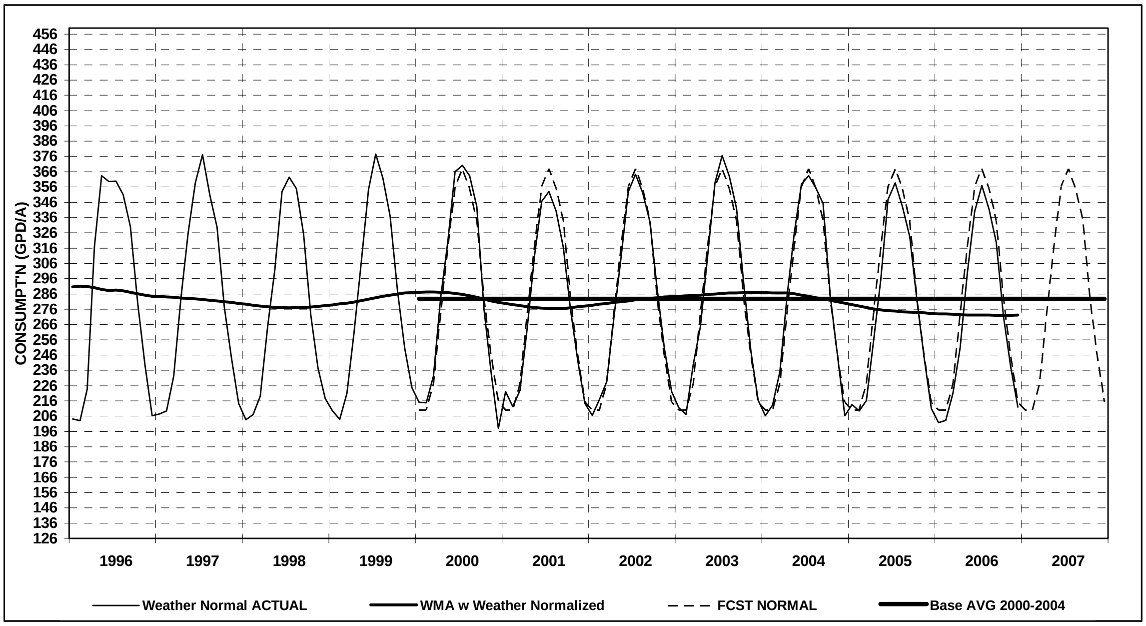


Note: Example provided for Low-Density Residential in Region F (solid line) and Region GN (dashed line).

Figure 4.3, Normalization of Data, presents an example of the weather normalized data for Low Density Residential customers in region AN (Pinole, Crockett, El Sobrante). The weather-normalized monthly-consumption data is represented by the solid line waveform with the highest fluctuations in amplitude. These weather-normalized data were converted to a 13-month weighted moving average (WMA) and represented by the solid line with the low amplitude fluctuations. An average of the WMA is the boldface flat-line, called the baseline normalized consumption. The normalization adjustment factor is the percentage difference between the raw base year consumption data and the baseline normalized consumption.

Normalization adjustment factors developed for the four land use groups in the 11 regions are presented in Table 4.1, Adjustment Factors for Normalization. Normalization was the first of several adjustments made to base year consumption data.

Figure 4.3 Normalization of Data



Note: Example provided for Low-Density Residential consumption in region AN.

Table 4.1
Adjustment Factors for Normalization

Region (DMR)	Low Density Residential	High Density Residential	Irrigation	Non-Residential
East of Hills				
D	0.0451	0.0683	0.0970	0.0619
E	0.0230	0.0448	0.0452	0.0897
F	0.0272	0.0216	0.1041	0.0166
H	0.0284	0.0081	0.0753	0.0245
West of Hills				
AN	0.0619	0.0136	0.0486	-0.0176
AS	0.0736	0.0011	0.2648	0.0302
B	0.0581	0.0066	0.2602	0.0196
C	0.0449	0.0074	0.0799	0.0219
GC	0.064	0.0721	0.1324	0.0038
GN	0.0613	-0.0043	0.1634	0.0260
GS	0.0411	0.0066	0.1534	-0.0020

Note: For example, an adjustment factor of 0.0284 for Low-Density Residential in region H is applied to the 2005 LUD by multiplying the actual demand by 1.0284.

Unmetered Water

Unmetered Water is a statistically significant component of system input and must be considered when projecting water demands. UWM is composed of both authorized water use and water losses. Unmetered authorized consumption includes fire flows and District unmetered use, such as use at unmetered facilities and water main flushing. Water losses include real water losses from physical sources such as losses from pipe breaks, storage facilities, water mains, and service connections; and apparent losses from non-physical sources such as unauthorized consumption, metering inaccuracies, and potentially other unidentified losses.

UMW by its nature cannot be quantified by direct measurement. UMW was calculated by subtracting metered consumption from distribution system input (treatment plant production, groundwater inflow to the Claremont Tunnel, and changes in distribution storage). Data from 1997 to 2005 were analyzed and UMW was calculated for the entire District, and the EoH and WoH regions. UMW was then examined statistically by computing mean, maximum, and minimum values; and investigated for trends by regression analysis.

As a percentage of system input, the mean UMW was 12 percent District-wide, 13 percent in WoH region, and 9.6 percent in EoH region. The significantly different values of the UMW between regions can be generally attributed to the differences in size and age of the regional distribution systems. In the 2040 Demand Study, UMW values of 13 percent for WoH and 9.6 percent for EoH were applied for the base year. The same values were used for the projection years because the trending analysis did not show any significant correlation with time.

Industry does not and cannot cost-effectively construct zero leakage distribution systems. The American Water Works Association has developed a performance indicator, the infrastructure leakage index (ILI), that can be used to assess the success of a leakage management policy. The ILI is a ratio of an agency's individual best possible performance against how it is actually performing. Theoretically, an ILI close to 1.0 demonstrates that all aspects of a successful leakage management policy are being implemented by a water utility. However economic values of ILI depend on the system-specific marginal costs of real losses, and typically lie in the range of 1.5 to 2.5[1].

The ILI also facilitates comparison between different systems. In an ILI survey conducted by the International Water Association's Water Losses Task Force[2], the ILI values ranged from 0.7 to10.8, with a median of 2.94 and an average of 4.38, among 27 diverse distribution systems in 20 countries. It is important to note that the systems represented in the study all had reasonably reliable data and active policies to try to manage Real Losses. EBMUD's District-wide ILI has

[1] Thornton, J. 2002. Water Loss Control Manual. McGraw-Hill. New York.
[2] Lambert A.O and McKenzie 2002. *Practical Experience in using the Infrastructure Leakage Index*. Paper to IWA Conference 'Leakage Management – A Practical Approach', Cyprus, November 2002.

ranged from 2.92 to 3.57[3] over the past five years and compares favorably among well managed systems.

Non-Potable Water Savings

Non-potable water includes recycled and raw water use. Recycled water use reflects treated wastewater distributed to specific locations in the District via a network of pipes, pumps, and storage tanks that are dedicated to recycled water. Raw water use is limited to a small number of customers supplied by the Chabot Reservoir. Well water use was not incorporated into the projections because the consumption data were unavailable and estimated quantities were negligible. A list of recycled water projects and raw water use existing in 2005 is presented in Table 4.2, Base Year Non-potable Water Projects.

The District's recycled water programs will significantly reduce potable demands in the future.

Non-potable use was incorporated into the demand projections to account for the potable offset to demand. Projections of non-potable use were provided by the District's Office of Water Recycling and were based on programs outlined in both the 1993 WSMP and WSMP 2040. The calculation for base year adjusted system input did not include an adjustment for non-potable use because the metered consumption data already reflected potable offsets from base year non-potable use. However, an accounting credit of 6 mgd was provided by the Office of Water Recycling and incorporated into the unadjusted system input for the base year to account for non-potable use, but the base year demand (adjusted system input) remained at 214 mgd.

Conservation Savings

Conservation programs include incentives for customers, education and outreach activities, and regulatory programs. All quantities for conservation were provided by the District's Conservation Division and were based on programs outlined in both the 1993 WSMP and WSMP 2040. The calculation for base year adjusted system input did not include an adjustment for conservation because the metered consumption data already reflected potable offsets from water conservation. However, an accounting credit of 18 mgd, provided by the Conservation Division,

[3] 2007 Annual Water Supply Engineering Audit (Treated Water).

was incorporated into the unadjusted system input for the base year to account for conservation savings up to the year 2005.

Table 4.2
Base Year Non-potable Water Projects

Project	Type of Use
Richmond Country Club (Richmond)	Golf Course Irrigation
Metropolitan Golf Links (Oakland)	Golf Course Irrigation
Chuck Corica Golf Complex (Alameda)	Golf Course Irrigation
Harbor Bay Parkway (Alameda)	Landscape Irrigation
Chevron Refinery (Richmond)	Cooling Tower Water
EBMUD Wastewater Treatment Plant (Oakland)	Plant Processing, Landscape Irrigation
San Ramon Valley Recycled Water Program	Landscape Irrigation
East Bayshore Recycled Water Project	Landscape Irrigation, Industrial, Toilet Flushing in Commercial Buildings
Lake Chabot Golf Course (Oakland)	Golf Course Irrigation
Willow Park Golf Course (Castro Valley)	Golf Course Irrigation
Sunset View Cemetery (El Cerrito)	Landscape Irrigation

Source: Urban Water Management Plan 2005, November 2005.

Summary of Base Year Demands

The base year demand was calculated from metered consumption data and includes adjustments for normalization and UMW. District-wide base year demand is presented in Table 4.3, Base Year District-wide System Input, which also identifies conservation and non-potable offsets to potable demands. Adjusted system input was 214 mgd and represents the average annual rate of potable water that is needed by the distribution system. The offsets to potable demand were 6 mgd from non-potable use and 18 mgd from conservation efforts. If non-potable use and conservation did not exist in 2005, then the potable water needed by the distribution system would have increased to 238 mgd, the unadjusted system input. These offsets are also applied to projected unadjusted system input as discussed in Chapter 6.

Table 4.3
Base Year District-wide System Input

	Demand (mgd)
System Input (unadjusted)	238
Conservation	-18
Non-Potable	-6
System Input (adjusted)	214

Base year demands for each region are presented in Table 4.4, Base Year System Input by Land Use and Region. As presented in Table 4.4, region GC (Oakland) has the highest demands of 48 mgd with the lowest demands found in region E (eastern Lafayette) of over 6 mgd. The greatest demands associated with one land use category are for ER2 (residential with 3 to 10 du/ac) with over 100 mgd.

As previously discussed, the 2000 Demand Study land use database was updated to ensure that designations for each land use polygon reflect existing land uses for the base year. Figure 4.4, Example of Land Use Polygons and Meter Locations, demonstrates typical polygons with existing development visible in the underlying aerial photograph. The dots in the graphic represent customer meter locations and consumption data are associated with that location in the GIS database. For each polygon, the metered consumption was summed, and multiplied by the normalization and UMW factors to calculate the base year demand. A LUD is calculated by dividing demands by acreage.

Figure 4.4 Example of Land Use Polygons and Meter Locations

The base year polygon demands were calculated using the Demand Model. The process of spatially calculating demands is presented on Figure 4.5, Calculation and Distribution of Base Year Demands. Each of the approximately 22,000 land use polygons (8,300 before overlying the polygons with DMR, slope, and pressure zone boundaries) has a demand associated with it.

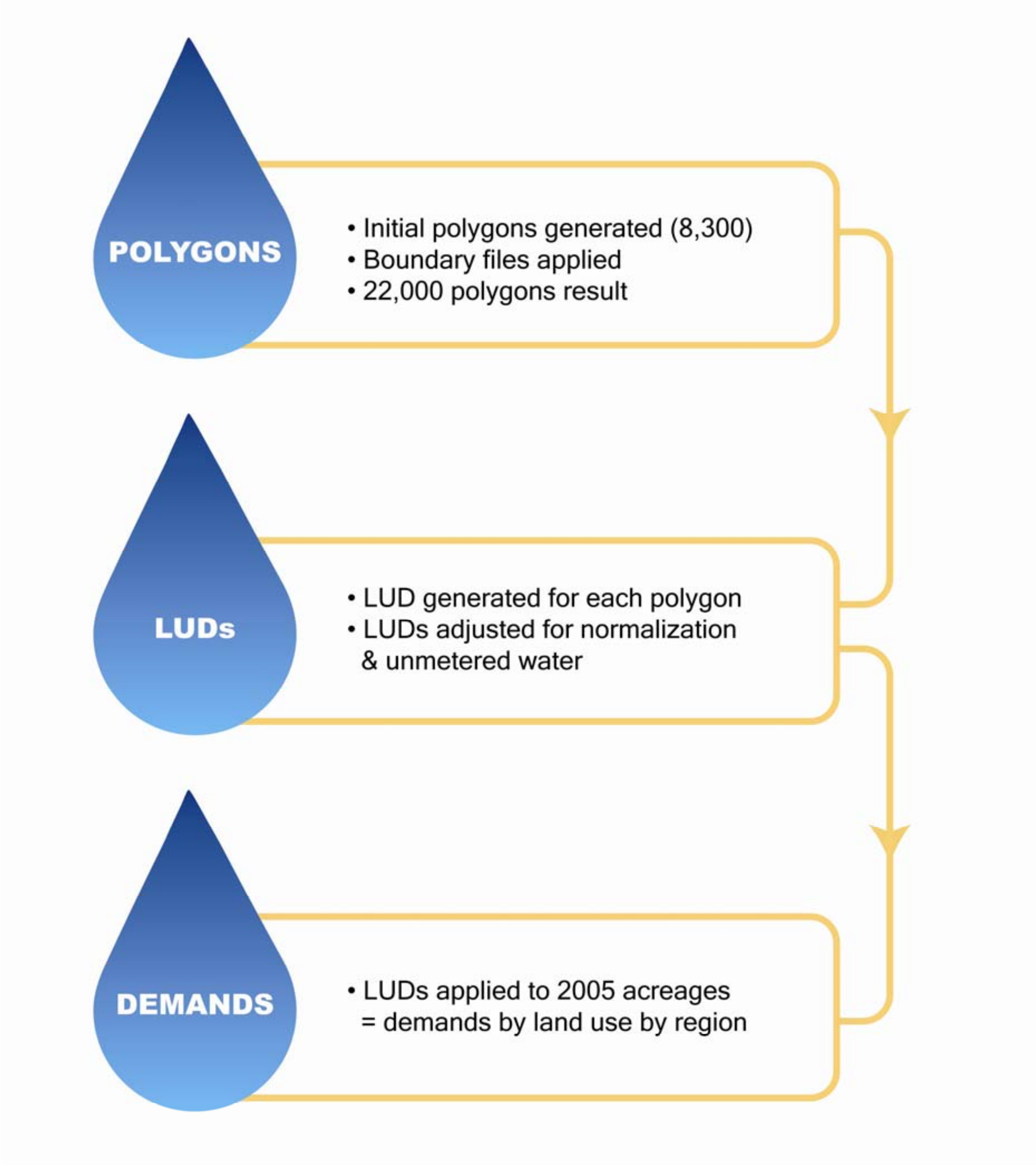
A base demand for each land use polygon was calculated by summing the annual average demands (AD) of all meters located within each polygon. The demands were adjusted for normalization and to account for UMW usage by multiplying the demand by the normalization factors in Table 4.1 and by the appropriate unmetered water adjustment factor (i.e., 9.6 percent for EoH or 13 percent for WoH). To calculate demands for each land use by region, polygon demands were summed.

Table 4.4
Base Year System Input (Adjusted) by Land Use and Region

Land Use	Adjusted Base Year Demands (gpd) [1]											
	Demand Model Region											Total
	AN	AS	B	C	D	E	F	GC	GN	GS	H	
ER0	0	0	0	0	4,124,761	1,102,553	0	0	0	0	0	5,227,314
ER1	181,783	360,040	698,631	244,661	3,510,364	1,361,478	6,863,108	5,421	0	8,779	1,315,843	14,550,109
ER2	10,138,292	5,864,461	8,486,689	7,007,550	985,793	1,565,953	18,613,088	23,410,620	8,305,142	12,800,323	3,523,039	100,700,949
ER3	2,240,146	1,446,288	320,011	1,072,648	1,471,563	1,322,897	1,605,042	8,293,962	2,862,987	3,307,416	1,011,434	24,954,394
EMU3	0	0	0	0	0	0	0	16,200	0	0	0	16,200
ER4	0	301,305	4,222	0	0	0	0	748,973	113,070	85,284	608,856	1,861,708
ER5	0	24,428	162	0	0	0	0	360,344	65,302	0	0	450,236
ER6	0	0	0	0	0	0	0	58,849	77,403	0	0	136,253
EIL	100,867	0	5,892	27,062	20,762	8,521	13,489	1,298,556	1,569,849	572,439	9,718	3,627,155
EO	336,215	158,648	48,181	13,554	72,785	161,362	795,704	2,861,489	1,315,911	1,285,342	233,180	7,282,371
EC	944,865	828,473	233,308	555,836	253,901	515,800	1,410,238	5,817,129	2,285,343	2,149,703	1,045,914	16,040,510
EOH	0	24,290	0	0	0	0	472,625	1,439,309	46,824	12,253	206,838	2,202,139
ER	0	0	0	0	0	0	0	0	64,918	0	0	64,918
ES	258,692	152,229	207,509	194,625	177,460	96,894	482,462	732,686	297,087	424,368	70,349	3,094,360
EPI	521,900	570,139	372,362	135,055	503,070	272,957	1,903,777	1,285,112	404,980	489,033	184,005	6,642,390
EP	70,906	69,241	193,900	168,463	54,957	74,567	545,302	903,229	200,416	126,271	300,460	2,707,711
EHW	7,443,127	1,693,384	0	0	0	0	0	855,707	11,387,225	1,022,479	0	22,401,921
ERW	0	0	0	0	0	0	905,361	58,041	8,719	2,341	0	974,462
ERAW	0	2,125	506	0	0	0	0	23	0	0	0	2,654
EV	36,832	4,469	35,500	9,118	20,016	15,244	56,724	63,708	26,099	20,091	9,099	296,898
EOS	107,627	13,247	23,380	99,899	78,116	31,555	269,087	49,781	66,822	11,696	22,156	773,366
Total	22,381,252	11,512,768	10,630,251	9,528,471	11,273,549	6,529,780	33,936,008	48,259,138	29,098,096	22,317,816	8,540,890	214,008,020

[1] *Includes adjustments for normalization and unmetered water; gpd = gallons per day.*

Figure 4.5 Calculation and Distribution of Base Year Demands



Chapter 5: Future Adjustment Factors

Water demand projections were developed starting with base year demands (presented in Chapter 4, Base Year Water Demands) then adjusting the demands to reflect anticipated changes to land use and consumption patterns in the future. Planned changes to land use designations were obtained from general plans and applied to the polygons in the land use database (discussed in Chapter 3, Land Uses and Trends). Adjustment factors for projected changes in consumption patterns were developed and applied to base year polygon demands. This chapter describes data sets and methods used to develop adjustment factors for future changes in consumption. Resulting projected water demands are presented in Chapter 6, Water Demand Projections.

Land Use Unit Demands

Consumption patterns vary throughout the District and are influenced by local conditions such as climate, soils, and slope; demographics; economics; and land use patterns and policies. Consumption patterns were analyzed by dividing the District service area into 11 regions and categorizing water use into 20 existing land uses. Water consumption was converted into a per acre unit called a land use unit demand (LUD), as described previously. The LUD allowed for spatial characterization in the analysis of consumption patterns regardless of differences in land use acreage.

Each polygon in the land use database was assigned a value for region, land use category, and LUD. In the future, a polygon could experience a change in land use, and/or a change in consumption pattern, as established uses are not static. For each polygon, the LUDs were modified for future scenarios reflecting trends described in Chapter 3, Land Uses and Trends. These adjustment factors were developed for 2040 conditions and typically distributed proportionately over each five year increment of the 2040 Demand Study planning period from 2005 through 2040 (except 2035).

LUDs for future years were calculated in one of several ways.

- If the base year land use category remains the same in the future, the future LUD was calculated by applying a future adjustment factor to the base year LUD for each polygon. The adjustment factors were based on infill potential, comparison of historical consumption patterns, occupancy rates, and jobs per acre, as described in the sections Existing Residential and Non-Residential.
- If the base year land use category changes in the future, as with new development or redevelopment triggering a land use or density change reflecting the general plan, the future LUD was calculated by applying an adjustment factor to the average LUD for each land use category in each region. This allows for the future land use category to reflect

consumption patterns for recent developments reflecting trends in changing land use patterns. The new LUDs were applied to the acreages of the changing land use polygon at the development year identified by the land use planning agency. The basis for the adjustment factors is described in the section titled New Development.

- If a land use category represents unique water users, future LUDs were determined individually. Unique water users included high water users, low density residential uses in steep sloped areas of the cities of Lafayette, Moraga, and Orinda (called Lamorinda) region, and mixed use land uses. For example, each high water user was researched to project potential future changes in demands. Mixed uses were analyzed and determined to require the same LUD and or adjustment factor as its underlying residential density. The basis for the adjustment factors is described in the section titled Special Land Uses.

Table 5.1, Adjustment Factor Data Sources, presents a summary of the sources of data used to identify future adjustment factors for existing uses that were already developed by 2005 and for new development or redevelopment anticipated to be constructed in the future, per the community general plans. These data sources and methodologies are discussed in detail following the table.

Table 5.1
Adjustment Factor Data Sources

Land Uses	Data Source/Methodology				
	Infill Potential	Historical Comparison of Consumption	High Density Residential Occupancy	Jobs per Acre	Sample Consumption Data
Existing Land Uses					
ER0		X			
ER1	X				
ER2	X	X			
ER3 through ER6 and ERMU3			X		
Existing Non-residential				X	
New Development and Redevelopment Land Uses					
FR0		X			X
FR1 and FR2					X
FR3 through FR6					X
FMUR2 through FMUR6					X
Future Non-residential					X

Existing Residential Development

Consumption patterns for existing residential land uses are expected to increase on a per acre basis over time because of the following.

- Infill of vacant lands
- Underutilized land converted to a more intense use without changing its land use designation, called densification
- Multiple generations living within the same dwelling unit and/or converting garages to living spaces (a trend identified by some planning agencies)
- Accessory units (e.g., in-law, second) developed legally or illegally
- Development of steep sloped sites that were once considered too costly to develop

Adjustment factors were developed by analyzing data for infill potential, historical consumption, and occupancy.

Infill Data

Land use polygons within existing development often contain small vacant, developable and underutilized lands; this is called infill development. Infill data were developed to document: infill potential for development of small vacant lands; subdivision of partially developed lands or addition of an accessory unit or other dwelling within the allowable densities; and construction on difficult sites. Although the land use database included a vacant land use category, there are numerous small vacant lands present within the ER1 and ER2 land use categories that could be developed. To obtain infill potential data, a sample location was identified from aerial photographs which best represented typical residential density characteristics of that region. The sample areas ranged in size from 19 to 370 acres. A calculation was made of the percent of small vacant lands within the sample location that were not captured as a vacant polygon and are designated by the general plan for an urban land use.

Figure 5.1, Example of Infill Potential, provides an example of a portion of the sample location for ER1 within region AN. Red polygons highlight lands with infill potential that were not large enough to be designated with a vacant land use category, yet could be developed.

Figure 5.1 Example of Infill Potential

Table 5.2, Infill Potential Data, presents raw data of infill potential for the majority of regions. The Sample Area column provides acres of land in that sample location that represents ER1 and ER2 densities found in each region. The Vacant Land column reflects the infill potential, in acres, of that sample location (e.g., red polygons found in Figure 5.1). The Infill Potential column provides the resulting percentage of vacant lands within the sample area. Infill typically occurs on lands that are not currently irrigated or are not irrigated throughout the vacant lands. Therefore, a net increase in demands usually occurs with development of infill potential lands.

Adjustment factors in the last column were taken into account when developing final future adjustment factors for ER1 and ER2. In most cases, the final future adjustment factor was not 100 percent of infill potential; lower adjustment factors were more often used to allow for differences in land use density patterns throughout the region. Higher adjustment factors were used in several cases where the infill potential was very low and did not reflect trends for that region. As with residential and non-residential, existing development and new development, future adjustment factors were determined by using:

- actual data such as infill or historical comparison data;
- average future adjustment factors for WoH or EoH;
- another region's adjustment factor if its application resulted in an average LUD similar to other regions; or
- percent of infill potential that resulted in an average LUD similar to other regions.

For example, for ER2 in region H (Walnut Creek), infill potential data indicate a 1 percent infill potential which does not reflect higher infill potential based on conversations with planning agencies, observed land use changes indicating ongoing densification, and historical consumption comparisons. In this case, historical comparison data discussed below were also taken into account when determining a 2040 adjustment factor for ER2 in region H of 12 percent.

Table 5.2
Infill Potential Data

Land Use Category	Region	Vacant Land (acres)	Sample Area (acres)	Infill Potential (%)	Adjustment Factor [(1)]
ER1	AN	17	25	66	0.33[(2)]
	AS	8	35	22	0.22
	C	15	19	79	0.26[(3)]
	D	32	94	34	0.34
	E	110	210	52	0.26[(2)]
	F	50	139	36	0.29[(4)]
	H	30	134	23	0.23
ER2	AN	23	370	6	0.06
	AS	10	123	8	0.08
	B	13	146	9	0.09
	C	20	127	15	0.15
	D	4	50	8	0.08
	E	16	78	21	0.10[(2)]
	F	1	21	6	0.06
	GC	4	304	1	0.10[(5)]
	GS	12	282	4	0.10[(5)]
	H	1	140	1	0.12[(6)]

(1) *Infill potential was taken into account when determining final adjustment factors. Deviations from infill potential are noted here.*
(2) *Used 50 percent of infill potential because other areas in the region could have lower values.*
(3) *Used 33 percent of infill potential because site constraints (e.g., steep slopes) in the region may limit development through 2040.*
(4) *Although infill data looks reasonable for Alamo, Walnut Creek and large lots throughout, other areas in the region appeared much lower, therefore 20 percent less was used.*
(5) *Infill data too low considering input from planning agencies (multigenerational housing, accessory units, lot splits, garage conversions, and remodeling activity increasing home size and new appliances). West of Hills average was used.*
(6) *Infill data too low considering input from planning agencies (e.g., multigenerational housing, accessory units, lot splits, garage conversions, development on difficult sites, and remodeling activity increasing home size and new appliances). 50 percent of historical comparison data used instead.*

An example where the adjustment factor was reduced from the infill data can be found with ER1 and ER2 in region E (eastern Lafayette). This region has many areas of steep slopes preventing (in the case of the slope ordinance) or reducing the potential for densification of ER1 and ER2 lands. The infill potential data was reduced by 50 percent to reflect slower or lower levels of densification by 2040 due to costs involved in developing sites that are not limited by the ordinance, thus anticipating that developable sites may be developed by 2040. Lands with slopes greater than or equal to 20 percent were classified as ER0 and are discussed under Special Land Uses.

Historical Comparison Data

Several land use planning agencies indicated in the project meetings changing demographic patterns that could influence consumption patterns, but are not captured in the GIS land use database. For example, there is a trend of increasing numbers of family members living in homes and that the increases are not necessarily reflected in census data. In order to augment the database of potential adjustment factors reflecting changing conditions, a comparison of demands over time was undertaken for a few regions where this trend had been noted. Historical comparison data were used for several regions to capture changes in consumption patterns resulting from conversion of garages to living spaces, increased numbers of multiple generational households (e.g., young adults not leaving home, aging parents living with their adult children, and multiple families living under one roof), and expansion of homes (typically with additional water using appliances and often expanded to allow a family to avoid having to move out, thus resulting in a greater number of people). Adjustment factors for ER2 were developed by analyzing and comparing normalized consumption data from 1996 and 2005 to determine if there was a change in consumption. Sample areas in the study area were selected based on planning agency recommendations or areas that represented average densities for that region.

The multigenerational housing trend is occurring throughout the service area.

For example, the City of Richmond noted the conversion of garages to living space. A sample area for GN was identified, residential polygons developed, and consumption data from the District's water consumption database for that area analyzed. Data indicated that demands on a per acre basis in most of these historical comparison polygons increased since 1996.

Table 5.3, Historical Comparison Data, presents raw data and the resulting percentage increase in demands between1996 and base year, assumed to reflect these changes occurring in existing developments that may or may not be apparent just from viewing land use changes. Historical comparison data were taken into account when developing adjustment factors but were not always used as the adjustment factor if the data appeared to be outliers. For example, sample sites of ER2 in region AS indicated 8 percent infill potential (Table 5.2) and 157 percent increase in historical consumption. The lower of the two data points was used for a conservatively low adjustment factor because changes to existing land uses are occurring more slowly in this region. Although this example is extreme, it would be difficult to explain the basis

Table 5.3
Historical Comparison Data

Land Use	Region [1]	Polygon Area (ac)	1996 LUD (gpd/ac)	2005 LUD (gpd/ac)	Increased Demand (%)	Adjustment Factor
ER2	AS	11.7	361	926	157	0.08[2]
	F	4.4	1,176	1,201	2	0.06[3]
	GN	8.1	1,408	1,622	15	0.10[4]
	H	4.7	1,490	1,871	26	0.12[5]

(1) *Regions sampled were selected based on planning agency input and observed trends.*

(2) *A lower adjustment factor from the infill data was used instead because some of the sample data contained parts of the 1991 Oakland Hills fire zone which increased in demands as homes were rebuilt.*

(3) *Historical comparison data for sample locations lower than infill potential, planning agency input, and observed trends would indicate. This region has almost 1,500 acres of vacant, developable land with potentially higher demands as the region builds out. Although still lower than the trends would indicate, the infill potential data was utilized.*

(4) *To be more conservative, because region GN contains such a range of ER2 density and socioeconomic patterns (e.g., small lot sizes in San Pablo with lower water use and larger lots in parts of Richmond with multigenerational housing), the lower West of Hills average adjustment factor was used instead of the historical comparison data estimate.*

(5) *Although the historical comparison data reflects input from planning agencies and observed trends, the data were much higher than for other regions, thus 50 percent of historical comparison data was used.*

for the significantly increased consumption in the sample historical comparison data area. As explained later in the section titled Results for Existing Residential and Non-Residential, and for ER1 and ER2 in particular because these are the majority of land uses, all of the data sources (i.e., infill, historical comparison, averages from other regions) were considered when identifying a future adjustment factor for each land use in each region, to prevent adjustment factors which deviated greatly from other regions.

Occupancy Data

Existing high density residential ER3 through ER6 adjustment factors primarily reflect indoor water use. Multi-family residential occupancy data were utilized to quantify the trend of continued population growth in the study area (District USB), but with limited vacant lands on which to provide new multi-family housing. It was assumed that infill development and increased densities of redeveloped residential lands will accommodate some of the multi-family residential growth, but also that occupancy levels will increase as availability of vacant, developable lands for new high density residential development becomes reduced over time. Occupancy data were used to quantify changes (increases) in consumption on a per acre basis for existing high density residential lands. The change in occupancy levels, was used to accommodate infill and densification (new uses but without a change to the land use category).

Occupancy data from RealFacts, Inc. (see Appendix C, TM No. 3, Economic and Demographic Data Analysis in Support of Water Demand Forecast Adjustments) was used to analyze trends for large apartment buildings. Occupancy rates for rental units declined after year 2000 to lower levels in 2005. It was assumed, in order to provide a realistic occupancy level that has been realized in the past, occupancy rates of existing high density land uses will increase to 2000 levels by year 2040. Occupancy levels may actually increase at a faster or a sporadic rate, but this approach was more conservative (lower and more gradual adjustment factors over time). Occupancy levels will increase as vacant lands in the study area develop and become less available, to accommodate the projected increase in population. As shown in Table 5.4, High Density Housing Occupancy Data and Factors, an increase in occupancy levels is anticipated throughout the study area by 2040. However, flat or declining occupancy levels are expected for region GC through 2020 due to the high levels of new multi-family housing stock anticipated to be available through 2015.

Table 5.4
High Density Housing Occupancy Data and Factors

Region	Change in Occupancy Level Adjustment Factors(1)					
	2010	2015	2020	2025	2030	2040
AN	0.01	0.02	0.04	0.05	0.06	0.09
AS (2)	0.01	0.02	0.04	0.05	0.06	0.09
B (3)	0.01	0.01	0.02	0.03	0.04	0.05
C	0.01	0.01	0.02	0.02	0.03	0.04
D (4)	0.01	0.02	0.02	0.03	0.04	0.06
E (4)	0.01	0.02	0.02	0.03	0.04	0.06
F	0.01	0.02	0.02	0.03	0.04	0.06
GC	0	-0.01	0	0.01	0.02	0.05
GN	0.01	0.02	0.02	0.03	0.04	0.06
GS	0	0.01	0.01	0.02	0.02	0.03
H	0	0.01	0.01	0.01	0.02	0.02
West of Hills Average						0.05
East of Hills Average						0.04

(1) Adjustment factors represent the assumption that 2005 high density residential occupancy rates will increase to 2000 levels by 2040. Adjustment factors were developed from the percent change to occupancy rates, derived from CBRE Consulting, Inc. data presented in Exhibit 17 of Appendix C.

(2) No data available; used region AN data.

(3) No data available; used West of Hills average.

(4) No data available; used region F data.

Existing Non-Residential Development

The trend of underutilized lands converting to more intense uses is particularly relevant for non-residential lands. Greater utilization of industrial and commercial properties is occurring as the properties become more valuable; individual buildings are redeveloped with higher density office uses; heavy industry and warehousing and equipment storage yards are converting to high technology, financial services, and other employee-oriented uses; and retail uses are denser as vast parking lots are converted to residential, commercial, and other uses. Data sources for quantifying trends associated with existing non-residential development include employment data and general plan land use data. These data were used to derive a change in jobs per acre between 2005 and 2040.

Jobs per Acre Data

An analysis of base year jobs per acre (JPA) was conducted for the study area as a source of data for non-residential LUD adjustments to reflect more intense uses observed since the 2000 Demand Study and planned for in the future. ABAG employment data were distributed spatially by region (see Exhibits 18 through 28 in Appendix C). The total acreage of existing non-residential land use (i.e., EC, EIL, EO, EP, ES, EHW) by region was calculated from the GIS land use database. Existing jobs per acre were then calculated for each region.

This block was redeveloped from a hardware store and other low density uses to higher density retail.

To absorb employment greater than the base year JPA levels, it was assumed that employment would increase on a per acre basis with the densification of land uses (replacing underutilized buildings and using existing lands more intensely), more employees within existing buildings, construction of new buildings on infill parcels or parking lots, etc. The resulting percent increase in JPA for most regions was reviewed for use as the 2040 adjustment factor. Applying the JPA percent increase to average LUDs at times resulted in LUDs which deviated greatly from that region's LUD or the average LUD for other regions, or input from planning agencies. As presented in Table 5.5, Jobs per Acre Data and Factors, adjustment factors were modified to reflect more average resulting LUDs. For example, region AS includes commercial lands east of Shattuck Avenue in Berkeley. A 0 percent increase in JPA did not reflect aggressive commercial growth and densification (without a change in land use designation) planned by the City of Berkeley for the downtown and adjoining areas. Region B, the Oakland Hills, on the other hand, had a JPA increase of 75 percent. This area has lower density employment centers than other parts of Oakland; it was difficult to justify such a high increase in employment density.

Acreages of schools and high water users were used in the calculation of jobs per acre since these land uses have employment associated with them. However, these adjustment factors

Table 5.5
Jobs per Acre Data and Factors

Region	Change in JPA 2005 to 2040 (%)[1]	2040 Adjustment Factor
AN	10	0.33[2]
AS	0	0.06[2]
B	75	0.44[3]
C	44	0.39[3]
D	2	0.03[2]
E	7	0.07
F	47	0.41[3]
GC	0	0.28[2]
GN	42	0.37[3]
GS	15	0.15
H	26	0.24[3]

(1) Factors are based on existing and future nonresidential acreage available to absorb new jobs. Some factors were modified to prevent regions from resulting in significantly higher average LUDs than surrounding regions.

(2) The use of JPA data alone as an adjustment factor resulted in average future LUDs for existing non-residential land uses for this region which differed greatly (lower) than for other regions. Adjustment factors therefore were based on JPA data as well as average LUDs for other regions. See text for further explanation.

(3) The use of JPA data alone as an adjustment factor resulted in average future LUDs for existing non-residential land uses for this region which differed greatly (higher) than for other regions. Adjustment factors were based on JPA data as well as average LUDs for other regions. See text for further explanation.

were not applied to irrigated turf (EPI), schools (ES), and high water users (EHW), as discussed in the following section.

Results for Existing Development

A LUD future adjustment factor was developed for each of the existing land use polygons based on the methodologies described above for existing residential and non-residential development. Only one future adjustment factor was used for each land use category per region per planning year. The final factors took into account data sources as well as a comparison of existing LUDs and data sources for other regions. If a data source indicated a future LUD should be increased or decreased to a point where the future LUD would be significantly out of line with other LUDs for the same land use category, averaging took place, or a more average future adjustment factor was used instead. In many instances, the average LUD or average adjustment factor for a land use category for EoH or WoH or a nearby region was used for a region based on proximity and/or similar weather or land use characteristics. Average LUDs and adjustment factors from other regions were also used if data were not available for a particular region.

LUDs for irrigated turf and schools were not adjusted partly because of the difficultly in isolating irrigation use. Schools have either one meter for all uses or a separate meter for irrigation, but the meters are often located in the same place on a street, not near the turf area, thus making it difficult to separate consumption patterns associated with irrigated turf. By reviewing the land use and meter location databases, it was estimated that about 9 mgd of 2005 irrigation consumption was associated with other land uses (irrigation meters were in polygons of land uses other than EPI). In addition to the difficulties in isolating irrigation use, elementary and high school enrollment fluctuates greatly over decades with historical enrollment not trending consistently up or down. Regardless of population projection increases and cycles of enrollment numbers, it is uncertain if overall elementary and high school public and private enrollment will increase or decrease by 2040. A review of historical school enrollment data and the lack of private school data do not present an apparent trend to justify adjusting the LUDs. The demand projections account for any increase in enrollment where there are land uses designated by general plans for new development.

Appendix E, Future Adjustment Factor Table, presents the resulting future adjustment factors for existing land uses. This table is just for future changes and does not include unmetered water adjustment factors, normalization factors, non-potable uses, or historical conservation savings assumptions. Future adjustment factors were applied in the base year polygon LUDs to generate future LUDs for each 5-year projection increment using the following formula.

Base year LUD x
[(1+normalization factor)
x (1+unmetered water factor)
x (1+existing or new development adjustment factor)]
= Future LUD

Demands were calculated by multiplying the LUDs by the acreage of existing land uses for each projection year.

New Residential and Non-Residential Development

New developments represent base year vacant lands anticipated by the planning agencies to be developed by 2040 with an urban land use in conformance with the general plan. Densities associated with new development are higher than historical development. For example, in region GN, the average existing LUD for ER2 is 1,636 gpd/ac. However, LUDs for recent ER2 developments are 2,512 gpd/ac, an over 50 percent increase in demands on a per acre basis. Instead of using lower LUDs from older existing developments, LUDs from land uses developed in the past few years were analyzed to contribute to a more realistic LUD for new development. New development LUDs were then based on existing, average LUDs per region adjusted to reflect recent development LUDs. These adjusted LUDs were applied to acres of vacant lands according to their general plan land use designation.

Data used to adjust LUDs to reflect new development were based on sample consumption data. Feedback from planning agencies on trends was used to identify new areas in a community or specific uses that represent future densities and land uses. Demographic data (see Chapter 3) were collected and reviewed for use in quantifying trends.

"Smart Growth" has higher densities than surrounding lands.

Sample Consumption Data

Actual LUDs associated with recent (approximately year 2000 to 2004) construction projects were identified for several land use categories within several regions and used as sample consumption data. Table 5.6, Sample Consumption Data, identifies the land use categories and regions sampled. Based on observations and analysis of land development activities since the 2000 Demand Study, recent development is at the upper end of allowable general plan densities and typically at higher densities than that experienced in the past. Based on a comparison of consumption data, increased consumption is associated with more dwelling units per acre. There may be individual situations where older, lower density uses have higher LUDs, but on average, newer uses within the same land use category usually have higher LUDs, often significantly higher.

Figure 5.2, Comparison of ER2 in Region F, presents typical density situations found through observed trends and input from planning agencies. In Figure 5.2, an older ER2 (3 to 9.9 du/ac) neighborhood is located on the right side and a newer ER2 neighborhood on the left side, straddling I-680 across from each other. The density of the new area is approximately 9 du/ac. The older ER2 homes across the highway have a density of about 6 du/ac, typical for older neighborhoods East of Hills.

Sample consumption data were developed as gpd/ac and compared with existing LUDs. Sample consumption data are provided in Table 5.6, Sample Consumption Data. Land use categories used in Table 5.6 were defined in Chapter 3. Future adjustment factors were derived as a percent of the difference between sample LUDs and average LUDs for each region. Footnotes indicate if other data were used to modify the future adjustment factor. If the sample LUDs were outliers (appeared to deviate too greatly from an average base year LUD) or if there was no data, the average LUD for either EoH or WoH was used for that region instead.

Figure 5.2 Comparison of ER2 in Region F

Newer, denser ER2 (about 9 du/ac) Older ER2 (about 6 du/ac)

Adjustment factors for the high density residential land uses FR4 through FR6 were more difficult to derive from sample consumption data because they either do not exist in all regions or there is limited high density uses, particularly EoH. However, enough data were available to utilize and were applied to other regions. These are important land uses since the study area will continue to densify by developing vacant parcels at high allowable densities. These land use categories also reflect land uses with demands that have been underestimated historically due to lack of data and a high rate of general plan amendments allowing higher than previously planned for densities.

Results for New Development

The existing average LUDs were analyzed and compared with sample consumption data or historical sample data for new development (including redevelopment of existing urban lands with a new land use designation). An average new development LUD was identified and future adjustment factors created. The resulting future adjustment factors for new residential and new non- residential development can be found in Appendix E, Future Adjustment Factor Table. Adjustment factors in this table do not include normalization factors, unmetered water, non potable estimates, or conservation savings planned for the future. As discussed above for adjustments made to existing development LUDs, future development adjustment factors provided in Appendix E were applied in the base year polygon LUDs to generate future LUDs for each five-year increment.

The trend noted previously of cities wanting more housing is reflected in the higher densities of allowable land uses per general plans. There is a significant amount of land identified for development with FR4 (20 to 49 du/ac) through FR6 (100+ du/ac) higher density uses (2,567 acres at 2040). There are 284 acres of lands with these densities in 2005, although it is likely much higher due to the difficulty documenting individual buildings in the database. The only

Table 5.6

Sample Consumption Data

Land Uses	Region	Sample LUD (gpd/ac) (1)	Average LUD by Region (gpd/ac)	Difference (%)	Adjustment Factors
West of Hills					
ER2	AN	1,974	1,327	49	0.73 (2)
ER2	B	1,529	1,192	28	0.28
ER2	C	2,473	1,271	95	0.95
ER2	GN	2,512	1,636	54	0.80 (2)
ER2	GS	2,521	1,539	64	0.64
Average for FR1 and FR2 WoH				58	0.58
ER3	AN	4,972	2,969	67	0.67
ER3	AS	7,473	4,415	69	0.69
ER3	GC	11,687	5,216	62	0.62
Average for ER3 WoH				68	0.68
ER4	GC	11,687	6,672	75	0.75
ER4	GS	3,441	2,781	24	0.24
Average for ER4 WoH				49	0.49
ER5	GC	8,395	12,254		0.24 (3)
FMUR5	GS&H		15,149		0.48(4)
ER6	AS	30,352	15,176	50(6)	0.0(5)
ER6	GC	16,537	10,503	57	0.57
Average ER6 WoH				54	0.54
EC	AN	1,381	1,085	27	0.37 (6)
EC	AS	5,257	2,290	130	1.04 (7)
EC	GC	2,502	1,997	25	0.25
EC	GN	2,248	1,784	26	0.26
Average Non-Residential WoH				48	0.48
East of Hills					
ER0	D	1,448	729	99	0.10 (8)
ER1	D	1,428	793	80	0.80
ER1	D	1,171	793	48	0.48
ER1	F	1,803	1,014	78	0.78
Average ER1 EoH (w/o vineyards)				63	0.63
ER2	D	2,126	1,534	39	0.39
ER2	E	1,983	1,430	39	0.39
ER2	F	2,396	1,690	42	0.42
ER2	H	2,341	1,424	64	0.64
Average ER2 EoH				46	0.46
ER3	D	2,524	2,345	8	0.08
ER3	H	5,707	4,050	41	0.41
Average FR3 EoH				24	0.24
EC	F	3,039	2,117	44	0.44
EC	H	3,832	2,190	75	0.75
Average Non-Residential EoH				59	0.59

(1) Sample LUDs from new construction data averaged by region
(2) Samples at lower density adjusted to reflect future uses anticipated to be closer to 9 du/ac upper end of density range
(3) Used average WoH LUD due to outlier sample omitted
(4) No LUD available; used average WoH LUD
(5) High single sample omitted; no adjustment factor used
(6) Increased 10percent for higher EO LUDs due to combining of categories
(7) Based on 1 sample; reduced by 20percent to be conservatively low
(8) Reduced to 10 percent to reflect future vineyards

future FR6s (100+ du/ac) are in region GC (Oakland); the only FR5s (50 to 100 du/ac) in the EoH are in region H (Walnut Creek). This may be due to the general plans not having density categories specifically for 100 dwelling units per acre and above. Only Oakland has specifically designated high rise office uses downtown (46 acres). Berkeley is encouraging high rise buildings downtown, while Walnut Creek has height limitations for new buildings.

As described previously, although LUDs for existing irrigated turf (EPI) and schools (ES) have generally increased between 1996 and 2005, these LUDs were not adjusted due to a lack of specific data justifying the change and the difficulty in locating meters accurately as discussed with existing land uses above. One trend noted for irrigated turf is the use of artificial turf in new playfields (with some retrofits noted). This would either result in a decrease in the LUDs in the future, or a decrease in EPI acreage, depending on how the land use database captures the lands. However, since it is a relatively new activity, and there is controversy over health effects associated with artificial turf, it is not known if this will be a significant trend. This potential trend should be watched and future demand projections should reflect any changes in consumption patterns associated with artificial turf.

The consistent pattern found, as stated previously, was that new development LUDs are higher than historical average LUDs. It is recommended that before the next update to the 2040 Demand Study, new development densities should be tracked from water service requests, an updated land use map should continually be modified to make updates more efficient, and more sample data should be developed for higher density land uses.

Special Land Uses

Adjustments to LUDs for unique land uses and water users were determined by reviewing each case separately to identify the best approach. The approach used for high water users and the unique land use categories of R0 and FMUR are described here. Increases in future conservation and non-potable water use were based on the selected WSMP 2040 Preferred Portfolio. The resulting adjustment factors are presented in Appendix E.

High Water Users

High water users are either a single facility that requires a large amount of water on an annual basis, or are large areas of land on very few water meters. Both instances reflect significantly higher than average consumption. Including high water users in the averaging of LUDs for each region would result in increases in the average and were therefore treated as unique separate land uses. To determine future changes in demands for high water users, each customer was contacted to determine expansion, process, or any other changes anticipated before year 2040 which would impact water demands. Several customers responded to the telephone interviews. For those not responding, information was obtained from District water supply assessments for proposed expansion projects.

Of the 11 highest water users (meters), there are 10 (six customers on 10 meters) users with potential changes in demands. Although high water users are not specifically identified in this document for privacy reasons, one exception was made. The City of Alameda has an unusual situation where the former Alameda Naval Air Station relied on two meters servicing large areas. These lands are currently being redeveloped into individual homes and businesses with individual meters, thus phasing out the single meter for a large area of land by 2030. Five customers anticipate increases in demands ranging from 10 to 30 percent by 2015. Adjustment factors were developed for customers anticipating changes in demands.

Residential Level 0

ER0 represents developed lands with 20 percent or greater slopes in Lamorinda. Lands with 20 percent slopes or greater are not permitted to develop with residential uses in Orinda and Moraga (region D); Lafayette (regions D and E) limits development to slopes less than 35 percent. However, many of these large irregularly shaped parcels have existing dwelling units; some existing parcels have developable lands which could accommodate an allowable accessory unit or another dwelling within the permitted densities, and some areas have meters located in these polygons which represent a demand that must be accounted for. In addition, vineyards and other agricultural uses are allowed and are becoming more common in high slope ER0 areas and in ER1 areas. Home sales are advertised with vineyard potential and city planning staff noted this growing trend.

Vineyards appearing in R0 and R1 residential lands use potable water.

Sample historical comparison data were analyzed and indicate that water demands of low density homes with a vineyard can be 78 percent greater than without vineyards. Several planning agencies interviewed provided rough estimates of the number of new vineyards being added each year, new accessory units developed with permits, and/or new homes on slopes greater than 20 percent but less than 35 percent (for Lafayette). Based on this anecdotal data provided and a review of changing land use patterns, it was assumed that demands are likely to increase by 10 percent by 2040. This assumption may be conservatively low and should be reviewed in the next update.

Mixed-Use Residential

All future mixed use (FMUR) land uses (FMUR2 through 5) relied on the LUD and adjustment factors for the underlying residential density of land use. For example, the FMUR2 LUD and adjustment factors are equal to FR2 LUD and adjustment factor for each region. Sample consumptions data for demands associated with nonresidential uses constructed in mixed use developments were analyzed and compared with residential LUDs of similar densities. Data indicate that LUDs are dominated by the residential water demands. This appears to be partly due to new mixed use developments in Jack London Square and Emeryville that do not have a regional draw to support high water use commercial activities such as restaurants on the ground floor. Prior to the next Demand Study update, consumption data should be gathered on an on-going basis to then be analyzed for these large-scale mixed use developments. It should be determined if non-residential demands increase significantly enough over time to warrant the use of a higher value LUD.

The Bay Street mixed use project has high occupancy retail uses on the ground floor. Upper residential floors were not fully occupied in the base year of 2005.

Conservation and Non-Potable Water

The demand projections incorporated non-potable water and water conservation as a direct subtraction from the system input demand projections. Non-potable water and water conservation projections were provided by the WSMP 2040. The WSMP 2040 projections resulted in significant decreases to demand projections between 2010 and 2040. For example, the WSMP 2040 projected non-potable water usage to increase from 6 mgd in 2005 to 20 mgd in 2040. Projected water savings from conservation efforts are to increase from 18 mgd in 2005 to 62 mgd in 2040. System input reductions associated with the WSMP Portfolio assumptions are discussed in Chapter 6.

Application of Future Adjustment Factors

Future adjustment factors were described in this chapter for existing development and new development. There are 1,416 future adjustment factors for existing and new development alone. In addition, unmetered water and normalization factors discussed in Chapter 4 were applied to existing LUDs to generate future LUDs for each planning period.

The adjusted LUDs were applied to the acreages of land use in each region to calculate system input demands. Demands per land use per region were summed for each projection year to determine the projected water demands. The resulting projected demands are presented in Chapter 6, Water Demand Projections.

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Chapter 6: Water Demand Projections

This chapter presents the 2040 District-wide demand projections and an analysis of projections by region. Recommendations for future updates to the demand projections are provided.

The demand projections were developed prior to the onset of the economic recession in December 2007[1]. The timing of development and associated demand will likely be realized slower than what is projected in this study. In addition, the continuation of the drought and the mandatory conservation imposed by the District (since the latter half of 2008) will likely reduce future demands. The magnitude and duration of reductions to projected demands is dependent on myriad factors such as the continuation of the drought, conservation/rationing policies, and the state of the economy.

Demand Projections to 2040

As described in previous chapters, future demands were calculated by applying adjustment factors to existing LUDs and multiplying the adjusted LUD by the acreage of land use. This process was conducted by the Demand Model for each of the 36 land use categories, for 11 regions, and for planning periods of 2010, 2015, 2020, 2025, 2030, and 2040. These average annual demands were further adjusted to incorporate the WSMP 2040 selected portfolio for conservation and non-potable water projections. The demand projections in this analysis do not reflect the greatest potential water demands, but rather, reflect current planning policy by land use agencies. Higher demand projections may be associated with other forecasting techniques such as long range population projections or demands based on assumptions that most land uses will increase in density over time but without specifically reflecting community policy.

Table 6.1, 2040 District-wide Demand Projections, presents unadjusted system input (without offsets to potable demand from conservation and non-potable), conservation, non-potable, and adjusted system input (net potable demands). The WSMP portfolio selected by the Board of Directors in 2008 provides for a variety of projects including planned conservation and non-potable water usage programs, included here.

The WSMP Preferred Portfolio assumptions regarding conservation and non-potable usage programs result in projected 2040 demands reduced by an additional 44 mgd for conservation savings above 2005 levels and an additional 14 mgd for non-potable usage. This results in a total reduction of demands of 82 mgd (the difference between unadjusted and adjusted). The projected 2040 adjusted system input of 230 mgd reflects a seven percent increase in demands over 2005 levels (214 mgd).

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[1] National Bureau of Economic Research, December 11, 2008 (http://www.nber.org/cycles/dec2008.html).

Table 6.1
2040 District-wide Demand Projections

	Demand Projections (mgd)						
	2005	2010	2015	2020	2025	2030	2040
System Input (unadjusted)	238	251	266	280	291	304	312
Cumulative Conservation	-18	-25	-32	-40	-47	-55	-62
Cumulative Non-Potable Water	-6	-10	-17	-19	-20	-20	-20
System Input (adjusted)	214	216	217	221	224	229	230

As Table 6.1 indicates, demands tend to nearly level off after 2030. This is due primarily to the planning agency staff anticipating that most of the planned land uses will be developed by 2030 and all planned land uses developed by 2040. Figure 6.1, Actual System Input with Demand Projections, illustrates the effects of conservation and non-potable use on the demand projections. Actual system input is the historical consumption with unmetered water; unadjusted system input is the projected demand without additional future conservation and non-potable projects; and adjusted system input is the projected demand including all the conservation and non-potable projects in the 2040 WSMP.

Figure 6.1 Actual System Input with Demand Projections

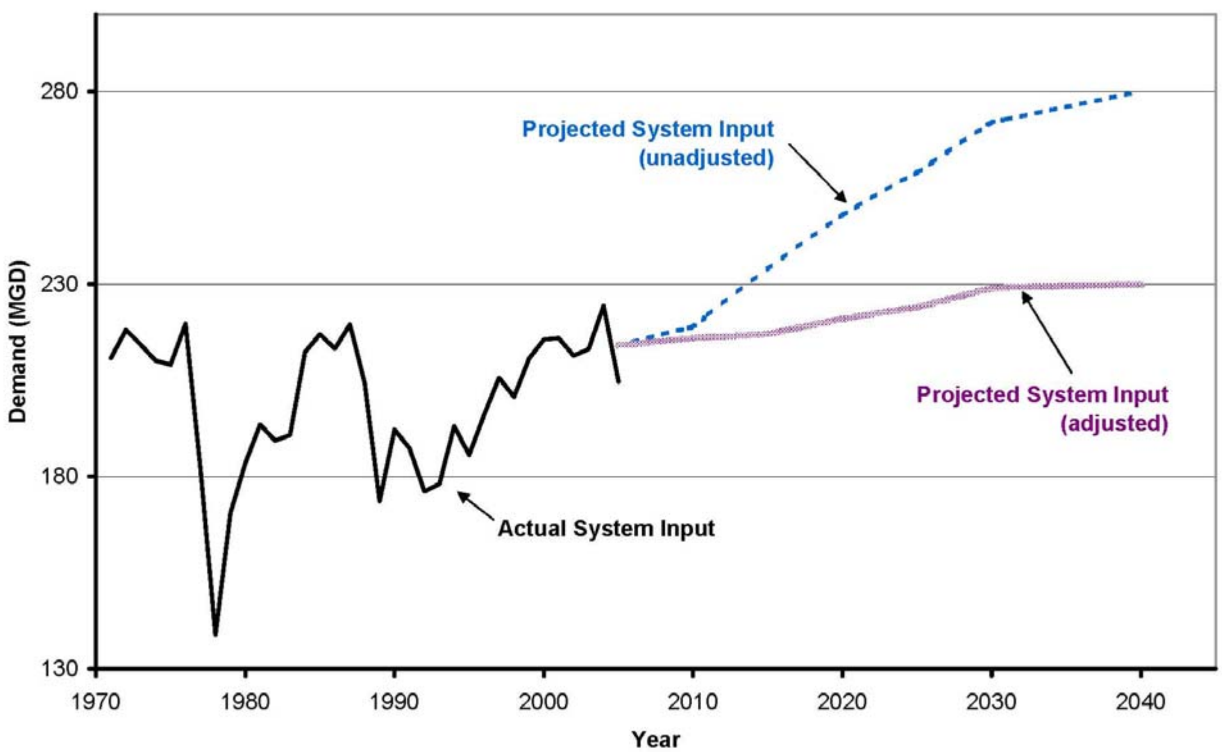
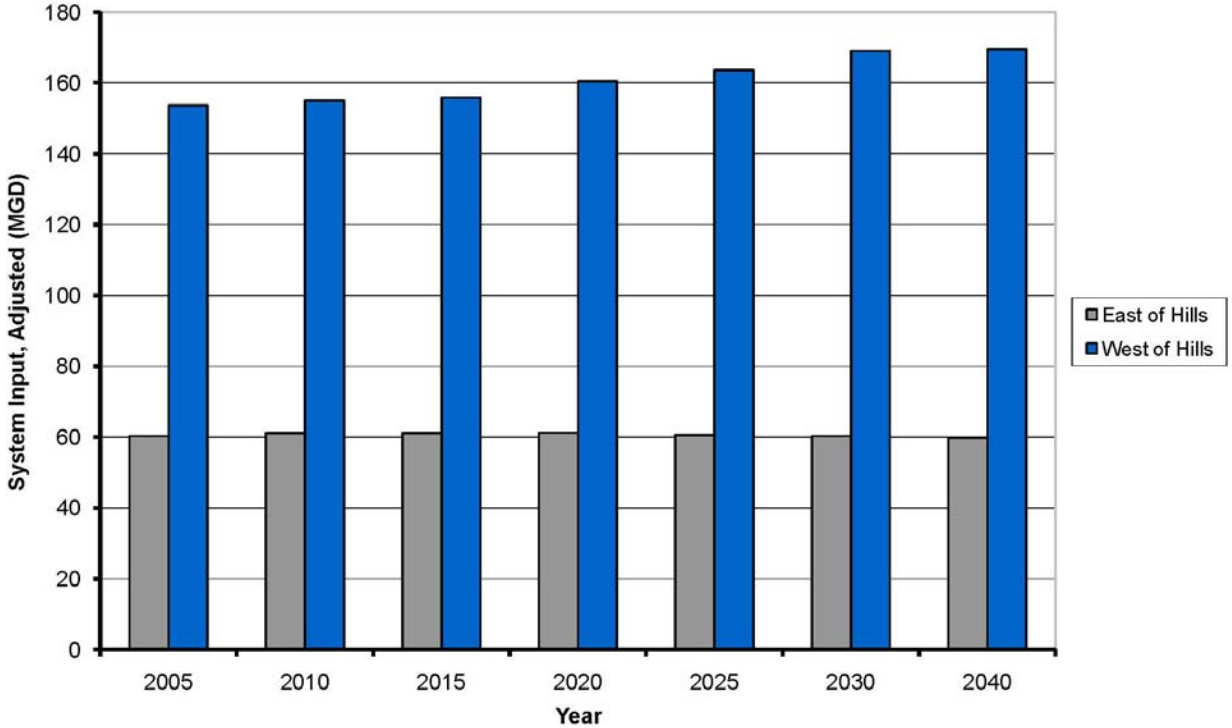


Figure 6.2, Demand Projections: East and West of Hills, presents the adjusted system input by the two primary District service areas: EoH and WoH. The eastern area has historically had

lower total demands than the western service area due to its smaller areal extent, lower densities, and less industrial and commercial uses. In fact, as of 2005, EoH had 76,680 meters while WoH had 296,808 meters. The EoH area is projecting to remain steady at approximately 60 mgd due to offsets in demand growth from future conservation savings and non-potable water use.

Figure 6.2 Demand Projections: East and West of Hills



Demand Projections by Region

Table 6.2, Water Demand by Regions, provides a comparison of the scale and pattern of water demand growth throughout the study area between the base year and 2040. In the 2000 Demand Study, the significant growth in demands was associated with the development of new lands EoH. The 2040 Demand Study projects a shift in demand growth from the development of new lands EoH to infill and redevelopment of lands WoH.

Redevelopment of underutilized lands results in a significant increase in projected demands West of Hills. This photo is of the former Alameda Naval Air Station.

Table 6.2
Water Demand by Regions

Region	System Input (Adjusted)		
	2005 (mgd)	2040 (mgd)	Change in Demands (%)
AN	22	22	0
AS	12	12	0
B	11	11	0
C	10	10	0
D	11	12	9
E	7	6	-14
F	34	32	-6
GC	48	61	27
GN	29	32	10
GS	22	23	9
H	9	9	0
Total	214	230	7

Note: System input (adjusted) includes future conservation and non-potable projects.

Figures 6.3 through 6.5 present the existing and projected demands for each region including the interim years. The regions are generally grouped by EoH and WoH, with Figure 6.4 reflecting regions with greater demands, thus requiring a higher range in presentation scale. Region GC is anticipated to experience the greatest increase in water demands due to dynamic changes occurring and planned by the cities. This is discussed in detail in Chapter 3, Land Uses and Trends.

New residential development in region GC at the former Alameda Naval Air Station.

Figure 6.3 Demand Projections for Regions AS (Berkeley Hills), B (Oakland Hills), and C (Castro Valley)

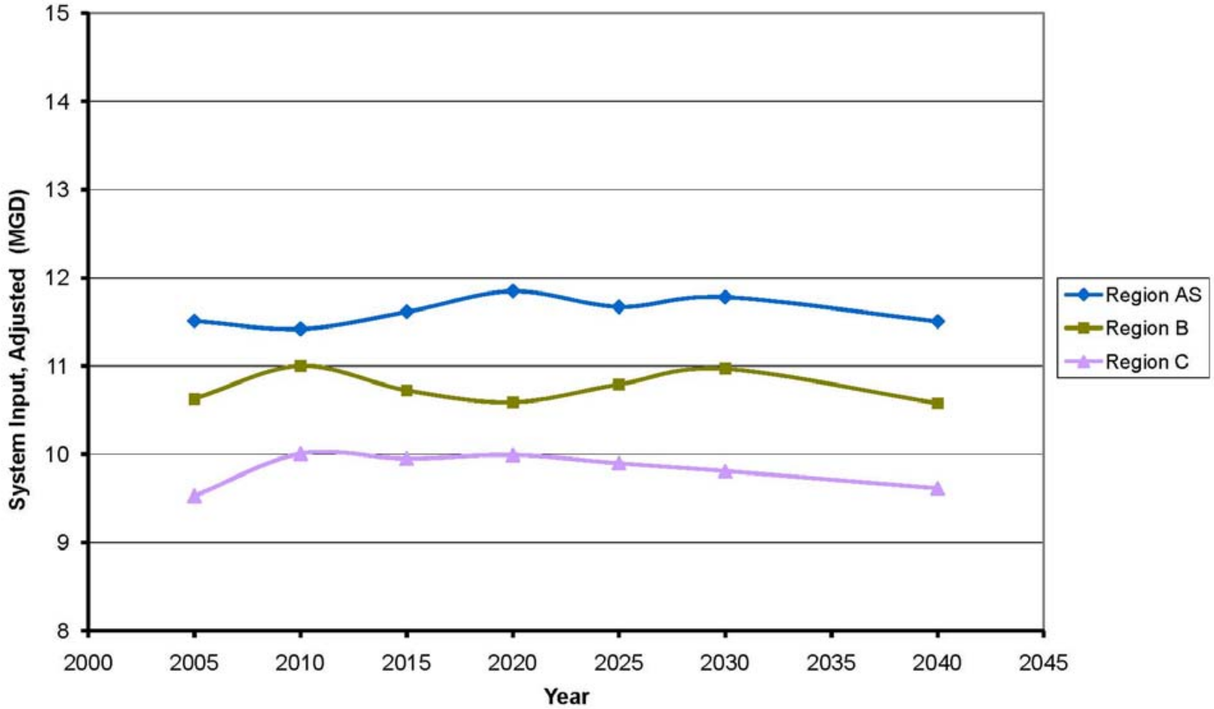


Figure 6.4 Demand Projections for Regions AN (Pinole), GC (Oakland), GN (Richmond), GS (San Leandro), and F (Danville)

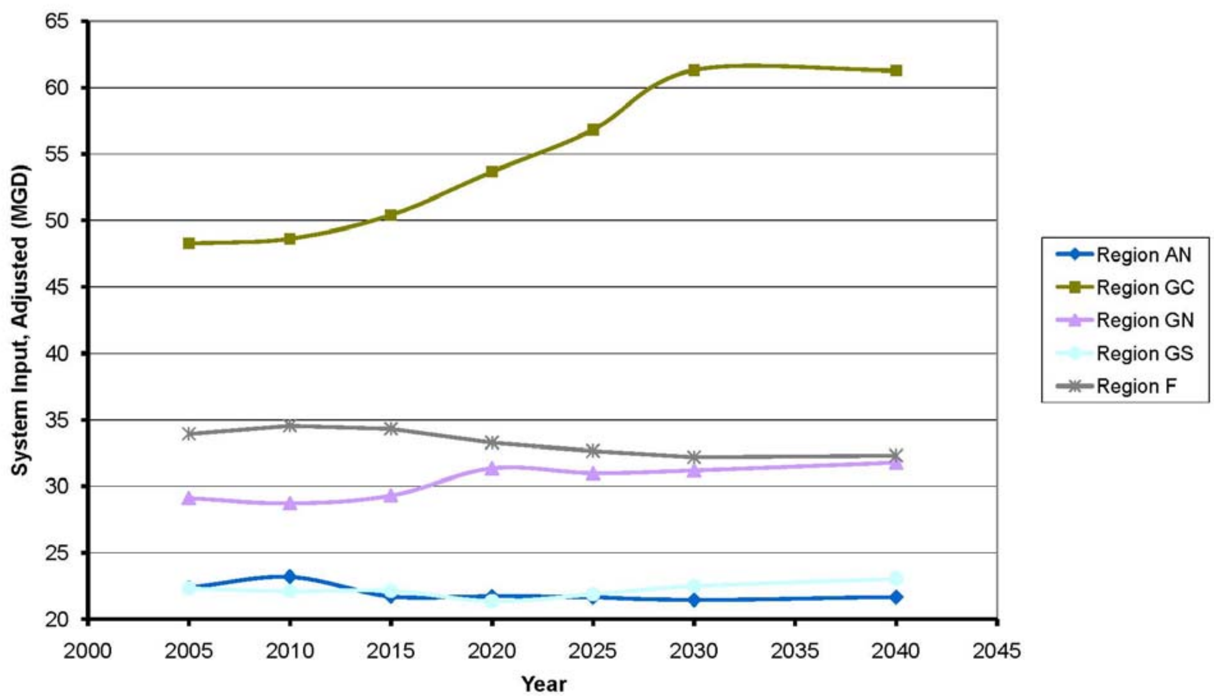
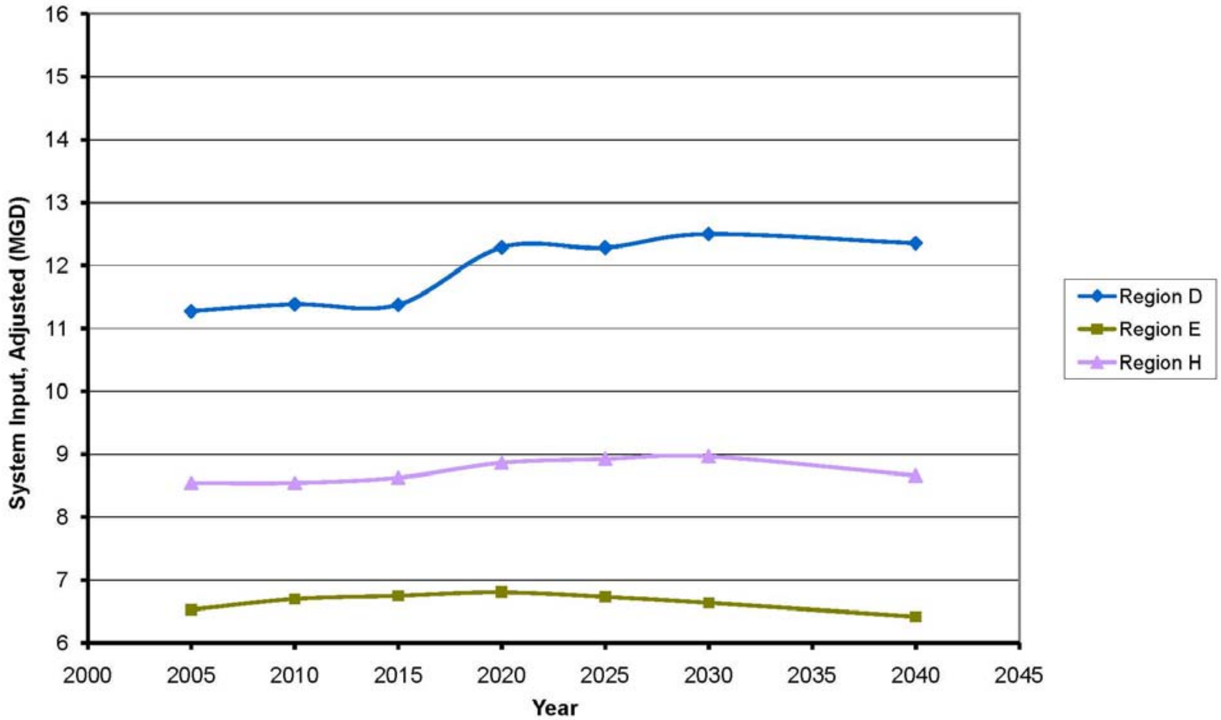


Figure 6.5 Demand Projections for Regions D (Orinda), E (Eastern Lafayette), and H (Walnut Creek)



Future Demand Study Updates

Several recommendations are provided here for the District's next update to demand projections.

- The land use database should be continually updated because general plan land use designations may be changed by the community over time. Planned land uses, historically have changed over time to reflect increased allowable densities of development. Since higher densities can greatly impact water demands, an updated land use map should continually be modified to make updates more efficient. In addition to tracking general plan amendments, it is recommended that actual new development densities be tracked from water service requests. In addition, more sample data should be developed for higher density land uses.

- The accelerated use of artificial turf is relatively new, however, potential growth of its use may be subdued because of the controversy over health effects associated with artificial turf. This potential trend should be watched and future demand projections reflect changes in consumption patterns associated with the replacement of irrigated turf with artificial turf.

- Based on anecdotal data and a review of changing land use patterns for the R0 land use category, it was assumed that only 10 percent of the potential increase in demands on a per acre basis would be realized by 2040. This assumption may be conservatively low and should be reviewed in the next update.

- High density mixed use developments are relatively new and are being planned extensively throughout the study area, yet consumption data are limited. The residential land use LUDs were used for future mixed use developments, which does not account for the commercial uses on the ground floors. Additional consumption data should be gathered on an on-going basis and analyzed for these large-scale mixed use developments to determine if the non-residential demands increase significantly enough to warrant the use of a higher value LUD.

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Appendix A

Abbreviations and Glossary

To enhance readability, the following abbreviations and acronyms were used in this report.

1993 WSMP	Water Supply Management Program (1993)
2000 Demand Study	District-Wide Update of Water Demand Projections (2000)
ABAG	Association of Bay Area Governments
ac	acre
AD	average annual demand
BART	Bay Area Rapid Transit
CEQA	California Environmental Quality Act
City Limits	Encompasses incorporated territory where land use is controlled by the city
consumption	Metered consumption of potable water
Demand Study	WSMP 2040 Demand Study
Demand Tool	A GIS based application to calculate demand projections
densification	Underutilized land converted to a more intense use without changing its land use designation
District	East Bay Municipal Utility District
DMR	Demand Model Region, or region
DOF	California Department of Finance
du	dwelling unit
du/ac	dwelling units per acre
EBMUD	East Bay Municipal Utility District
EoH	East of the Oakland Hills

GIS	geographic information system
gpd	gallons per day
gpd/ac	gallons per day per acre
HDR	high density residential (ER3 through ER6) used for normalization analysis only
ILI	infrastructure leakage index
infill	Small vacant developable and or underutilized lands within existing development polygons
intensification	An increase in the intensity of land uses, typically associated with infill development and redevelopment that does not necessarily result in a change in land use designation
JPA	jobs per acre
LAFCO	Local Agency Formation Commission
Lamorinda	Includes Lafayette, Moraga, and Orinda
land use polygon	polygon designating a specific land use category
LDR	low density residential (ER0 through ER2) used for normalization analysis only
LUD	land use unit demand
mgd	million gallons per day
mixed use	Land use that allows for residential uses typically located above commercial uses in the same building
normalization	To remove the effects of weather and other factors on annual demands
polygon	A closed planar area bounded by three or more sides
redevelopment	Used to describe the replacement of a building or other use of land, with a different use. Not a legal term as in a Redevelopment Agency.
region	Demand Model Region
seasonal index	Monthly demands data representing weather normal average conditions
smart growth	Compact development along and near transportation corridors

SOI	Sphere of Influence as established by LAFCO. Encompasses incorporated and unincorporated territory that is in a city or district ultimate service area
System Input	Quantity of water that enters the distribution system from treatment plant production and groundwater inflow, with adjustments made for distribution storage.
System Input (adjusted)	Distribution system demand adjusted for normalization, unmetered water, non-potable usage, and conservation savings.
System Input (unadjusted)	System input including normalization and unmetered water, but without offsets from non-potable water and conservation savings.
TM	Technical Memorandum
UMW	unmetered water; water that leaves the distribution system without being measured resulting from both authorized and unauthorized sources and activities including District unmetered facility use, system water quality control maintenance activities, fire flow, metering inaccuracies, water theft, leaks (both acceptable and not), pipeline and valve breaks, and potentially other unidentified losses.
USB	Ultimate Service Boundary
UWMP	District's Urban Water Management Plan updated every five years
WMA	weighted moving average
WoH	West of the Oakland Hills
WSMP	Water Supply Management Program 2040 (unless otherwise noted)

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Technical Memorandum Number 2

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From: Karen Johnson, Water Resources Planning, Demands Manager
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Date: September 4, 2007

Subject: **Water Supply Management Program 2040 – Demands Study Meetings with Planning Agencies**

Introduction

This Technical Memorandum (TM) Number 2 has been prepared for East Bay Municipal Utility District (EBMUD or District) as a part of the Water Supply Management Program (WSMP) 2040 Demands Study. The Demands Study provides the District with an update to its analysis of existing (2005) and projected system input. System input is comprised of customer demands and unmetered water. This current analysis replaces the previous analysis of demand projections published in 2000 which were based on an "existing demands" start date of 1996. Year 2005 was chosen as the existing demands date for this analysis because of the availability of a full year of consumption data and a lack of unusual conditions impacting water consumption.

This TM Number 2 is organized by the following topics.

- Background
- Overview of Land Use Activities
- Land Use Trends
- Appendix A: Meeting Notes, Background Paper, and Agenda for Each City and County Meeting

This memorandum provides a description of the meetings held with various land use planning agencies within the study area and a summary of information obtained during these meetings or in preparation for these meetings. TM Number 2 will be followed by TM Number 3, Existing Water Demands. TM Number 3 will provide a description of the methodology used for developing existing and projected water demands, along with the existing water demand analysis results.

Background

The approach to projecting water demands relies on changes in land use within the District's ultimate service boundary. As presented in Figure 1, the approach relies on the development of a land use database derived from mapped polygons encompassing similar land uses. Land use categories were consolidated, mapped existing land uses updated, and future land uses identified based on each general plan for the city or county with land use planning jurisdiction of each future land use polygon. Meetings were held with each city and county in the study area to confirm, modify, or identify the existing and planned land use information described below.

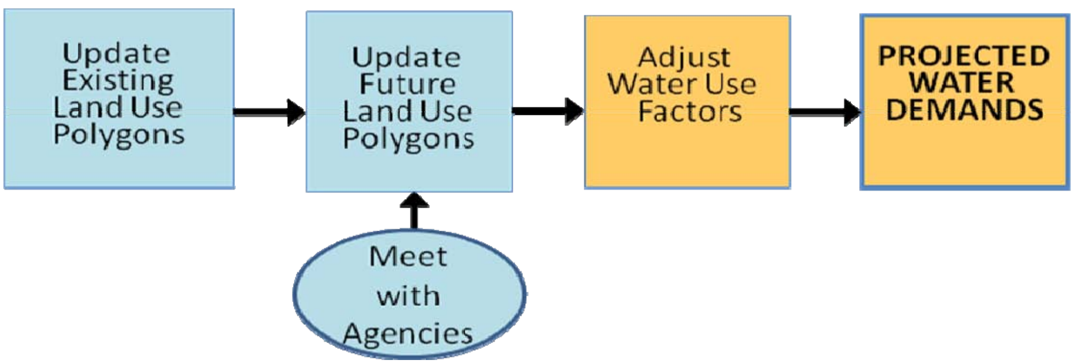


Figure 1. Overview of Approach

Study Area and City Boundaries

The study area boundary presented on Figure 2 is the District Ultimate Service Boundary (USB). The USB is similar to the District Sphere of Influence (SOI) established by the Local Agency Formation Commissions (LAFCO) of Alameda and Contra Costa counties.

Cities within the study area are presented on Figure 2. Unincorporated areas include Castro Valley and the Eden Area (including San Lorenzo) in Alameda County; and Crockett, Rodeo, El Sobrante, Kensington, Alamo, and Blackhawk in Contra Costa County. Portions of the cities of Walnut Creek, Pleasant Hill, and Hayward are within the study area.

Land Use Categories

All cities and counties in California have a general plan to provide for and implement the vision for the development of the community. General plans include a land use element and land use map with specific allowable uses and densities for all lands within the SOI. Each community within the project study area used different land use categories in their general plan land use element. Therefore it was necessary to standardize the categories and enable them to reflect land uses with similar average annual water consumption requirements, seasonal consumption patterns, or diurnal (24 hour) consumption

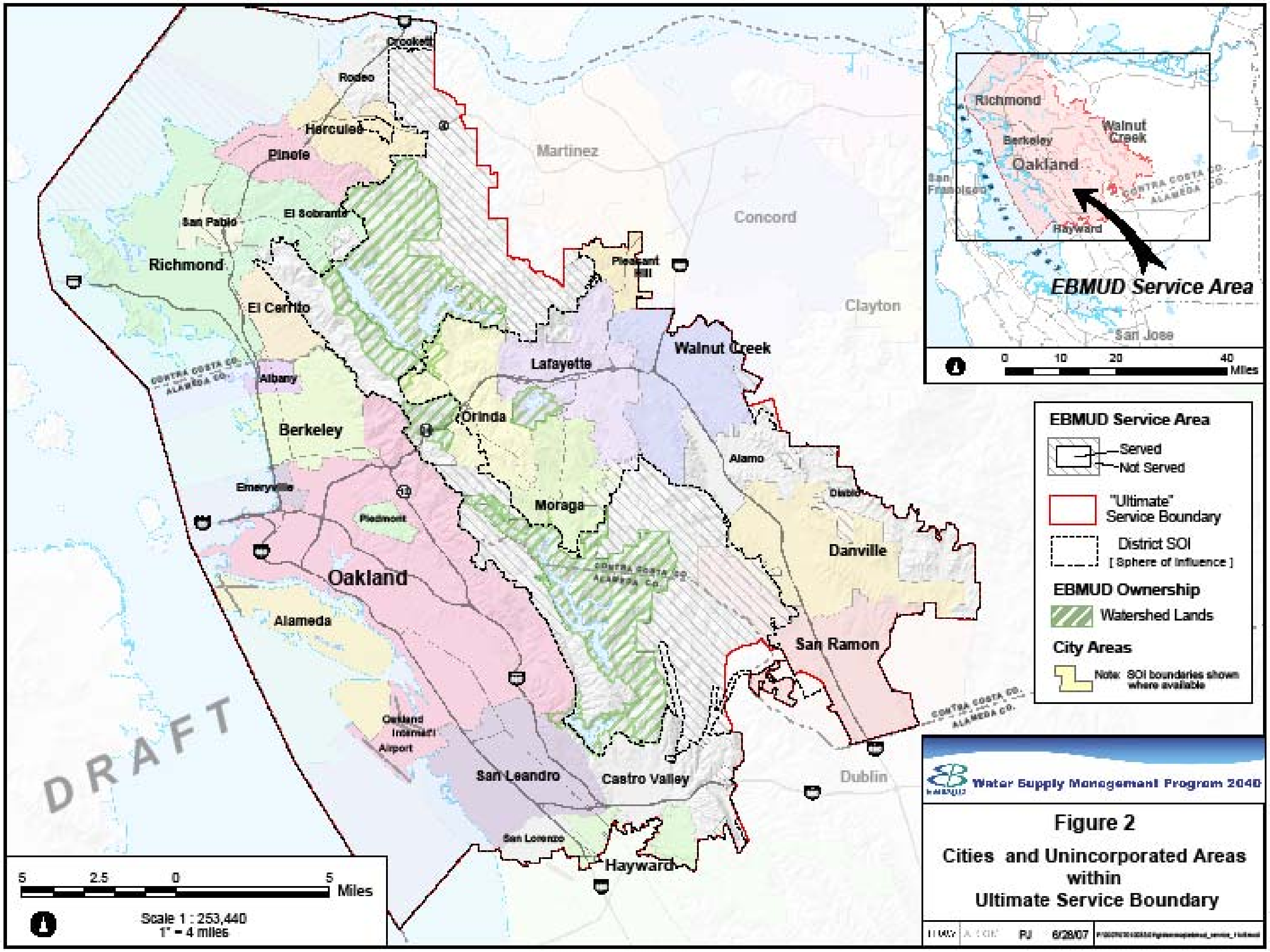


Figure 2

Cities and Unincorporated Areas within Ultimate Service Boundary patterns. Table 1 presents a summary of the land use categories used for the mapping and analysis of existing land uses (starting with E) and future land uses (starting with F). The future land use categories reflect either vacant polygons or existing land uses which are anticipated to redevelop as a different land use in the future. These land use category abbreviations are used in this memorandum.

Table 1. Land Use Categories

Land Use Categories		
Existing Land Uses	**Future Land Uses**	
ER1: 0 to 2.9 du/ac	FR1	
ER2: 3 to 9.9 du/ac	FR2	FMUR2 (2)
ER3: 10 to 19.9 du/ac	FR3	
EFMUR3: 10 to 19.9 du/ac plus commercial		FMUR3 (2)
ER4: 20 to 49.9 du/ac	FR4	FMUR4 (2)
ER5: 50 to 100 du/ac	FR5	FMUR5 (2)
ER6: 100+ du/ac	FR6	
EIL: Low intensity industrial	FIL	
EO: office and industrial	FC: office, retail, services, and industrial	
EC: retail and industrial		
EOH: high density office	FOH	
ER: petroleum refinery		
ES: schools	FS	
EPI: irrigated turf	FPI	
EP: public and quasi-public uses	FP	
EHW: high water users(1)		
ERW: recycled water		
ERAW: non-potable water		
EV: vacant, developable (no current water use)		
EOS: open space (no water use)		

(1) Each high water user is labeled separately.

(2) Future Mixed Use Residential utilizes the same density categories as existing and future residential categories; it also incorporates retail uses on the ground floor.

Four new land use categories related to mixed uses but with different densities of residential development (FMUR2 through FMUR5) were added to the list since the previous study. This was due to the more prevalent use in recent general plans of land use categories reflecting different densities of residential development with retail or office uses allowed on the ground floor.

Separate Office (EO) and Commercial (EC) categories were maintained for existing conditions, but were combined into a single category for future conditions (FC). This decision was based on the review of development patterns for new construction since 1996. These particular land uses were being developed or redeveloped together with very little distinction between uses. Since the water consumption does not vary greatly between these previously segregated categories, combining the two categories was more efficient. Separate categories were, however, maintained for 'Low Intensity Industrial' (EIL: warehousing, storage, and similar low water consumption uses), and 'High Density Office' uses that exhibit greater consumption than EO.

Existing Land Uses

Existing land use polygons, using the categories described above, were created in a geographic information system (GIS) program for each cluster of land with an apparently similar type of use. The land use polygons were originally developed during the previous demands study based on interpretation of 1996 orthophotographs. These existing land uses were updated to reflect 2005 land uses using 2005 orthophotographs and site visits. Unique water users, such as high-volume water users and recycled water users, were identified by EBMUD based on annual consumption data and the use of recycled water, respectively. Each unique water user was bounded by an individually labeled polygon.

Figure 3. Example of Existing Land Use Polygons (with and without aerial photograph in background)

Future Land Uses

An important part of EBMUD's approach to projecting water demands is the reliance on locally-defined visions of how the respective communities are to grow and change during the WSMP 2040 planning horizon. The planned land uses reflect the communities' vision and provide the basis for future water demands.

During the mapping of existing land uses, areas that appeared to be vacant and developable (according to the general plans) and currently unirrigated, were labeled 'Existing Vacant" (EV). Existing land uses that were anticipated to experience a change in land use, or an increase in the density of the current land use in the future, were identified based on several sources of information:

- published community general plan land use maps that identified designated buildout land uses, and other planning documents that identify specific change areas (e.g., Grow and Change Areas identified in the Oakland General Plan);
- changes that are occurring now (e.g., expansion of retail commercial in downtown Walnut Creek); and
- new development, reuse, and densification areas that were specifically identified during the planning agency meetings described below.

Once these future vacant or redeveloped land use polygons were identified, the land use maps from the general plans (or specific plans) of each of the cities and counties were used to identify land use designations. After the future land use polygons were identified and labeled according to the planned land uses, draft existing and future land use maps were developed and presented to each of the cities and counties for review.

Overview of Land Use Activities

There are 17 cities entirely within the District service area, three cities partially served by the District, and eight significant unincorporated areas located within two counties within the service area. This section provides a summary of land use activities occurring within the 17 cities and two counties based on information obtained from the meetings held with the land use planning agencies listed in the boxes and located on Figure 2. The County of Alameda was not available to meet with project staff. Meetings were not held with the cities of Pleasant Hill and Hayward because their lands within the District service area are very limited.

Meetings with Land Use Planning Agencies

EBMUD staff and members of the consultant team met with planning agency staff from the service area communities, as listed in Table 2 at the end of this TM. Pre-meeting background papers were prepared prior to each meeting to summarize pertinent information obtained from review of the agency's general plan document(s). The background papers noted policies related to the community's vision of growth, along with additional details such as the range of densities identified for growth areas and redevelopment, locations targeted for economic or residential development, and long term trends that might affect water demands.

Contra Costa County Planning Agencies

Contra Costa County
City of El Cerrito
City of Hercules
City of Pinole
City of Richmond
City of San Pablo
Town of Danville
City of Lafayette
Town of Moraga
City of Orinda
City of San Ramon
City of Walnut Creek

Draft GIS maps were prepared for these meetings depicting existing and future land uses using the SOIs for each city, and unincorporated county lands for the counties. An aerial based future land use map of the same coverage was also prepared. After briefly describing the objectives of WSMP 2040 and the importance of updating the future water demands analysis to support those objectives, community planners were asked to contribute the following information.

Alameda County Planning Agencies

Alameda County
City of Alameda
City of Albany
City of Berkeley
City of Emeryville
City of Oakland
City of Piedmont
City of San Leandro

- Confirm and correct mapped existing land uses.
- Confirm, correct, and expand, if necessary, the mapped future, planned land use polygons and categories.
- Identify additional future land use polygons.
- Determine the anticipated timing of development of future land uses, within a schedule of five-year increments from 2010 to 2040.
- Discuss the long term character of the community, out to year 2060, as may be reflected in long term land use pattern trends or community vision.

Development occurring since 2005 was identified in the next increment of 2010. If staff identified a polygon that would likely develop incrementally, the polygon was subdivided and each new polygon labeled with the anticipated year of development. In instances where staff would not assign a future development date to a change area, such future development was assumed to occur around 2040. Since most city agency staff representatives declined to comment on future land uses outside of the city limits but within their SOIs, these unincorporated areas were presented to the counties for their review.

Following the planning meetings, WSMP project staff modified the draft existing and future land use maps according to community staff planner input and prepared meeting notes. At the time that this memorandum was prepared, County of Alameda was not available to meet with project staff. The agenda, background paper, and summary notes from each meeting are provided in Appendix A.

Summary of Significant Land Use Activities

The most significant land use changes, including densification, are planned for the cities of Alameda, Emeryville, Oakland, and Walnut Creek. A summary of significant land use activities of each city and county within the study area is provided below. Full descriptions of planned land uses in each community based on the planning meeting discussions are provided in Appendix A. These land use changes are reflected in the project mapping of future land uses. Some redevelopment, densification, and other types of changes to land uses and activities identified here will not change the underlying general plan land use category, but may influence the water use factors assumed for future lands.

Alameda County. The County of Alameda was unavailable to meet regarding this project. Information was obtained from general plan documents. In the unincorporated community of Castro Valley, the general plan encourages mixed uses, accessory units, subdivision of large lots for higher densities, and rezoning for higher density multi-family residential developments. A Castro Valley BART station project is planned to include mixed uses with office, retail, and services on the ground floor and housing above, developed on the existing parking lot. Significant development potential remains in the following areas once constraints, such as water supply for some areas, are removed and sensitive resources are protected: Madison Commons; EBMUD land; John Drive area; Crow Canyon Road area; and Jensen Road area.

The Eden Area (Ashland, Cherryland, El Portal Ridge, Fairmont Campus, Hayward Acres, Hillcrest Knolls, Mt. Eden, and San Lorenzo) general plan encourages infill development to increase the density of existing neighborhoods. The majority of medium to high density residential development is focused along transportation corridors; assembly of parcels to create larger and more easily developable lots is encouraged along corridors. Lewelling Boulevard to be redeveloped for denser uses; Brockman

Shopping Center encouraged to be redeveloped with residential added; and Grant Avenue industrial area underutilized with research and development encouraged.

Alameda. The most significant area of redevelopment within the City of Alameda is the reuse of the Alameda Naval Air Station. The reuse plan for this area, called Alameda Point, is being implemented with over 200 people living in the area at the present time. Most of this area is currently on one single water meter, thus considered a high water user, but each new user will have its own meter. The future land uses include new commercial areas, a variety of ranges of residential densities, mixed uses, and park and recreation areas. A large area in the northwest is being considered for either a golf course or a veteran's cemetery. The ferry terminal may be moved by 2015 to Sea Plane Lagoon (Hornet location). The timing of development of specific parcels is dependent on what lands the Navy will release, when they will release them, and what cleanup effort is required.

Alameda Landing is located along the harbor to the east of Alameda Point. It is being redeveloped with FR3 density residential, high density office (FOH), and play fields and waterfront parkway. Alameda Gateway is between Alameda Landing and Alameda Point and will densify with high density office uses and FR3 residential by 2015 surrounding the existing winery. Shipways is an underutilized office area planned for 143,000 square feet of office uses. Towne Centre (formerly South Shore Shopping Center) will retain the same land use, but intensify with an additional 100,000 square feet of retail replacing existing buildings and parking lots. Bay Farm Island business park has some developable lands but an intensification of uses is planned; 106 dwelling units are being discussed in this area, but lands are not presently designated for residential in the general plan; the sport club may move and be rebuilt with residential uses, but this is also not currently in the general plan; and the old landfill north of the golf course may develop as an irrigated park by 2030. The Northern Waterfront area will redevelop an old tank farm and other industrial uses to FR3 by 2010; FR3 by 2015; FMUR3 by 2030; FC by 2020. East of this area, along the waterfront will be FMUR3 uses sometime between 2015 and 2025, with the Coast Guard lands remaining in their present use. The commercial corridors of Park Avenue and Webster Street may intensify with second stories added to the existing historic structures and parking structures built on underutilized lots. Overall, people per households in Alameda are increasing as the immigrant population increases, resulting in more basement conversions to living space. Extensive infill of small vacant or underutilized lots will take place over the next 10 to 15 years with second units added.

Albany. There are no major development plans within the city. The University Village is continuing to be rebuilt with higher density residential uses. Gradual intensification of commercial uses along San Pablo Avenue corridor is occurring. Most of the growth in demand will be due to the construction of multiple story commercial buildings where single story buildings of the same land use category currently exist. In addition, more mixed use buildings with residential on the upper floors will replace many of these single story commercial buildings over time. The Saint Mary's High School and Albany Middle School playing fields will be replaced with artificial turf in the future.

Berkeley. The Downtown Specific Plan will likely be adopted by 2010. Under it, the downtown will double in size, particularly the core area around Center, Oxford, and Shattuck. A hotel and conference center, museums, and other regional facilities are planned, which will replace existing commercial buildings. About 1,200 dwelling units have been constructed within the city in the past seven years with 1,000 units currently undergoing development review. 100 to 200 units per year are anticipated to be developed to meet the regional housing demand. Intensification is expected along the major transportation corridors of Bancroft, Telegraph, and Shattuck avenues. A 19-story commercial hotel, conference center, and museum are planned for the Center Street block between Shattuck and Oxford. The Ashby BART western parking lot will be converted to 300 dwelling units. The western commercial and industrial lands will intensify with more office, laboratories, research & development, and live-work units. A ferry terminal may be located at the marina waterfront in the future; all other commercial uses proposed in the past for the marina area have been changed to open space and low-scale recreational uses.

Emeryville. The city is currently updating its 1993 General Plan. The city has changed greatly in the last decade and will continue to do so as old industrial properties convert to medium to high density residential (typically FR3 and denser), office, and other commercial uses. Major projects include: Chiron to build new facilities between Horton, Hollis and 53rd streets; new residential, restaurant, and other retail at Marketplace, replacing the existing movie theatre and some parking; south Bayfront Site B retail, hotel, and residential above the hotel adjacent to the Bay Street mall; research and development uses north of 59th Street and east of the Amtrack station; and BRE Gateway residential and retail commercial proposed between Christie and La Coste, north of Powell. The Bay Street mall will be built out by 2010 with three to five floors of residential on top of parking floors above existing retail uses. Pixar's relatively new facilities will be expanded by 2015. Residential and commercial densities will continue to increase throughout the city with mixed uses targeted for major corridors: San Pablo Avenue, Hollis Street, 40th Street, and Doyle Street.

Oakland. Downtown: The implementation of city policy to add 10,000 residents to downtown Oakland is evident by the recent and ongoing construction of high density residential buildings. Most new projects will be 50 to 300 units each with densities of FR5 and FR6. There are currently 5 to 6 thousand units approved but not yet developed. Major projects: Uptown Mixed Use Project to redevelop lands surrounding the Fox theatre; Oak to 9th to provide 3,000 new units at FR5 density plus commercial uses and parks by 2025; Oak Knoll to provide 1,000 units including senior housing at FR3 densities; Leona Quarry to be built out by 2010 at FR3; Wood Street to provide 1,600 units at FR5 densities by 2015. The MacArthur BART station is planning over 800 units as FR6 densities, and Fruitvale BART to add 500 units, both project to replace existing parking by 2015. The Fruitvale community is interested in high density commercial and residential development, similar to a satellite downtown. The City-controlled part of the Oakland Army Base reuse areas are planned for industrial and commercial uses such as film studios and related uses, large format retail (e.g., auto dealers), and trucking and other port and maritime-related industries. There are no firm proposals for the old Army Base at this time, but redevelopment is anticipated by 2025.

The Mandela Parkway and other industrial lands in the city targeted for redevelopment to mixed uses with high density residential will likely not redevelop as uses other than industrial due to public interests in preservation of industrial lands. This trend will also impact redevelopment plans in the south and southwest industrial areas of the city. The Kaiser medical facilities at Broadway and MacArthur will be consolidated into new facilities currently under construction with reuse of existing buildings for offices. The Broadway Auto Row dealers will be moved to the old Army Base near I-80 by 2020. These large dealership parcels along Broadway between 51st and 27th Streets will be redeveloped with high end retail including department stores. San Pablo Avenue is planned to redevelop existing uses with FMUR4 densities. Telegraph Avenue in the Temescal neighborhood, on the other hand, will not redevelop with densities allowed in the General Plan due to resident opposition to the high density changes taking place. Other “Grow and Change” transportation corridors will also increase in density and intensity over time; the further south from downtown - the later (2025, 2030) the anticipated densification.

Piedmont. There is limited development potential in the city. A PG&E substation at Oakland Avenue and Howard Avenue may be moved with a residential project developed at FR3 densities by 2010. The city would like to densify the Grand Avenue commercial corridor with retail on the ground floor and housing above. However, this may be difficult to implement with separate ownerships of uses. The general plan is currently being updated.

San Leandro. Although vacant lands within the city are limited, there are opportunities for densification. Major projects: The Kaiser site next to the Marina off-ramp of I-80 is planned to accommodate a hospital by 2020 to the north, and a “lifestyle center” reflecting commercial and FR3 density housing to the south. The city is considering closing the harbor due to lack of dredging funds; if it is closed, new land uses will be determined. Downtown is considered Davis and 14th Street with transit-oriented development of increased densities envisioned by the general plan by 2030. Downtown project include a mixed use development in the San Leandro BART parking lot, Town Hall Square project, and Cannery-West Lake property developed with mixed uses. The Bayfair BART station is being studied for potential densification. Densification along the MacArthur Boulevard, 14th Street, and Washington Street transportation corridors is planned with street improvements already constructed along MacArthur Boulevard.

Contra Costa County. There is active interest in construction of accessory units in the County and more multi-generational families living together. In west Contra Costa County, the aging population will be replaced in their homes in the near future by a greater number of people per unit. Overall, the county is experiencing densification and increased densities of new development and may see an increase in the conversion of “grayfields’ (low density strip commercial uses) replaced with higher density mixed uses.

There are some vacant lands designated for medium density residential (FR2) in the unincorporated area of Crockett; however, development is generally constrained by limited sewer service and steep slopes. Rodeo industrial lands next to the refinery are currently used as a buffer but could be developed in the future. Industrial lands to the east will be developed in conjunction with refinery related operations around 2020. The business park to the south will be annexed by Hercules with commercial uses developed by 2020. Unincorporated industrial lands adjacent to Richmond currently in use for nursery production are proposed for conversion by 2015 to high density residential uses with neighborhood commercial and public uses. Some development in El Sobrante with mixed uses of FMUR3 by 2015; lands previously designated for development may be open space due to slope constraints.

The community of Alamo is considering incorporation. In Alamo, subdivisions of existing large lots are not expected in the near future; new homes are continuing to be large on large acreages; and a proposed soccer field may have artificial turf. Diablo also will continue to develop with large lots as FR1 and homes are being constructed on steep slopes. Blackhawk Plaza my redevelop with increased commercial density and multi-family housing.

Danville. Some previously designated residential lands will not be developed due to slope constraints. Downtown is built out, but may experience densification such as a FMUR2 density project proposed for Hartz and Prospect Avenues and senior housing that was built after 2005. Several homes along El Dorado were demolished and will be rebuilt as condominiums (FR2); another project is planned on this street at FR3 density. There are development proposals located throughout the city that will result in additional FR1, FR2, and commercial uses between 2010 and 2030. A proposal to modify the Urban Limit Line at the east side of Danville adjacent but outside of the District’s USB has been proposed to accommodate a 770 acre residential project; it is unknown at this time if the New Farm project will be approved.

El Cerrito. Significant changes in the city have occurred in the last ten years including the redevelopment of El Cerrito Plaza to higher densities of commercial usage with a new FR4 development proposed by 2010. Future projects in the city include but are not limited to: FR4 developments around the BART station, Village Town Center, Portola and San Pablo, the back of Albertsons, all developed between 2010 and 2020. Mixed uses at FMUR4 densities are planned between Moser and Waldo streets by 2010; along San Pablo Avenue by 2020; and expanding beyond the corridors for activity centers at the BART station, Midtown area, and El Cerrito Plaza. Overall, multigenerational families are living in large homes with the trend expected to continue.

Hercules. Significant land use changes are anticipated for the area west of I-80 by 2015: the Hercules New Town Center (FMUR4) to be built at the current park and ride lot next to I-80 by 2015; the Caltrans yard to be replaced with big box retail and a business park (FC) by 2015; a train and ferry station anticipated at the bay by 2015. Several areas previously identified for development will change in land use designation to open space due to presence of wetlands. Franklin Canyon residents have limited development to one dwelling unit per 40 acres in the canyon. Multigenerational families are living in Bayside and Victoria-by-the-Bay. New homes are large, generally between 2,800 and 4,000 square feet.

Lafayette. Most of the residential land use changes will be low density developments (FR1) between 2010 and 2020, with the northern parts of the city developing earlier than the southern areas. Some infill parcels are planned for higher densities of multifamily housing and mixed uses. Eastern Deer Hill Road area is planned to be redeveloped as FR1 and FMUR3 by 2020. Redevelopment is encouraged by the city of underutilized commercial lands as mixed uses with retail on the ground floor, for downtown and particularly the eastern Mt. Diablo Road area, west of the Lafayette Park Hotel. Several homes planned for development in the southeastern part of the city have requested annexation to EBMUD. Five to ten accessory units are permitted each year throughout the city.

Moraga. The Moraga Open Space Ordinance (MOSO) limits residential development to 1 dwelling unit per 20 acres, which can be clustered; agricultural uses such as vineyards are allowed. The city has indicated that most new large homes being developed have vineyards which use potable water. The Palos Colorados Project is planned for development by 2015 with123 units clustered at FR1 densities. Rancho Lagunita project is planned for FR2 densities by 2025. The Bollinger Canyon proposal of FR1 densities by 2030 has resident opposition to the project and may not move forward. There are several other smaller FR1 projects planned in the city such as the Old Moraga Ranch and Indian Valley projects which may be developed by 2030. St. Mary's College has facilities expansion plans to accommodate the current enrollment. The Rheem Specific Plan has identified seven acres of commercial uses next to the theatre in the near future. The most significant change anticipated for the city is identified in the Moraga Center Area Specific Plan: the redevelopment of the existing shopping center to add office space, senior housing, FR2 and FR3 density housing, hotel, and local serving businesses, between 2015 and 2020.

Orinda. The Gateway project is currently under construction; it will result in 245 new housing units, public uses, and an art and garden center and will be completed by 2015. Five new play fields will be constructed west of the Gateway project and annexed to the city. The North Village (commercial area north of Highway 24) has several developments planned through 2040: FMUR4 density development; senior housing on the former library site, Santa Maria church site to accommodate a school and playfields or FR3; new city hall west of Santa Maria by 2010; FMUR3 by 2015; FMUR3 by 2030; FMUR4 by 2015; and the former JFK University campus may be redevelop on 11 acres to FR2 by 2020. BART is planning on developing part of the east parking lot with office uses by 2030. A northern area of the city designated for FR1 to develop between 2020 and 2040; and the northwest area vacant parcels to develop in the future before 2040. Orinda has the interesting occurrence of several properties to the far north of the city consolidating parcels to achieve larger lots.

Pinole. Limited residential development expected by 2040 due to slope constraints. The RV storage yard may redevelop as residential, but after 2040. Kaiser Medical Campus is under construction in Gateway West and will transfer other facilities outside of Pinole to here by 2010. San Pablo Avenue corridor changes will occur gradually through 2040; limited demand for increased densities of FMUR3 at this time. Old town is undergoing revitalization of commercial retail and office uses, with a new community playhouse and enhancements to the park constructed, but limited economic interest at the present. Illegal conversion of garages to living space continues to occur.

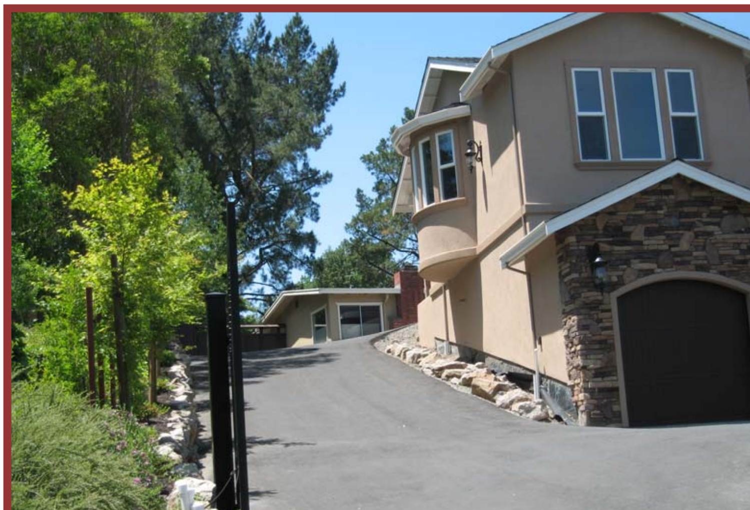
Richmond. The city is undergoing a general plan update. Limited future mixed uses are anticipated at this time in the update process due to lack of developer interest, although the city is encouraging it particularly along San Pablo Avenue. McDonald Avenue intensification is anticipated by 2015. A 10 to 15 percent increase in accessory units is anticipated in the central district, serving multigenerational families. Most future residential land uses will range from FR3 to FR5 densities; most future commercial uses will be developed by 2015. Additional housing is proposed in Marina Bay; Campus Bay is still developing with FR3 and FR4 residential densities planned; and lands west of the Richmond Parkway are still being developed. The Point San Pablo area west of the Chevron refinery will be the subject of a future specific plan considering residential and commercial uses. The city would like to relocate the industrial lands south of I-580 to the Chevron vicinity. The Ford Assembly Building Reuse Project is planning for commercial retail and office, residential, and a museum.

San Pablo. Overall, the city is experiencing a conversion from industrial uses to commercial, mixed use, and higher density residential development. The existing population is the densest in the EBMUD service area. Illegal conversions of garages to living space are occurring throughout the city with two to three families living in one home. The El Portal/Transit District has several mixed use developments planned as FMUR4. Existing manufacturing uses at the Giant Trade Center will be redeveloped as residential uses of FR3 and FR4 by 2010 with additional development planned for 2015. The Devon Square project will develop with FR3 density; Giant Road Family Apartments at FR4 density; and El Paseo Apartments at FR2 density.

The Rumrill Boulevard area has commercially-designated lands that will be developed for residential uses (FR3 by 2010) instead. Two trailer parks in the city will be replaced with FMUR4 at 2015, and FMUR3 at 2020. The 23rd Street corridor is undergoing street improvement by the city, with FMUR4 planned to densify the corridor between 2015 and 2030. Lands identified as FMU along San Pablo Dam Road will be redesignated for open space. No changes are anticipated for the casino.

San Ramon. Most of the Northwest Specific Plan area will be developed by 2010. The city is requiring several developments, such as the Old Ranch Estates and Lauder Hill, to include accessory units with many of the single family homes. This is to meet affordable housing requirements and accommodate multigenerational families living together. Many parcels identified for low density housing have steep slopes that will likely not be developable. The City Center will be developed by 2010 with FMUR3 with pedestrian-oriented residential, civic, recreational, and commercial uses at a higher intensity of use. The Bishop Ranch 2 buildings were removed and are being redeveloped for this new city center. There may be opportunities for the retail centers to densify to mixed uses in the future as FMUR3. Particularly the north side of Crow Canyon east of I-680 and both sides of Crow Canyon west of I-680; and 45 acres on the south side of Alcosta Boulevard east of I-680 is planned for residential, retail, and park uses.

Walnut Creek. Although only 60 percent of the city is served by EBMUD, significant changes are planned for this area. Fifteen "change areas" identified in the most recent General Plan propose projects to redevelop underutilized commercial areas with higher density commercial and residential uses. Of the 15 identified change areas, areas 2, 3, 5 through 10, 14, 18, 21, 24, 27, and 28 are within the EBMUD USB. These planned projects are located throughout the extended downtown retail and office areas and consist of replacing gas stations, motel, shopping center parking, auto yard, BART parking, and other underutilized uses, with FMUR4 and FMUR5 densities and commercial uses by 2020 and 2025. Some auto sales and related services may move to Main and Broadway, south of Pine after 2025. Height limitations restrict some developments; exemptions from the height ordinance require voter approval. Residents in unincorporated pockets surrounded by the city are not interested in being annexed to the city at this time; these areas appear to be subdividing large lots, creating flag and other developable lots.



Accessory units in Walnut Creek increase densities

Land Use Trends

Trends in land use were observed from windshield surveys, observed development activity, a comparison of what was planned for in 1996 for 2005 versus what was actually built, review of general plan documents, and information obtained in the agency meetings. The trends are presented in three groupings to reflect the needs of the Demands Study in developing future demands.

Changes from 1996 Conditions Influencing Demands

- Approximately 30 percent of the vacant lands identified as part of the 2000 Demands Study are no longer vacant. Many of these lands have since developed. Other lands formerly mapped as ‘vacant but developable’ have been precluded from development through mechanisms such as open space easements.
- Overall, new residential development is being planned for at much greater densities than in the past. Most new projects ‘west of hills’ (a term used by EBMUD to define the western service area) are FR3 to FR5, and FR2 to FR3 in the service area ‘east of hills’.
- New construction of ER2 (3 to 9.9 du/ac) is at the higher end of the density range than was the case in the 2000 Demands study.
- Multi-generational families within the household result in a higher persons-per-household trend: illegal accessory units are common in San Pablo, Pinole, and Albany; Contra Costa County encourages accessory units; Hercules, El Cerrito, and San Ramon have observed multi-generations sharing larger homes.

Increased densities along San Pablo Avenue in Emeryville and Oakland

- Industrial and commercial (office and retail) land uses are no longer segregated but are developing together with a variety of uses within new business parks and in older, redeveloping areas.
- Old industrial areas of Berkeley, Emeryville, and parts of Oakland continue to attract mixed uses (lofts and other high density residential with retail on ground floor) and other types of uses that differ from the original uses, such as retail or small offices in buildings or neighborhoods where once manufacturing occurred.
- Industrial operations requiring space and conflicting with new residential uses have been observed moving from Emeryville and Oakland to the City of Alameda

(Alameda Landing and Bay Farm Business Park) and out of the Bay Area (e.g., Peet's coffee, Donsuemor's Madeleine cookies, Clif Bar).
- 'Mixed use' is no longer a single land use category in general plans reflecting a mix of uses on the same parcel, but now is used more specifically for a multitude of specified residential densities.
- Difficult site conditions are less of a deterrent to development in communities with high land values like Castro Valley and Walnut Creek; yet, lands subject to the same difficult site conditions are not being developed as quickly in areas such as Crockett.
- The Oakland Hills fire (1991) zone is more fully rebuilt since the analysis of 1996 land uses for the 2000 Demand Study; however, some vacant parcels still remain.
- Densification is continuing along transportation corridors west of the Oakland hills.
- Downtown districts such as Walnut Creek's are exhibiting higher intensity of uses, and accelerated development of infill parcels.

Other Conditions Influencing Near-term Demands (2015 to 2030)

- State law encouraging accessory units (also called second units and in-law units) results in units built over garages in new construction and in backyards in Lafayette (adding 5 to 10 new accessory units per year) and Danville; and built in back yards of Walnut Creek. San Ramon required accessory units in a subdivision which sold out quickly.
- Vineyards irrigated with potable water are becoming more common in Lafayette, Moraga, and Orinda for new, large lot, single family developments (ER1).
- Subdivisions of large residential lots in Walnut Creek's unincorporated neighborhoods and Lamorinda neighborhoods result in higher densities.
- New homes are larger in places like Castro Valley, Danville, and Alamo.
- Trailer parks are slowly being converted to high density housing.
- Many communities are encouraging portions of shopping center parking lots to convert to senior housing to meet the city's low income housing requirements, or other types of high density housing to meet overall housing needs.
- Berkeley and Oakland's allowable future downtown residential density exceeds the FR5 range (50-100du/ac), therefore, a new land use category for 100+ du/ac was created. However, since this high density residential use dominates

Conversion of parking lot for residential uses any ground floor retail use, there is no need for an FMUR6 category.

- Mixed uses are not being developed in Richmond at this time due to lack of developer interest.
- "Underutilized" industrial districts are continuing to be converted to higher intensity uses (manufacturing mixed with commercial uses) due to demand and land value (e.g., Oakland industrial areas; Richmond Ford Assembly Plant reuse). Other areas are changing from industrial to high density residential uses (e.g. Richmond nurseries)
- Small cities want to retain their small town feel (Piedmont, Albany) and semi-rural character (Danville, Moraga, Orinda)
- Some general plans anticipate development of destination uses such as movie theatres, restaurants, and shopping (Danville, San Leandro).
- Senior housing is being built throughout the service area, typically at FR4 or FMUR4 density.

Trends Affecting Future Demands (2030 to 2040)

- Conversions of gray fields (strip commercial shopping centers) to higher density mixed uses
- Densification of transportation corridors east of the Oakland hills
- Use of artificial turf at school playfields
- Market demand and desirability for second units may loosen up permit process and neighborhood perception, particularly in new development
- Berkeley aggressively promoting "green" support businesses and companies developing green technology in association with UC Berkeley and Lawrence Berkeley Labs. Green construction is a term commonly used for construction which minimizes the use of new materials in construction; instead utilizing recycled materials and sustainable, biodegradable products.
- San Ramon wants to re-establish its business-to-business supply sector that was disrupted by the technology market shakeout earlier in the decade.
- On-line retailing may decrease store sales in regional retail centers such as Walnut Creek and big boxes.

Use of Trends

The trends identified above were used to support the analysis of how existing water consumption patterns may change in the future. For example, small, vacant, infill parcels and the redevelopment of underutilized lands are not captured as new future land uses with an associated water demand due to the size of an infill parcel or due to the land use category remaining the same. However, these intensification and densification activities increase water consumption on a per acre basis. The water use factors, LUDs, were adjusted to reflect these community goals which result in changes in water consumption patterns over time. The results of the correlation between land use trends and water use factor (or LUDs) adjustments will be presented in TM Number 4, Future Land Use Unit Demands.

Table 2. Meetings with Cities and Counties

City/County	Address	City/County Attendees	Meeting Date	Meeting Time	EBMUD & Consultant Attendees
Cities					
Alameda	2263 Santa Clara Avenue 3rd floor conference room Alameda, CA 94501	Cynthia Eliason-Supervising Planner Obaid Khan-Supervising Civil Engineer (510-747-6881)	August 9, 2007	9:30 a.m.	Mark Caughey (EBMUD) Sue Chau (EDAW) Karen Johnson (Water Resources Planning)
Albany	1000 San Pablo Avenue Albany, CA 94706	Jeff Bond - Planning Manager/Director (510-528-5760)	May 14, 2007	8:30 a.m.	Mark Caughey (EBMUD) Sue Chau (EDAW) Jae Park (EBMUD)
Berkeley	2120 Milvia Street, 3rd Floor Berkeley, CA 94704	Mark Rhoades - Planning Manager (510-981-7410)	May 16, 2007	10:00 a.m.	Mark Caughey (EBMUD) Sue Chau (EDAW)
Danville	510 La Gonda Way Danville, CA 94526 (meeting held at EBMUD office)	Steve Lake - Development Services Director (925-314-3319)	May 23, 2007	3:30 p.m.	Mark Caughey (EBMUD) Sue Chau (EDAW)
El Cerrito	10940 San Pablo Avenue El Cerrito, CA 94530	Jennifer Carman - Planning Manager Noel Ibalio - Senior Planner (510-215-4330)	May 29, 2007	1:30 p.m.	Mark Caughey (EBMUD) Sue Chau (EDAW)
Emeryville	1333 Park Avenue Emeryville, CA 94608	Diana Keena - Associate Planner; Deborah Diamond - General Plan Specialist(510-596-4335)	July 2, 2007	10:00 am	Mark Caughey (EBMUD) Sue Chau (EDAW)

City/County	Address	City/County Attendees	Meeting Date	Meeting Time	EBMUD & Consultant Attendees
Hercules	111 Civic Drive Hercules, CA 94547	Dennis Tagashira - Planning Director (510-799-8243)	May 15, 2007	8:30 a.m.	Mark Caughey (EBMUD) Sue Chau (EDAW)
Lafayette	3675 Mt. Diablo Boulevard Suite 210 Lafayette, CA 94549	Greg Wolff - Senior Planner Michael Cass - Planning Technician (925-299-3219)	May 30, 2007	9:00 a.m.	Mark Caughey (EBMUD) Sue Chau (EDAW)
Moraga	329 Rheem Boulevard Moraga, CA 94556	Lori Salamack - Planning Director Ken Chew - City Councilmember (925-376-5200)	June 12, 2007	1:00 p.m.	Mark Caughey (EBMUD) Sue Chau (EDAW) Karen Johnson (Water Resources Planning)
Oakland	250 Frank H. Ogawa Plaza Suite 2114, 3rd Floor Oakland, CA 94612	Eric Angstadt, Strategic Planning Manager (510)238-3941	August 2, 2007	9:00 a.m.	Mark Caughey (EBMUD) Sue Chau (EDAW) Karen Johnson (Water Resources Planning)
Orinda	14 Altarinda Road Orinda, CA 94563	Emmanuel Ursu Planning Director (925-253-4210)	May 31, 2007	11:00 a.m.	Mark Caughey (EBMUD) Sue Chau (EDAW) Karen Johnson (Water Resources Planning)
Piedmont	120 Vista Avenue Piedmont, CA 94611	Kate Black - Planning Director (510-420-3063)	May 25, 2007	8:30 a.m.	Sue Chau (EDAW) Jae Park (EBMUD)
Pinole	2131 Pear Street Pinole, CA 94564	Elizabeth Dunn - Planning Manager/Director (510-724-9038)	May 15, 2007	11:00 a.m.	Mark Caughey (EBMUD) Sue Chau (EDAW)

City/County	Address	City/County Attendees	Meeting Date	Meeting Time	EBMUD & Consultant Attendees
Richmond	1401 Marina Way South Richmond, CA 94804	Richard Mitchell - Planning Director (510-620-6706)	May 10, 2007	1:00 p.m.	Mark Caughey (EBMUD) Sue Chau (EDAW)
San Leandro	835 East 14th Street San Leandro, CA 94577	Debbie Pollart - Planning Manager (510-577-3327)	May 16, 2007	1:30 p.m.	Mark Caughey (EBMUD) Sue Chau (EDAW)
San Pablo	13831 San Pablo Avenue San Pablo, CA 94806	Avan Gangapuram - Planning Director (510-215-3201)	May 10, 2007	10:00 a.m.	Mark Caughey (EBMUD) Sue Chau (EDAW) Karen Johnson (Water Resources Planning)
San Ramon	2226 Camino Ramon San Ramon, CA 94583	Phil Wong - Planning Services Director Debbie Chamberlain - Division Manager (925-973-2560)	June 5, 2007	8:30 a.m.	Mark Caughey (EBMUD) Sue Chau (EDAW)
Walnut Creek	1666 N. Main Street, 2nd Floor Walnut Creek, CA 94596	Andy Smith - Senior Planner (925-943-5899 x 213)	June 6, 2007	3:00 p.m.	Mark Caughey (EBMUD) Sue Chau (EDAW) Karen Johnson (Water Resources Planning)
Counties					
Alameda County	224 West Winton, Room 111 Hayward, CA 94544	Chris Bazar (510-670-5400)	Not available to meet		
Contra Costa County	651 Pine Street North Wing 2, 4th & 5th Floor Martinez, CA 94553	Dennis M. Barry - Director Patrick Roach, Principal Planner (925-335-1290)	May 31, 2007	1:30 p.m.	Mark Caughey (EBMUD) Sue Chau (EDAW) Karen Johnson (Water Resources Planning)

Appendix A

Meeting Notes, Background Papers, and Meeting Agenda

Background papers and meeting agenda were prepared prior to each of the meetings with the land use planning agencies. Meeting notes were prepared following each meeting. These documents are presented in this appendix in the following order. A meeting was not held with the County of Alameda; the background paper is provided.


EBMUD East of Hills Service Area

Counties
Alameda
Contra Costa

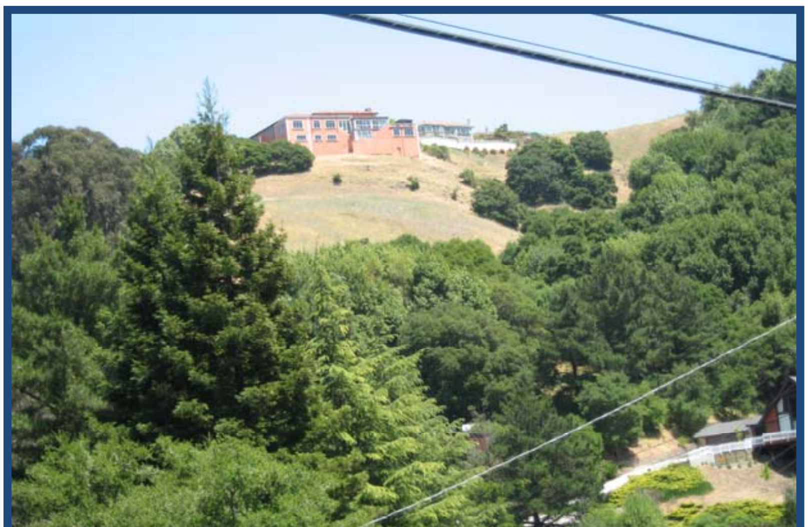
Cities
Alameda
Albany
Berkeley
Danville
El Cerrito
Emeryville
Hercules
Lafayette
Moraga
Oakland
Orinda
Piedmont
Pinole
Richmond
San Leandro
San Pablo
San Ramon
Walnut Creek


EBMUD West of Hills Service Area

Alameda County General Plan
Background Paper

Miscellaneous

- General Plans: Eden Area (2005) and Castro Valley (January 2007, Draft)
- Eden Area
  - Under eight square miles; terrain generally flat or gently sloped
  - Unincorporated lands in western Alameda County, between San Leandro and Hayward
  - Substantially built out; some individual sites are either vacant or abandoned
  - Comprised of eight communities, including: Ashland, Cherryland, El Portal Ridge, Fairmont Campus, Hayward Acres, Hillcrest Knolls, Mt. Eden, and San Lorenzo
  - Population is multi-generational
  - Local economy is strong in manufacturing and wholesale trade sectors, services, and certain retail segments such as building materials
  - Eden Area's economy is growing more slowly than the County overall
  - Numerous areas are considered blighted
  - Four corridors in Eden: East 14^{th} Street/Mission Boulevard; Hesperian Boulevard; Lewelling Boulevard; and "A" Street
  - Five new districts to be created: San Lorenzo Village Center; East 14^{th} Street at Ashland; Mission Boulevard at Mattox Road; Four Corners area at the intersection of Hesperian and Lewelling Boulevard; and intersection of Hesperian Boulevard and "A" Street
  - Three Special Precincts: Fairmont Campus, Grant Avenue Industrial Area, Mt. Eden
- Castro Valley
  - Located in western part of the County, bounded by San Leandro and the unincorporated communities of Ashland and Cherryland to the west, the City of Hayward and unincorporated Fairview to the south, EBRPD to the north, and Contra Costa County and the Dublin Planning Area to east
  - Many sites available for residential and commercial development
  - Key objectives include revitalizing the


Construction on steep slopes in Castro Valley

Central Business District
- Variety of infill residential development will occur over the next 20 years
- Commercial uses are concentrated along Castro Valley Boulevard
- Recent development include subdivisions on narrow deep lots or creating detached single family homes or townhomes on small lots along a private driveway, as well as single family homes built behind existing homes on deep lots (new “flag lots”)

Areas of Development

- Eden Area – Goals and Policies
    - The majority of new commercial and Medium, Medium-High, and High density residential development shall be focused along identified Corridors in the Eden Area
    - The assembly of parcels should be pursued to create larger and more easily developable lots for development along Corridors
    - The County shall pursue redevelopment of the new District areas
    - The County should strategically pursue commercial and vertically-mixed use development in Districts
    - The Four Corners of Lewelling Boulevard (between Hesperian Boulevard and the UPRR – historic center) should be developed as a District with a diverse mix of uses that serves as a community meeting and gathering place
    - Middle Lewelling Boulevard (between the Amtrak line and the BART tracks just past Wickman Court and includes San Lorenzo High School and intersection with Meekland Avenue) should contain a mix of residential and commercial uses (focus on affordable housing)
    - East Lewelling (between the BART tracks and Mission Boulevard) should be redeveloped to emphasize commercial uses
    - Brockman Shopping Center (Brockman Road between Via Chiquita and Channel Street) underutilized and should be redeveloped with low-medium density residential allowed as an additional use
    - Fairmont Campus (northeast of Eden Area, generally bounded by Foothill Boulevard and Fairmont Drive and El Portal Ridge Neighborhood). Future uses – public
    - Grant Avenue Industrial Area (290-acre industrial enclave, 100 acres of which are wetlands, located at the western terminus of Grant Avenue): very low vacancy rates on industrial properties. The County should encourage the transition of Grant Avenue Industrial Area to Research Development/Office uses; new light industrial uses focusing on production, distribution and repair
- Castro Valley – significant remaining development potential in the following areas
    - Madison Common (also includes significant biological resources
    - EBMUD site (24-acre parcel at Sydney Way, Stanton and Carlton Avenue; steep slopes; zoned for single family development; proposed Master Plan or specific plan and require land dedication
    - John Drive Area: steep slopes and poor access; infill development sensitive to existing residential neighborhood
    - Crow Canyon Road Area: sensitive biological resources
    - Jensen Road: sensitive to step topography and natural resource values

Trends

- Eden Area – Goals and Policies
  - The County shall discourage the cities of Hayward and San Leandro from annexing individual parcels of County land, especially those with viable, non-residential land uses, such as large commercial developments
  - The annexation of unincorporated islands and the logical minor re-configuration of jurisdiction boundaries should be encouraged
  - Infill development that increase the density of existing neighborhoods may be allowed
- Castro Valley – Goals and Policies
  - Encourage the development of mixed use projects that include neighborhood retail, restaurants, and services on the ground floor and housing
  - Allow residential uses with neighborhood commercial
  - BART Station Joint Development to including housing, office, and retail uses in addition to structured parking on the BART parking lots
  - Opportunity for new housing units that meet affordability goals (2nd units, allowed by state law) A number of medium and large single family lots that can be further subdivided for new homes (concentrated in the hillside areas)
  - Continued requests for rezoning on the medium and large size single family lots, to increase density within multi-family development areas
- New ABAG projections: population increase from 141,700 in 2005 to 167,500 in 2035 (unincorporated)
- New ABAG projections: employment increase from 41,770 in 2005 to 58,670 in 2035 (unincorporated)

Attached:
GP Land Use Map

Higher density infill on constrained site in Castro Valley

Contra Costa County Community Development Department
Meeting Notes

Date and Time of Meeting: May 31, 2007; 1:30 p.m.
City Attendees: Mr. Dennis Barry, Director
Mr. Patrick Roach, Principal Planner
Phone Number: (925) 335-1242
WSMP Attendees: Mark Caughey, EBMUD WSID
Suet Chau, EDAW
Karen Johnson

Existing and Future Land Uses

- Crockett
    - Development constrained by:
        - Limited sanitary service
        - Steep slopes
        - Complicated ownership, as many parcels are owned by family trusts
    - Some vacant lands designated residential (5 to 7.2 du/ac) may be developed between 2010 and 2020.
- Rodeo
    - Areas identified in the County's General Plan land use map as heavy industrial are currently used as a buffer. However, the designation permits the owners to pursue an application at anytime. Existing refineries are valuable; if expansion were to occur, it would occur at these locations.
    - The vacant lands east of the refinery designated for industrial uses would develop in accordance with the refinery. Changes would likely occur in 2020.
    - If development of the existing (currently capped) slag heap located adjacent to the Bay were to occur, developers must consider disposal of the underlying material. Development within the WSMP horizon is unlikely, but change of use by 2060 is anticipated.
    - Abandoned Hillcrest Elementary School serves as a buffer between residential uses and the Conoco Phillips refinery. The area is designated in the General Plan as medium-density residential (FR3) by 2025.
        - Conoco Carbon Plant: the plant could expand, but not anticipated within the WSMP 2040 horizon.
        - The business park located in the southern part of Rodeo will be annexed by Hercules. Commercial uses would likely develop by 2020.
- Alamo
    - Residents are considering incorporating
    - Limited subdivision potential within Alamo; development would occur on individual lots.
    - Proposed soccer field adjacent to the Humphrey Property (west of Monte Sereno) would utilize artificial turf.
    - Newly developed homes are generally large.
    - The Alamo Creek development is under construction and will be developed by 2010; it includes a variety of uses.

- Diablo
  - New development would occur on large lots (1 acre lots)
  - The part north of existing open space (near Round Hill) would likely remain open space due to the slope gradient. The vacant lands in the Round Hill area (in the vicinity of Gnarled Oak) are designated for low-density development (FR1) due to steep slopes and would likely develop by 2030.
  - The Bryant Ranch subdivision would be developed to FR1 by 2020.
  - An 8-unit subdivision (FR1) has been proposed near Las Trampas and is anticipated by 2015. Surrounding parcels would be developed to low-density residential uses (FR1) by 2025.
  - The parcels around Mona Lisa Hill would be developed by 2015 to low-density residential uses (FR1).
- Blackhawk
  - No subdivision activity is anticipated within the WSMP 2040 horizon.
  - Blackhawk Plaza may redevelop with residential added, but no estimated time horizon.
  - The tennis courts in Blackhawk may redevelop as homes (FR1) by 2040.
- Richmond
  - Within the SOI areas, a proposed specific plan would guide conversion of existing industrial areas to residential uses (between 2010 to 2020)
  - The nursery located between Parr Blvd and Pittsburg Avenue may be developed as high density residential (FR3) with some neighborhood commercial and public uses intermixed with housing by 2015.
- Montara Bay: limited development potential.
- El Sobrante: Mixed use development (FMU R3) is envisioned for the Appian Way/San Pablo corridor (from El Portal to Appian up to Valley View) by 2015.
- Kensington: essentially built out. The community has specific regulation/ overlay zoning (e.g., design review based on solar orientation, views, lot to area ratio, etc.) that limits the construction of 2nd units.

Trends and Vision

- More accessory units; state law has made the inclusion of 2nd units less than 1,000 square feet a ministerial action.
- Conversion of industrial uses to residential uses.
- Meeting State affordable housing requirements will likely result in changes to those higher income communities that intend to stay the same (e.g., development of more affordable homes; the category of homes was not identified)
- More conversion of grayfields (e.g., low-density strip demolished to accommodate new multiple uses).
- Redevelopment of the older housing stock of North Richmond by 2040.
- An Indian tribe acquired land on the north side of San Pablo Creek (near Parr Boulevard) in Richmond; there is potential for casino development in the future. However, no plans have been submitted to the County
- EBRPD lands will stay publicly-owned.

Contra Costa County General Plan
Background Paper

Miscellaneous

- 2005 General Plan (2020 horizon date)

Areas of Development

- County divided into 3 primary areas: West County, Central County, and East County. Central County is subdivided into: North Central County (including Walnut Creek), Lamorinda, and the San Ramon Valley. East County is outside of the EBMUD service area.
- West County: Kensington, El Sobrante, Rodeo, and Crockett (Port Costa is served by EBMUD only in an emergency).
- Central County: Saranap (Walnut Creek), Alamo and Blackhawk (Canyon is not served by EBMUD; Tassajara is just outside)
- The following cities appear to have significant lands in their SOI outside of their city limit: Richmond, Pinole, Walnut Creek, Pleasant Hill, and San Ramon.
- Overall residential: The GP, subject to compliance with growth management and the 65/35 Standard, will allow for infill development.
- Crockett: mixed uses encouraged in downtown area, and offices along Loring Avenue; Pointe Crockett GPA is intended to support up to 100 du, locations TBD.
- Rodeo: new major residential development should be infill and redevelopment of Rodeo proper; encourage reuse of existing buildings; establish waterfront area with mixture of multifamily, retail, and commercial recreation uses along shoreline park; revitalization of Old Rodeo appears to be a significant effort involving mixture of land uses with higher density residential and increasing opportunities for live/work space, appears to be addressed in Rodeo Waterfront/Downtown Specific Plan (we don’t have); Commercial Recreation designation is primarily to develop the waterfront between the marina and the wastewater treatment plant and allow all related retail businesses and services.

Community of Crockett, home to C&H Sugar

- El Sobrante: maintain semi-rural and suburban character of community; residential development directed to infill of previously “passed over” property and to larger undeveloped acreage: western slope of Sobrante Ridge, and lower portions of the north face of San Pablo Ridge; aggregate parcels designated for

multifamily uses to eliminate deep narrow lots; ridgeline preservation ordinance recommended.
- North Richmond: hundreds of acres of vacant industrial land are expected to be developed and redeveloped during and after the planning period; new residential uses within the heavy industrial designation is incompatible; Redevelopment Plan adopted in 1987.
- There are Special Concern Areas designated for Appian Way corridor, San Pablo Dam Road Commercial, San Pablo Ridge, and Kensington. These appear to be focused on design guidelines for large infill projects (or maintain status quo for Kensington) to allow for development into well designed neighborhoods instead of accumulation of unrelated developments, retain identify and individuality of distinctive communities, and preserve scenic features and ridgelines above the 400foot elevation level. Land use maps for first three in GP document.

Trends

- The jobs/housing analysis assumes that only a portion of the vacant land designated commercial and industrial will be developed during the next 15 years because there is too much of this type of land set aside for the market to absorb during that period.
- Employment growth in manufacturing and wholesale trade are decreasing over last 20 years as services, primarily, and retail, to a lesser extent, increase.
- **65/35 Land Preservation Standard** established in 1990 (Measure C) which limits urban development to no more than 35 percent of the land in the County and preserves at least 65 percent of the land for ag, open space, wetlands, parks, and other non-urban uses.
- **Urban Limit Line** (Measure C, 1990) purpose: to ensure preservation of identified non-urban areas by establishing a line beyond which no urban land uses can be designated during the term of the GP; and to facilitate the enforcement of the 65/35 Land Preservation Standard. During the term of the GP, properties that are located outside the ULL may not obtain GPAs that would redesignate them for an urban land uses, unless approved by the Board of Supervisors.
- **Growth Management** may delay the land use conversions during the horizon of the GP. Growth Management Element provides performance standards (e.g., traffic LOS for specific land uses, within ULL) that developments must meet or projects are denied.
- 2007 ABAG projections: population increase from 1,023,400 in 2005 to 1,300,600 in 2035 just for District service area
- 2007 ABAG projections: employment increase from 379,030 in 2005 to 591,650 in 2035 for entire county

Contra Costa County Community Development Department
Meeting Agenda

Date and Time of Meeting: May 31, 2007; 1:30 p.m.
City Attendees: Mr. Dennis M. Barry, Director
Ms. Catherine Kutsuris, Deputy Director
Phone Number: (925) 335-1290
WSMP Attendees: Mark Caughey
Karen Johnson
Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   - Review and confirm vacant lands and future land use designations
   - Discuss locations of densification activities: where and what type.
   - Discuss development trends County is seeing on County lands (as well as within cities), if any, e.g., more mixed uses, higher densities from flag lots, second units or expansions of existing homes; conversions of single family homes to duplexes; commercial or industrial uses changing to lower intensity. In particular, the lands within SOIs that the cities do not necessarily want to annex and distinctive communities such as Rodeo, Crockett, Alamo, and Blackhawk.
   - Franklin Canyon has a Water Service Assessment request into EBMUD for a large development south of the golf course and annexation to Hercules. Will the County be involved with the approval process or leave it up to Hercules? Same with other development applications within SOIs? Are there any industrial development proposals for the lands north of Hwy 4 north of the Franklin Canyon Golf Course?
   - What is the status of developing a plan for Old Rodeo? Is the Rodeo Waterfront/Downtown Specific Plan still current and being implemented? What is the Hillcrest Elementary School site to be used for?
   - Any El Sobrante, Crockett, Kensington, Alamo, Blackhawk land use changes or activities of significance to map?
   - Is the Growth Management Land Use Information System (LUIS) up to date and available (vacant and developable lands)?

4. **Timing of Development (10 min)**
   - Identify the anticipated dates of development of future land uses (infill)
   - Identify the anticipated dates of densification of developed uses

5. **Looking Beyond Planning Horizon (10 min)**
   - What will County look like in 2060?

- What densification of County-governed lands may occur beyond the General Plan horizon?
- Will the cities' SOI boundaries (or established Urban Limit Line) change significantly (e.g., annexation of Rodeo or Alamo)? If so, what communities and what land use changes could occur?
- What emerging economic sectors are anticipated to impact land uses in the county?
- Will Canyon ever be annexed or develop enough to require EBMUD services?

6. ESA Facilitation Plan Meeting

- EBMUD handout

Community of Rodeo with refinery in background

City of Alameda Planning Department
Meeting Notes

Date and Time of Meeting:	August 9, 2007, 9:30 a.m.
City Attendees:	Ms. Cynthia Eliason, Supervising Planner, Mr. Obaid Khan, Public Works
Phone Number:	510-747-6880
WSMP Attendees:	Mark Caughey Karen Johnson Suet Chau

Existing and Future Land Uses

- Ms. Eliason identified existing land uses that required recategorization, including south of Cola Balena Street (mix of existing office and vacant rather than industrial), and Independence Plaza (ER3 rather than ER4), Marina Village (ER4 instead of ER2).
- Alameda Point (former Alameda Naval Air Station)
    - People currently living in 200 units in the northeastern-most corner of Alameda Point. This area would remain and would not be redeveloped. This area consists of homeless housing, rentals, and new homes.
    - Within the remainder of the property, many existing buildings would be demolished and redeveloped in accordance with the most recent Alameda Point Preliminary Development Concept (February 2006) (mix of FR2, FMUR3, FC, FPI, and FP). The timing of redevelopment would depend on the clean up of the property and negotiations with the Navy. For the purposes of water planning, proposed uses would be developed between 2015 through 2025, starting with those lands that abut the existing residential uses in the northeastern-most property and fanning outwards.

New residential construction in Alameda has smaller lawns

    - The triangular piece of land on the northern boundary that extends west to the Bay (north of the bird sanctuary) would be developed either as a golf course or veteran's cemetery (FPI, 2015)

    - Seaplane Lagoon: The ferry terminal would be relocated here by 2015.
    - Other boat launches (Hornet and Marao) would be developed by 2015 south of Seaplane Lagoon.
    - The Marina Village housing is part of the Alameda Air Station. The area would be redeveloped at existing densities
- Alameda Gateway (east of Alameda Point, immediately south of the channel)
    - The area is shaped like a upside down triangle
    - Rosenbloom, the winery, is currently located within the Gateway. The winery and other marine uses in the northern portion of the Gateway would remain
    - The southern portion of the property – 7 acres south of Mitchell Mosely – would be redeveloped as a high density residential use (FR3) by 2015
- Alameda Landing (east of Alameda Point)
    - Development of Alameda Landing would require a General Plan Amendment, as it currently consists of primarily light industrial uses, which would be redeveloped as residential, commercial, and high-density office uses in the future
    - High density office uses would be developed in phases north of Mitchell, from 2010 to 2020
    - A high-density residential use would be developed north of Mitchell and west of the Webster Tube (FR3) by 2015
    - Residential uses, consisting of 300 units (FR3, 2015) and 39 units (FR4, 2010) are proposed (north of Tinker and west of Mayport).
    - Commercial uses are proposed west of Marina Square (2010)
- High-density residential uses (FR3) are anticipated south of Marina Village (generally between Decatur, Fox, and Bainbridge) by 2010
- A Park and Ride would be constructed east of Webster Street by 2015 (FIL)
- Shipway (east of Invincible) would be developed as 145,000 square feet of office or 11 dwelling units. A General Plan Amendment would be needed to develop at higher densities. The area has been identified as FOH by 2025
- Towne Centre (formerly Southshore Shopping Center): this area would consist of intensification, but would remain as commercial uses. The retail uses would increase by an additional 100,000 sq. ft. The buildings would be torn down and parking would be built. The carwash area may be redeveloped. Because proposed uses are still commercial (but intensified), no changes to the land uses have been identified (EC)
- Northern Waterfront (generally from the beltline (Wood) to Grand, along Clement)
    - A General Plan amendment was approved recently
    - The Grand Marina (north of Portman) would consist of 40 units (FR3, 2010). High-density residential (FR3) uses would also be developed south of Portman by 2015.
    - Intensification would occur between Park and Blanding (mostly north of Clement), from light industrial uses to FMUR2 (phased from 2015 to 2025) and FMUR3 (2015)
    - The Penzoil site (west of Alameda Marina) would be redeveloped to commercial uses (FC) by 2020
    - FMUR3 and FS would be developed between 2025 and 2035 north of Entrance

  - o High-density residential (FR3) are proposed north of Buena Vista between Entrance and Nautilus by 2015. An irrigated park (FPI) is anticipated immediately north of this development by 2015
- Coast Guard Island may change uses but details are not available
- High-density residential (FR3) is proposed west of McKay on a 10 acre site by 2020
- The linear strip south of Maple (currently identified as open space) will be irrigated by 2010 (FPI). Another linear segment of irrigated park (currently open space) would be located east of Constitution along Stewart by 2015
- Theatre is currently under construction at Park and Central (FC, 2010)
- Bay Farm Island
  - o Peet's Coffee manufacturing has relocated from Emeryville to the Bay Farm Island business park on a 12-acre site
  - o The eastern portion of the island will be more fully developed with office uses by 2010
  - o There's a potential 126 dwelling units proposed within another 12 acre site. However, because it has not yet been approved, the proposed future land use change is not identified on the map
  - o Harbor Bay Sports Club: the club may be relocated south (to an unknown location) and the parcel may be redeveloped for residential uses. Because this change has not been identified in the General Plan, no future land use changes are identified
  - o The parcel east of the Club (east of Island ramp) would be irrigated (FPI) by 2030
  - o Abbot laboratories will expand but would retain existing land use category (EC)
  - o Proposed commercial uses (FC) would be developed between Maitland and Garden (west of Harbor Bay) by 2010.

Trends and Vision

- Residential uses will not change much as currently the City is "residential rich". The household size has been increasing, primarily due to changes in demographics (influx of Asians, multigenerational households) and may continue to increase
- Most areas within the City allow one dwelling unit per property. Legal conversions (basement) and 2nd units (backyard) occur at a rate of 10-15 per year.
- Vision of the City (2040 – 2060): The City will continue to grow, although the downtown corridors (Webster and Park) would not experience much intensification as they are historic areas. Some reuse may occur associated with the development of 2nd story residential/office uses.
- There will be more structured parking in the City, including on Park Street
- Commercial uses within the City will intensify (e.g., shopping center). The City would like to see more offices and other employment-based uses

City of Alameda General Plan
Background Paper

Miscellaneous

- General Plan (1991)
- Measure A (passed in 1973) prohibited residential structures having more than two units.
- According to the General Plan, the only major committed nonresidential project is completion of Harbor Bay Business Park on Bay Farm Island. Approval of that project, plus some other housing at the time, brought Alameda to 95 percent residential holding capacity
- The themes of the General Plan include multi-use development on the Northern Waterfront.
- In 1997, the U.S. Navy closed the Alameda Naval Air Station (NAS) and the Fleet Industrial Supply Center (FISC). In 2001, the FISC property was conveyed to the City, which transferred the property to the Catellus Development Corporation. Three federal government facilities are in use: U.S. Coast Guard (Coast Guard Island), the Naval Reserve Training Center on Clement Avenue, and the Federal Center on McKay Avenue
- Other source of information: Northern Waterfront Advisory Committee's Recommended Waterfront General Plan Amendment (2006) – draft document; a 15-member Northern Waterfront Advisory Committee was appointed by the City Council to develop recommendations for the reuse and redevelopment of this area.

Areas of Development

- The General Plan identifies the development increment for the various areas from 1990-2010 below:
    - Mixed Use sites: Island Auto Movie, Mariner Square, Ballena Isle, Northern Waterfront (Grand to Willow), and Northern Waterfront (Willow to Oak);
    - Nonresidential projects: Alameda Gateway, Marina Village, Paragon, Harbor Bay BP, and Grand Marina;
    - Residential projects: Alameda Annex, Independence Plaza, Atlantic/Buena Vista, Marina Village, Beltline Yard, Main Island Infill, Village 5 (Bay Farm Island), Clarke Lane (Bay Farm Island), Grand Harbor (Live aboard), and Specific Mixed Use Sites; and
    - Commercial, Office, and Industrial Districts: Park Street, Webster Street, Neighborhood Business Districts, offices near Civic Center, and Encinal Terminals
- Alameda Point (formerly the NAS):
    - Create mixed-use development and establish neighborhood centers; residential and office above or adjacent to retail and other commercial uses, and retail and service commercial uses intermingled with research and development or light industrial uses are encouraged
    - Six subareas within the NAS:
        - Civic Core: envisioned as a major new center of the City with an emphasis on public serving and civic uses (includes business

park, office, civic, residential, public/institutional, parks and public open space, commercial, and other supporting uses).
- Marina: marine-related industry, office, commercial, residential, recreation, and supporting retail; limit housing to the eastern and northeastern portions of the marina to avoid proximity to the Wildlife Refuge
- Inner Harbor: mixed-use area with emphasis on research & development and light industrial uses; cluster mixed-use residential, retail commercial, and other supporting uses in a neighborhood center along the extension of Pacific Avenue
- West Neighborhood: encourage higher density residential development in the vicinity of the multi-modal transit centers
- Northwest Territories: Plans for a sports complex was being discussed and development of a golf course/hotel-resort underway; develop Alameda Point Park and trails; use reclaimed water from EBMUD to irrigate planned golf course if feasible
- Wildlife Refuge: support system of trails

Trends

Trends for the City are captured in the area guiding policies, described below.

- ***Residential Areas:***
  - Conserve housing located in areas that have been zoned for commercial or industrial use
  - Limit residential development to one family detached and two family dwellings
  - Explore development of a small portion of the Alameda Beltline railyard near Webster Street into a residential neighborhood
- ***Retail Business and Services:***
  - Revitalize Alameda's historic downtown shopping districts on Park Street and Webster Street
  - Do not permit offices to occupy ground floor space suitable for retail within the Main Street and Neighborhood business districts
  - Encourage retention and addition of housing in the Park Street, Webster Street, and Neighborhood Districts
- ***Mixed Use Areas:***
  - Island Auto Movie Area: implement a program that includes housing and may include offices;
  - Mariner Square: preserve the existing mix of water-related uses and add onshore live-work space; permit elder assisted living facilities
  - Ballena Isle: Implement a program consisting of a hotel up to 4 stories and 220 rooms plus conference rooms and public open space
  - Grand to Willow Street (Northern Waterfront): Consider live-work space
  - Willow Street to Oak Street (Northern Waterfront): provide for redevelopment of existing sites for 250-350 two-family residential units
  - Willow Street to Oak Street (Northern Waterfront): create a continuous 300-foot-wide "marina green" park along the Estuary
- ***Business Parks and Industrial Areas:***
  - Support development of Harbor Bay Business Park

- ***Northern Waterfront:***
    - allow the development and reuse of existing sites including the Del Monte Site, Encinal Terminal Site, Marinas, Penzoil Site, Self Storage Site, Parrot Village, and Beltline Rail Yard Site
- Stop the trend toward private use of public property
- 2007 ABAG projections: population increase from 74,300 in 2005 to 91,100 in 2035
- 2007 ABAG projections: employment increase from 27,400 in 2005 to 50,550 in 2035

Old Naval Air Station water use will increase with redevelopment

City of Alameda Planning Department
Meeting Agenda

Date and Time of Meeting: August 9, 2007, 9:30 a.m.
City Attendees: Ms. Cynthia Eliason, Supervising Planner, Mr. Obaid Khan, Public Works
Phone Number: 510-747-6880
WSMP Attendees: Mark Caughey
Karen Johnson
Suet Chau

Agenda and Questions to Ask

1. **ntroduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss locations of densification activities: where and what type (as relevant)
      i. Mixed Use sites: Island Auto Movie, Mariner Square, Ballena Isle, Northern Waterfront (Grand to Willow), and Northern Waterfront (Willow to Oak);
      ii. Nonresidential projects: Alameda Gateway, Marina Village, Paragon, Harbor Bay BP, and Grand Marina;
      iii. Residential projects: Alameda Annex, Independence Plaza, Atlantic/Buena Vista, Marina Village, Beltline Yard, Main Island Infill, Village 5 (Bay Farm Island), Clarke Lane (Bay Farm Island), Grand Harbor (Live aboard), and Specific Mixed Use Sites; and
      iv. Commercial, Office, and Industrial Districts: Park Street, Webster Street, Neighborhood Business Districts, offices near Civic Center, and Encinal Terminals
      v. Alameda Point
      vi. Northern Waterfront
   c. Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial and industrial uses changing.

4. **Timing of Development (10 minutes)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of existing uses

5. **Looking Beyond Planning Horizon (10 minutes)**
   a. What will City look like in 2060?

b. What densification within the City may occur beyond the General Plan horizon?
c. Will the City's SOI boundaries change? If so, what land use changes could occur?

City of Albany Planning Department
Meeting Notes

Date and Time of Meeting: May 14, 2007, 8:30 a.m.
City Attendees: Mr. Jeff Bond, Planning Manager/Director
Phone Number: 510-528-5760
WSMP Attendees: Mark Caughey
Suet Chau
Jae Park

Existing and Future Land Uses

Mr. Bond reviewed the existing and future land use polygons and discussed land use changes that have occurred in the last decade, as well as those changes that are anticipated in the next 30 years.

- Golden Gate Fields: The existing site is considered "recreation commercial" under the City's General Plan. A year ago, the owners informally proposed retail development (300,000 square feet) within the westerly parking lot. The proposal was subsequently withdrawn. The owners have recently filed an application for replacement of the dirt track with artificial track material. The track will continue to operate through the WSMP planning horizon.
- UC Berkeley University Village Property:
    - The remainder of the site is currently under construction. The density is a higher than the ER3 currently mapped.
    - The existing soccer fields along the tracks are located within a flood plain and used for flood protection. It will not become a commercial use as identified by the General Plan, but will remain irrigated turf. A small portion may become a corporation yard. However, due to its small size and uncertain timing, it will not be identified as a future land use change.
    - The mixed used development proposed at the corner of San Pablo and Marin will likely occur by 2010. It will consist of housing (FMUR4), a community center, and a Whole Foods market. To accommodate the mixed use development, two existing little league fields will be relocated north of that area.
- Villa Motel has been redeveloped to Creekside apartments, located at the east corner of San Pablo and Marin.
- Albany bowl: likely to remain unchanged through the WSMP planning horizon. It may ultimately become a mixed use development.
- Albany Ford: likely to remain unchanged through the WSMP planning horizon.
- The area adjacent to Target could be developed for other retail, although not to the same scale. The industrial area to the north could be converted to commercial uses favoring the building supply industry. For the purposes of planning, changes in these areas have been identified as 2020.

Trends and Vision

- Golden Gate Fields: There are two visions in the long-term:
  - Golden Gate Fields will continue to operate and some degree of improvement would be made, such as including some public open space on the east side of the tracks.
  - Golden Gate Fields goes away. The predominant use would be open space, but because this is under private ownership, some sort of development would be anticipated.
- San Pablo Avenue: long-term trend – the area is anticipated to change but no specific plans have been identified to date. The buildings would be torn down and reconstructed to a higher density (~20 du/acre or FR4), with ground floor retail and houses above.
- Solano Avenue: fairly stable.
- 2nd Units: The City encourages development of 2nd units, but requires 3 parking spaces per parcel which hinders legal conversions. Currently, unpermitted conversions are common.

San Pablo Avenue corridor densification

Miscellaneous Notes

- St. Mary's high school: lawn in the playing fields will be replaced with artificial turf, which would reduce water consumption.
- Albany Middle School: the playing field, located within the City of El Cerrito, will also convert to artificial turf
- BART tracks through Albany undergoing seismic retrofit. Upon re-landscaping, EBMUD should consider installing recycled water piping for possible future connection.
- Key Route Blvd. median should be considered for future recycled water irrigation.

City of Albany General Plan
Background Paper

Miscellaneous

- General Plan and Final EIR - 1990-2010 (Adopted December 7, 1992)
- City is already built-up and is densely developed
- City will continue to be predominantly residential
- Solano and San Pablo Avenues continue to serve as commercial areas
- UC will continue to own Gill Tract Property
- The Waterfront land will be operated as a racetrack (Golden Gate Fields) at least until 2002
- Industrial land located mostly along I-80
- USDA research facilities – no change is planned through 2010

Areas of Development

- Housing development opportunities are limited to vacant land on Albany Hill, infill development on scattered vacant lots, redevelopment or further developing of existing sites
- San Pablo Avenue (mixed use)
- Golden Gate Fields
- Albany bowl property and Villa Motel site on San Pablo Avenue (mixed use redevelopment opportunities)
- UC Village redevelopment (by UC)
- Second units
- 17-acres of Santa Fe Railroad lines along the industrial section and 11.5 acres of vacant industrial land in the vicinity

Trends

- Development trends are captured in the goals and policies identified in the General Plan
- Maintain existing residential densities and reduce permitted densities on Albany Hill
- Encourage development of secondary dwelling units
- Permit a moderate increase in new commercial development intensity to a maximum FAR of 1.25
- Future development opportunities are limited to a small amount of vacant land (only 2% of the vacant land is in residential areas, mostly on Albany Hill)
- Planned Residential Commercial land use designation: intended to encourage redevelopment of existing commercial uses on San Pablo Avenue into mixed use developments (retail and high-density residential uses)
- The San Pablo Avenue commercial district is underdeveloped. Recommend increasing the intensity of commercial development, attracting non-automotive retail uses, etc.
- The Solano Avenue shopping district could support a modest increase in building intensity
- Restrict conversion of residential uses to commercial uses along specific blocks of Kains and Adams Streets where residential uses predominate and permit such conversions where commercial uses predominate
- Limit conversion of existing multi-family residential units to condominiums

- 2007 ABAG projections: population increase from 16,800 in 2005 to 19,200 in 2035
- 2007 ABAG projections: employment increase from 4,840 in 2005 to 5,880 in 2035

Attached:
GP Land Use Map

City of Albany Planning Department
Meeting Agenda

Date and Time of Meeting: May 14, 2007, 8:30 a.m.
City Attendees: Mr. Jeff Bond, Planning Manager/Director
Phone Number: 510-528-5760
WSMP Attendees: Mark Caughey
Suet Chau
Jae Park

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss locations of densification activities: where and what type (e.g., San Pablo Ave corridor, Albany bowl property and Villa Motel site)
   c. Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial and industrial uses changing.
      i. Golden Gate Fields and surrounding areas
      ii. UC Village
      iii. Along railroad tracks
      iv. Second units

4. **Timing of Development (10 minutes)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of existing uses (e.g., San Pablo Ave corridor)

5. **Looking Beyond Planning Horizon (10 minutes)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the City's SOI boundaries change? If so, what land use changes could occur?

City of Berkeley Planning Department
Meeting Notes

Date and Time of Meeting: May 16, 2007, 10:00 a.m.
City Attendees: Mr. Mark Rhoades, Planning Manager
Phone Number: 510-981-7410
WSMP Attendees: Mark Caughey, EBMUD WSID
Suet Chau, EDAW

Existing and Future Land Uses

- Berkeley has already developed a GIS database showing the locations of future development, densities and status of entitlements; they will provide it to EDAW
- There are a number of 20-50 and 100-170 unit mixed-use development projects that will be constructed in the city. 1,200 units have been built in the last 7 years, and 1,000 units are in the pipeline.
- Mr Rhoades suggested we speak with UC Berkeley and LBNL separately to identify their respective future land use changes

Anticipated Land Use Changes

- Downtown: The Downtown Plan will likely be adopted by 2010. The downtown will double in size, particularly in the Core area. In the next three to six months, an application for a 20-story hotel/conference center will be submitted (located at the existing Bank of America building) for the Center Street block between Shattuck and Oxford
- Southside: The Southside Plan will likely be adopted next year. Intensification is expected along the Bancroft and Telegraph avenue corridors; most of the development along Telegraph would occur south of Dwight
- University Avenue corridor: significant changes are anticipated for eastern University and western University (San Pablo to Bayshore); University at Martin Luther King will have a 150-unit mixed use development with Trader Joe's.
- San Pablo Avenue corridor: some development anticipated in the northern reach, but primarily concentrated south of Dwight. The BMW dealership will remain, but be redeveloped to mixed use with 300 units of housing above.

Berkeley industrial area has underutilized uses

- Adeline corridor: transit oriented development at the west parking lot of the Ashby BART station, with 100 to 200 units.
- Sacramento corridor: little change anticipated through WSMP 2040 planning horizon
- West Berkeley: office/industrial uses will remain. Lands within these areas will change hands and intensify, with more office, lab uses, R&D, and live-work units for artists.
- In southwest Berkeley, properties that will change hands include: McCally Foundry, Urban Ore, Peerless Lighting, Fantasy Records. The Marchan building, previously UC warehouse, will likely become R&D/office space.
- The City would like the east bay to become the "Green Valley" (much like the "Silicon Valley" but for sustainable development), with Berkeley at the center of that phenomenon. This will be achieved through synergies with UCB and LBL.
- Solano, Elmwood, and North Shattuck: currently at capacity; no changes anticipated.
- Residential Areas: there are 600 vacant lots in the hill areas. Six or seven single family homes are built per year; second units average 10 per year.
- Waterfront: There may be a ferry terminal located near the existing hotel or Hs Lordship. In addition, there may be low-scale recreational / commercial uses located at the current Golden Gate Fields stables. The entire waterfront area has been identified primarily for open space because of the Waterfront Specific Plan that ended all previous development proposals.

Trends and Vision

- Berkeley will add 100 to 200 units per year to meet regional housing demand.
- There are a lot of young families and professionals in Berkeley who would live in housing units offered by mixed-use development

Miscellaneous Notes

- Housing vacancy rate is 3 percent citywide; demand remains high
- Duplexes and triplexes are allowed in the City but few have been produced
- Once entitlements are granted, applicants usually acquire building permits within 2 years

City of Berkeley General Plan
Background Paper

Miscellaneous

- General Plan (adopted April 23, 2002)
- The General Plan covers the city limits only, and does not include UC Berkeley or LBNL
- Adopted area plans available for Waterfront, West Berkeley, University Avenue, South Berkeley, South Shattuck, and Downtown. Area plans in progress for the Marina and Southside. These documents were not reviewed
- Berkeley is nearly built out. Vacant land for new housing development is limited; however, on the major transportation corridors and avenues and in the Downtown, there are a significant number of underutilized parcels that represent opportunities for additional housing or other types of needed development
- Approximately 50 percent of all retail sales are generated in West Berkeley, 10 percent in the Downtown and 10 percent in the Telegraph area
- Approximately 24 percent of all Berkeley jobs are in West Berkeley (manufacturing and wholesale jobs)
- Between 1990 and 2000, the city's housing stock increased by a net of 1,140 new housing units, almost half of which were constructed by UC Berkeley

Areas of Development

- Mixed use development is encouraged in the following areas:
  - Downtown
  - Commercial corridors (University, San Pablo, Telegraph, and South Shattuck)
  - Ashby BART
- UC Berkeley expansion into the City, particularly the first block around the campus
- Infill of UC Berkeley and LBNL; outside of the City's jurisdiction

Reuse of old industrial buildings in Berkeley

Trends

- The Land Use Element directs new housing development to the transit corridors and the Downtown
- The Downtown Plan encourages new retail uses in the area first, then encourages housing as a second priority; the downtown is split into six subareas with established "base" height limit, which could be exceeded through a bonus system to a "maximum" height. Base height varies from 3 to 5 stories and

maximum height varies from 3 to 7 stories. Subareas include: North 1, North 2, Oxford, Core, West, and South

- The West Berkeley Plan sets conditions to preserve at least some of the city's industrial base, to retain diversity of jobs and major tax generators; West Berkeley continues to grow in retail, primarily around 4th Street and Gilman Street areas; loss of warehouse and manufacturing space in Emeryville would create strong demand for such space in Berkeley
- Establish the waterfront area as a recreational and open space resources
- Policies identified in the General Plan show reflect the trends anticipated for the planning horizon:
  - Encourage infill development in Berkeley
  - Encourage mixed-use projects that include both office space and housing above appropriate ground floor uses to improve the balance between jobs and housing units in the Downtown
  - Explore options for the partial or complete closure of Center Street, Addison Street, or Allston Way to automobiles
  - Encourage and maintain zoning that allows greater commercial and residential density and reduced residential parking requirements in areas above-average transit service such as Downtown (transit-oriented development)
  - Consider revisions to the Zoning Ordinance to establish a minimum height limit of tow, where feasible, three, stories to require or encourage residential development above the ground floor on transit corridors
  - Encourage development of affordable housing in the Downtown Plan area, the Southside Plan area, and other transit-oriented locations
  - Encourage sensitive infill development of vacant or underutilized property of avenue commercial areas (e.g., University, San Pablo, Telegraph, and South Shattuck)
  - University Avenue Strategic Plan: encourage more pedestrian-oriented development and revitalize University Avenue Corridor
  - South Shattuck Strategic Plan, to improve and create commercial and mixed-used development along South Shattuck
  - Ashby BART Station: encourage affordable housing or mixed-use development including housing on the air rights above the BART station and parking lot west of Adeline Street
  - West Berkeley Plan: Maintain range of land uses, including residences, manufacturing services, retailing, and other activities in West Berkeley
  - Prohibit further expansion of the Fourth Street commercial area beyond the existing commercially zoned areas
  - Discourage additional UC expansion (except housing in Berkeley
  - Advocate the University maintain a student enrollment cap of 30,000 students
- New ABAG projections: population increase from 104,400 in 2005 to 119,400 in 2035
- New ABAG projections: employment increase from 75,430 in 2005 to 87,150 in 2035

Attached:
GP Land Use Map
GP Berkeley Area Plans Map
GP Berkeley Downtown Subareas Map

City of Berkeley Planning Department
Meeting Agenda

Date and Time of Meeting:	May 16, 2007, 10:00 a.m.
City Attendees:	Mr. Allan Gatzke, Principal Planner
	Mr. Mark Rhoades, Land use Manager
Phone Number:	510-981-7410
WSMP Attendees:	Mark Caughey
	Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss locations of densification activities: where and what type
      i. Downtown
      ii. Commercial corridors (University, San Pablo, Telegraph, and South Shattuck)
      iii. Ashby BART
   c. Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial and industrial uses changing.
      i. UC Berkeley infill and expansion into the City
      ii. LBNL

4. **Timing of Development (10 minutes)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of existing uses

5. **Looking Beyond Planning Horizon (10 minutes)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the City's SOI boundaries change? If so, what land use changes could occur?

Town of Danville Development Services Department

Meeting Notes

Date and Time of Meeting: May 23, 2007; 3:30 p.m.
City Attendees: Mr. Steve Lake, Development Services Director
Phone Number: (925) 314-3319
WSMP Attendees: Mark Caughey, EBMUD WSID
Suet Chau, EDAW

Existing and Future Land Uses

- Alamo Springs (in Alamo) has been developed. The adjacent area within the City (around Alamo Springs Drive) won't be developed due to slope constraints. The area should be identified as open space (EOS)
- The parcel east of La Gonda Way could accommodate an infill project. However, the timing of development is unknown (and thus assigned 2030)
- The Eugene O'Neil National Historic Site is located west of Danville, outside city boundaries. The polygons identified for change in the vicinity of that area should be maintained as open space
- There are no undeveloped properties within downtown. Any redevelopment in that area would require demolition of existing uses and reconstruction of new uses. The Town purchased a small parcel on Rose Street (at Front) that will be used as an incentive for future development. That area is intended for commercial and retail uses. The timing of development is unknown (and thus assigned 2030)
- A 2.5-story redevelopment project consisting of retail, commercial, office, and residential use is anticipated at Hartz Avenue and Prospect Avenue (in Downtown) by 2015. Housing included in the development would be less than 10 du/acre. As such, it is classified FC rather than FMU R3.

Irrigated turf in Danville

- A senior housing building has been constructed at Hartz Court (west of I-680) in the last 1.5 years (2010)
- Several homes along El Dorado have been demolished and rebuilt as condos (FR2 in 2010)
- Elworthy West: The entire area was intended for development, but due to slope constraints, development has been restricted to the northeastern portion of the area, adjacent to I-680 (FR2, 2010); remaining area is EOS

- South of Elworthy West, the area adjacent to the city boundaries is intended to be developed by 2010 (FR1)
- The parcels located at the southwesternmost corner of the property (between I-680 and Camino Ramon) are under Williamson Act contract. That area will be developed in the future although the timing is unknown (and thus assigned 2030)
- The parcel adjacent to the PG&E research facility north of Crow Canyon Road is unlikely to be developed due to its proximity to the PG&E facility. The area will be identified as existing open space (EOS)
- Elworthy East (in the vicinity of Bolero Drive): The area will likely be developed as low density residential (FR1), although the timing is not known at this time (2030)
- A nursery currently exists south of El Cerro Blvd, at Diablo Road. Because it is a non-conforming use, the area will change to FR2 by 2010, similar to the proposed use located across Diablo Road
- A 50,000 square foot commercial use is anticipated for the parcels south of Sycamore Valley Rd (east of the freeway) by 2010
- Between Matadera Way and Hill Road, low-density residential uses (FR1) are anticipated by 2010
- West of Brightwood Circle, low-density residential uses (FR1) are anticipated by 2020
- Several developments are anticipated by 2010 along Camino Tassajara, including low density residential uses (FR1) and a church (FP)

Trends and Vision

- Mixed use development downtown would be below the threshold for FMU R3
- Development of additional condominiums along El Dorado is expected in the next 5 to 10 years (through demolition of existing single family homes and reconstruction)
- The Town's SOI is located east and west of the town boundaries. No changes to the SOI are anticipated. The areas to the west are constrained by topography and habitat. The area to the east is actively being developed by the County. Land use changes within the unincorporated areas will need confirmation by the County
- The Town is not anticipated to change significantly by 2060. In the next 4 to 5 years, the Town expects to add approximately 40 units per year

Miscellaneous Notes

- Potentially 100 jobs could be created by the proposed office/commercial use, but increases to the level identified by ABAG are questionable. The current biggest employers include the Town of Danville and the school district

Town of Danville General Plan
Background Paper

Miscellaneous

- 1999 General Plan

Areas of Development

- The downtown area is still the commercial hub; second commercial area is Crow Canyon Rd and Camino Tassajara on east side; third is Camino Ramon and Fostoria Way
- There are 21 Planning Areas (PA) and 14 Special Concern Areas (SCA). The SCA have policies not shown on the land use map nor in other parts of the general plan. There are Mixed Uses designated in GP for Wood Ranch, Downtown, and Thiessen SCAs.
- Town & Country PA has 458 acre Elworthy property and 73 ac Podva property undeveloped – 2 of largest landholdings in Danville. Much is undevelopable and should be retained in OS or low density res.
- Danville Blvd PA has some infill on east side of Danville Blvd north of El Cerro Blvd.
- El Pintado SCA land use designations permit up to 1 du/ac, only a portion of the areas should be developed at this upper end of the range.
- La Gonda/W. El Pintado PA has small number of large developable vacant sites remaining along La Gonda Way and West El Pintado Road.

Addition of second unit over garage in Danville

- Diablo/Green Valley/Stone Valley corridor SCA has development potential of vacant parcels. Green Valley road has potential for change in future due to large parcels and potential for subdivision.
- 15 acre Weber property is located between Matadera Way and Blemer Rd. One of largest flat vacant parcels remaining abutted by existing development. Residential designations.
- Magee Ranch is located along south side of Diablo road extending east from the Green Valley Rd/Diablo Rd intersection. Half designated for Rural Res at 1du/5ac. GP would like it clustered with remaining lands preserved.
- Wood Ranch SCA may develop with variety of low profile housing, offices, limited range of specialty commercial uses.
- Borel property is 17 acres designated for commercial located along north side of Fostoria Way between Camino Ramon and I-680.

- Elworthy West / Podva SCA 531 acres from San Ramon Valley Blvd west to Town boundary. Range of res uses on flatter lands with OS on hillsides.
- Downtown encourages higher density res where possible and low density mixed uses (housing or office above retail).
- Thiessen property SCA has mixed uses designation on its 1.6 ac parcel for office and/or multifamily res.
- San Ramon Valley Blvd has redevelopment potential.

Trends

- Greater emphasis on infill development, and reuse of property that has not been developed to its full potential. Redevelopment and expansion of Downtown anticipated.
- Due to high housing costs and desirability of community, residential development is at higher densities than in past: increase in number of townhouses and multifamily units, and smaller single family lot size and more zero lot line homes and duets. Higher densities encouraged at locations within walking distance to Downtown, shopping centers, buses.
- Encourage business and professional office uses above ground level retail.
- Some areas with low density designations may not be realized due to site constraints, however, some areas may be allowed clustering with higher densities if remainder of lands retain OS use.
- San Ramon will eventually annex Dougherty Valley. Danville would like County to relocate the Urban Limit Line to preclude further development in Tassajara Valley.
- Green Valley Road in Cameo Acres neighborhood is experiencing "reinvestment". Upward moving home prices elsewhere and age is resulting in homes that are undergoing remodeling or renovation. Newer homes are typically much larger and more modern.
- 2007 ABAG projections: population increase from 43,400 in 2005 to 45,700 in 2035
- 2007 ABAG projections: employment increase from 13,980 in 2005 to 17,430 in 2035

Town of Danville Planning Department
Meeting Agenda

Date and Time of Meeting:	May 23, 2007; 3:30 p.m.
City Attendees:	Mr. Steve Lake, Development Services Director
Phone Number:	925-314-3319
WSMP Attendees:	Mark Caughey Karen Johnson Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss locations of densification activities: where and what type, particularly the downtown
   c. Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial uses changing.
   d. Did the Town establish an Urban Growth Boundary following adoption of the General Plan?

4. **Timing of Development (10 mins)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of developed uses

5. **Looking Beyond Planning Horizon (10 mins)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the City's SOI boundaries (or established Urban Growth Boundary) change? If so, where and what land use changes could occur?

City of El Cerrito Planning Department
Meeting Notes

Date and Time of Meeting: May 29, 2007; 1:30 p.m.
City Attendees: Ms. Jennifer Carmen, Planning Manager
Mr. Noel Ibalio, Senior Planner
Phone Number: 510-215-4330
WSMP Attendees: Mark Caughey, EBMUD
Suet Chau, EDAW

Existing and Future Land Uses

- Significant changes in the City in the last decade include the redevelopment of El Cerrito Plaza and the Target commercial area
- Future development includes
  - Plaza BART: sole source agreement with developer to construct 227 units (FR4, 2015)
  - Del Norte BART: 56 units (FMU R4 – 2010)
  - El Cerrito Plaza: The original plan was to include housing over the existing retail uses, but the owner backed out on this plan and decided instead to develop the L-shaped lot (north of existing dentist offices) with 128 condominiums (FR4); they would be built by 2010

El Cerrito Plaza redeveloped with more intense uses

  - Village Town Center (Village at Schmidt): 156 Units (FMU R4) will be built by 2010
  - 31 units with some commercial uses on the ground floor (FMU R4) located between Moser and Waldo will be developed by 2010.
  - 20 units (FR4) at Portola and San Pablo will be developed by 2010
  - Portola middle school will likely be relocated (due to existing landslide hazards) to the Fairmont School site (Kearny and Stockton). Land swap with the library and senior center may occur. The Portola site would be developed partially with existing public facilities and partially with residential uses. The Fairmont site would require acquisition by eminent domain of 12 homes. This change could occur by 2020
  - The back of the Albertson's lot north of Conlon would be developed to FMU R4 by 2020

- The City is working with Richmond on a joint Specific Plan for San Pablo Avenue. Within the City of El Cerrito, mixed uses with densities of R4 are anticipated along the entire corridor. The City provided a map of the San Pablo corridor and anticipated changes. Activity nodes may be converted to transit-oriented development. At the nodes (purple areas of the map), lands may be consolidation to encourage higher density development. Development of the San Pablo Avenue corridor is expected by 2020.
- East of Ganges Road, a proposed 24 – 25 unit development is anticipated to be complete by 2015. The area is constrained because of landslide potential and presence of two creeks. The neighbors oppose the project.
- The Bay Vista area will be maintained as open space
- The two proposed change parcels abutting Wildcat canyon will be developed as low-density residential uses (FR1) by 2020.
- The parcel at the southwestern part of the City (abutting Albany) is within a flood zone and will be maintained as open space
- The vacant parcel along Moser will be maintained as open space as it provides an area to slow down run-away vehicles on Moser
- A mixed use development (FMU R3) is proposed for the open lot north of St. Jerome's Church

Trends and Vision

- Second unit requests will continue to increase. There is currently no methodology for inventorying existing 2nd units, but the City has started to track new 2nd units
- El Cerrito consists of many multigenerational families. That trend will continue to increase, particularly in homes greater than 5,000 square feet.
- The City is not considered a commercial hub. The goal is to improve San Pablo and provide services for the local community. Old buildings are expected to redeveloped or improved over time
- The BART station is an opportunity site. Del Norte is a regional hub, with 700 buses.
- El Cerrito does not have the resources to annex SOI areas. The area north of El Cerrito has requested annexation in the past. Kensington would remain in the County

Miscellaneous Notes

- Cougar Field, owned by Albany High School, but located within the City of El Cerrito, will be improved with new football and baseball facilities. This change will likely increase water consumption in the future.
- Ohlone Greenway: this area will be re-landscaped as part of the BART seismic improvements, and could possibly use recycled water

City of El Cerrito General Plan
Background Paper

Miscellaneous

- 1999 General Plan
- East Richmond Heights and Kensington are within the SOI
- Has redevelopment agency but is inactive
- 124 acres of vacant land

Areas of Development

- San Pablo Ave (SPA) Corridor development encouraged in activity centers that extend up selected perpendicular streets; mixed uses encouraged along corridor
- El Cerrito Plaza, Del Norte BART area, and retail along SPA Corridor
- Freeway interchange area

Trends

- Reduction in traditional manufacturing and industrial uses; decline in classic commercial strips; rise in big boxes
- Conversion of auto oriented to retail
- Shopping becoming entertainment – "go to" places
- Population is stable; people per house declining slightly; age increasing
- Multi-unit housing increasing and percent of owner occupied decreasing
- Res development limited to densification; maybe more multi-family along SPA
- New ABAG projections: population increase of 2,500 by 2035
- New ABAG projections: employment increase of 9,100 by 2035

Attached:
GP Land Use Map
SPA densification corridor map

City of El Cerrito Planning Department
Meeting Agenda

Date and Time of Meeting:	May 29, 2007
City Attendees:	Ms. Jennifer Carmen, Planning Manager Mr. Noel Ibalio, Senior Planner
Phone Number:	510-215-4330
WSMP Attendees:	Mark Caughey, EBMUD Suet Chau, EDAW

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
      i. Confirm school expansion south of Eureka within empty lot
   b. Discuss locations of densification activities: where and what type (e.g., San Pablo Ave corridor)
   c. Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial and industrial uses changing.
      i. Confirm densification at El Cerrito Plaza
      ii. Activity Center: Terrace and Stockton Area

4. **Timing of Development (10 minutes)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of existing uses (e.g., San Pablo Ave corridor)

5. **Looking Beyond Planning Horizon (10 minutes)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the City's SOI boundaries change? If so, what land use changes could occur?

City of Emeryville Planning Department
Meeting Notes

Date and Time of Meeting:	July 2, 2007, 10:00 a.m.
City Attendees:	Ms. Deborah Diamond, project Manager, General Plan & Zoning Update Ms. Diana Keena, Associate Planner, Long-Range Planning
Phone Number:	510-596-4335
WSMP Attendees:	Mark Caughey Suet Chau

Existing and Future Land Uses

- The City provided background information intended to give EBMUD an understanding of the changes and trends anticipated in Emeryville. It includes the "Emeryville General Plan Update - Imagine Emeryville pamphlet" (Spring 2007), "Emeryville Recent and Near Future Development as of February 2007", a list of larger projects (dated June 20, 2007), "Emeryville's Land Use Projection" (dated October 2006), and "Emeryville's Projections based on the sites discussed" (no date).
- The City is currently in the midst of updating its General Plan, so an updated General Plan map has not yet been prepared. The Imagine Emeryville pamphlet provides a map which identifies "areas of stability," "areas of potential change," and "approved development areas." The latter two categories have been identified, but not defined. The City Council will conduct a field trip on July 21st to define proposed land uses in these areas. Final approval of land use changes by the City Council could occur in the fall.

San Pablo Avenue densification in Emeryville

- The City has changed tremendously in the last decade, and will continue to change
- The City identified the large development projects on the future land use map, which includes the following.

- Chiron
  - The site is located generally between Horton, Hollis, 53rd, and the UPRR tracks
  - The site was purchased by Novartis, and then Bayer
  - Two alternatives: 1) 350,000 sq. ft. of new laboratory (Buildings 3 and 7b), 220,000 sq. ft. of office (Building 1), and 350,000 sq. ft. of laboratory; or 2) only the new laboratory at Buildings 3 and 7b
  - There's a 30-year entitlement on this site. Incremental expansion every five year is anticipated. For the purposes of water projections, a future commercial use (FC) by 2025 is used.
- Marketplace
  - The site is located generally between Shellmound and Christie
  - The project would consist of 55,000 sq. ft. of retail (Shellmound Building), 160 residential units (Shellmound Building), 11,000 sq. ft. of restaurant (within parking area pads), 5,000 sq. ft. of retail (within parking area pads), 180 residential units (64th & Christie), and 6,000 sq. ft. of retail (64th & Christie)
  - This project would require the demolition of the existing theatre
  - None of the proposed facilities would be built on top of the existing marketplace
  - The project is anticipated to be complete and online by 2015
- South Bayfront Site B
  - The site is located south of Powell, adjacent to the Bay Street mall
  - The project would consist of 180,000 sq. ft. of retail, a 250-room hotel, and 170 residential units (residential units would be located above the hotel use)
  - The site (FMUR4) would be completed by 2015
- Transit Center
  - The site is located at the Amtrak station, north of 59th and east of the railroad tracks
  - The project would consist of 250,000 sq. ft. of laboratory (likely R&D, not manufacturing)
  - Existing buses would be rerouted to the parking lot
  - The future use (FIL) would be completed by 2010
- BRE Gateway
  - The site is located between Christie and La Coste, north of Powell
  - The project would consist of 280 residential units, 2,500 sq. ft. of general retail/service, 2,500 sq. feet of restaurant, and 5,000 sq. feet of bank
  - The future mixed use (FMU R5) would be developed by 2010.

* In addition to the larger, in-the-pipeline projects, other projects and/or land use changes identified by the City on EBMUD's land use map include the following.
  - Adeline: the east side of Adeline, and a parcel on the west side of Adeline would be converted to residential lofts (FR3) by 2010.
  - Avenue 64: a parcel located south of 64th, west of Christie, would be converted to high density residential (FR3) by 2010
  - In the old district (generally between 67th and Peabody, and west of the city boundaries), townhouses (FR3) would be built by 2010
  - Bay Street: the mixed retail/residential uses on the east and west side of Bay Street Mall would be online by 2010 (FMU R3)

  - o Papermill and Alder: Papermill is located south of Powell, between Hollis and Doyle; Alder is a triangular parcel located south of 59th and west of Hollis; mixed use residential (FMU R4) would be constructed at both sites by 2015
  - o A 230,000 sq. ft. laboratory (FC) building west of the Alder site (between Peladeau and Hollis, north of Powell) would be developed by 2010
  - o Pixar expansion, between 45th and Park, east of Watts would be completed by 2015 (FC)
  - o The existing AC Transit bus yard may be relocated to accommodate the Center for Community Life. The Center would involve expansion of the school and other community uses. However, the City has had difficulty finding a relocation site for the bus yard, and this relocation and expansion of the Center (FP) would be completed by 2020
- Areas of stability include the Marina, and the residential use areas along the eastern border of the City, as the City is trying to retain homes to create a distinctive community

Trends and Vision

Underutilized commercial uses remain in Emeryville

- Densities would increase throughout the City (at least 20 du/ac) and mixed uses would be developed along major corridors, including Hollis, 40th, Doyle, and San Pablo Ave.
- Market demand is resulting in the elimination of industrial uses, replaced by office, lab, and residential uses
- Doyle Street – the residential uses on the east side would remain, but some mixed use would develop on the east side at some unspecified point in the future. The densities have not yet been determined, but would not be less than 20 du/ac.
- The Expressions College for New Media (north of 65th and west of Shellmound) may expand in the future, but information on this potential change is not available at this time.

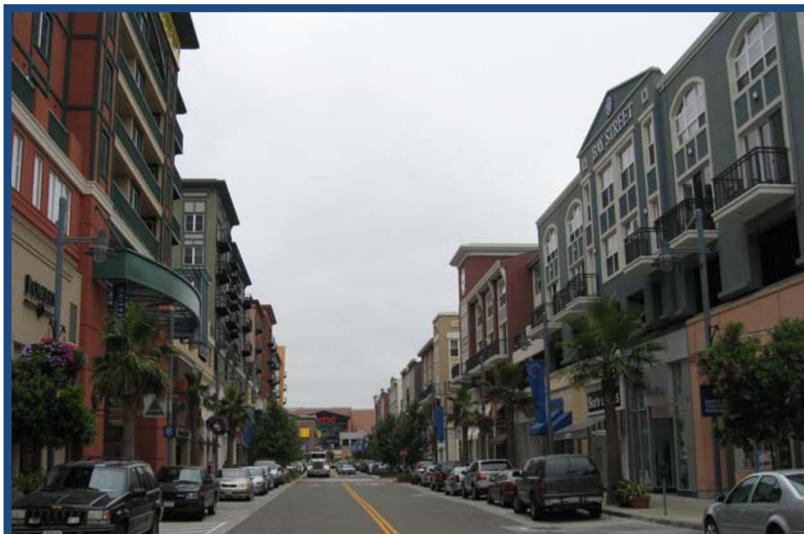
City of Emeryville General Plan
Background Paper

Miscellaneous

- General Plan (1993)
- In 1987, the City revised the existing zoning ordinance to allow for second units in the single-family area of East Emeryville. However, a significant number of existing lots are too small or narrow to accommodate the parking needed for a two-unit project – difficult to increase housing stock through the second unit provision
- Emeryville is divided into three subareas:
    - o Peninsula: land area west of I-80
    - o Bayfront: land between I-80 on the west and the railroad tracks on the east.
    - o East Emeryville: east of the railroad tracks.

Areas of Development

- Bay Street
- San Pablo Avenue



Bay Street mixed use project with parking between residents and retail

Trends

- The trends for the City are captured in the area policies, described below:
    - o Encourage the provisions of second units on lots containing a single family dwelling to serve the needs of lower and moderate income households
    - o Encourage development of housing on surplus, underused and Encourage the development of family housing, particularly in the Triangle and the northeastern sections of both north and South of Powell districts
    - o Encourage residential development in mixed use areas, particularly on large industrial sites
    - o Facilitate the conversion of underused industrial area when appropriate for residential or live/work use
    - o Encourage infill housing and housing above commercial developments
    - o Facilitate the transition of Emeryville into an intensively developed city with a wide range of economic activity
    - o Take steps to implement the San Pablo Avenue Revitalization Plan

  - The bulk of residential development in Emeryville should be medium density (< 45 du/gross acre). High density development will be permitted only in selected locations where high density development already exists
  - Land susceptible to re-use or redevelopment in Emeryville should be developed such that a variety of compatible uses will be established on the same site. In the largest of such mixed use projects (in excess of 200,000 sq. ft.), residential uses should be required where feasible.
- New ABAG projections: population increase from 8,400 in 2005 to 15,100 in 2035
- New ABAG projections: employment increase from 19,670 in 2005 to 28,210 in 2035

Attached:
GP Land Use Map

City of Emeryville Planning Department
Meeting Agenda

Date and Time of Meeting: July 2, 2007, 10:00 a.m.
City Attendees: Ms. Diana Keena, Long-Range Planning
Phone Number: 510-596-4335
WSMP Attendees: Mark Caughey
Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
- Review and confirm existing land uses
- Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
    a. Review and confirm vacant lands and future land use designations
    b. Discuss locations of densification activities: where and what type
    c. Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial and industrial uses changing.

4. **Timing of Development (10 minutes)**
    a. Identify the anticipated dates of development of future land uses (infill)
    b. Identify the anticipated dates of densification of existing uses

5. **Looking Beyond Planning Horizon (10 minutes)**
    a. What will City look like in 2060?
    b. What densification within the City may occur beyond the General Plan horizon?
    c. Will the City's SOI boundaries change? If so, what land use changes could occur?

City of Hercules Planning Department
Meeting Notes

Date and Time of Meeting: May 15, 2007; 8:30 a.m.
City Attendees: Mr. Dennis Tagashira, Planning Director
Phone Number: (510) 799-8243
WSMP Attendees: Mark Caughey, EBMUD WSID
Suet Chau, EDAW

Existing and Future Land Uses

- Significant changes are anticipated to occur in the area west of I-80 by 2015
- In general, there would be more mixed-use development in the City
- Central District: the BART parking lot located between Highway 4 and I-80 (to the west) is planned for relocation to a vacant parcel south of Highway 4/east of I-80 by 2010.
    - The parking structure would be bounded to the west and east by a mixed use development called the Hercules New Town Center (FMUR4) by 2015
    - The Caltrans Yard would be relocated to the east part of the SOI area (within the County) by 2015. This area would also accommodate a big-box store with a business park to the east by 2015
- Near the point extending into the Bay, a train and ferry station is anticipated by 2015 (FP).
- A school would be constructed on the FP site by 2015
- The North Shore Business Park is mostly developed. The last phase would consist of a parking structure
- Parcels surrounding Bayside: Several parcels identified for change in the future have wetland resources onsite and would be maintained as open space
- Franklin Canyon: by referendum, the residents voted to allow 1 house per 40 acres on the Franklin Canyon site. No proposal has been received for the site, partly because of the limitations and red-legged frog habitat. The Trust for Public Lands had wanted to buy this area to preserve lands but no longer had a need because of the referendum. Franklin Canyon was annexed by Hercules.
- The land use changes in unincorporated County (with the exception of the business park site) will need confirmation by the County

Trends and Vision

- More mixed-use development would be built in the City over time
- The City intends to annex the SOI area where the big-box and business park would be located.
- Accelerated pace of 2nd unit housing is not anticipated.

Miscellaneous Notes

- Residents move from the older areas of the city to newer areas, but they hold onto the old residences. To afford the new homes, multi-generational families live together. These families are assumed to concentrate in Bayside and Victoria by the Bay. The increase in household size creates parking issues
- Homes are generally between 2,800 to 4,000 square feet.

City of Hercules General Plan
Background Paper

Miscellaneous

- General Plan (date not specified)
- Primary attributes include preservation of open space
- The Hercules SOI area consists of 13 separate parcels totaling approximately 850 acres. Northern limits are defined by Burlington Northern and Santa Fe railroad tracks and right-of-way.
- Development of the commercial and employment areas has lagged behind residential growth

Areas of Development

"New urbanism" residential project in Hercules

- WSAs received from New Pacific Properties Project (residential/retail) and Franklin Canyon Project (residential/ commercial)
- The following have been identified by the General Plan as "Special Study Areas"
    - Hercules Properties Inc. parcels
    - Franklin Canyon Golf Course: settlement agreement conditions the golf course property to postpone residential development until Highway 4 is improved
- The City of Hercules Community Development Division website identifies new development within the City, as follows:
    - Central Hercules District: Waterfront Quarter
        - Promenade residential neighborhood will eventually encompass 217 detached and other units (Western Pacific Housing).
        - The Historic Town Center neighborhood, in the blocks of live/work buildings, would include a parking structure of several hundred spaces, the Capitol Corridor train station, and relocation and rehabilitation of existing historic buildings (Bixby Company).
        - In the Bayfront neighborhood commercial and loft-over-retail buildings would be constructed by Bixby.
        - In the Refugio neighborhood, the Planning Commission has approved a tentative map for smaller-lot residential place. In the Transit Village, there may be additional multi-family and commercial uses.

- Central Hercules District: Central Quarter
    - Apartment homes centered on a Main Street -- the extension of Sycamore Avenue -- in the lower Refugio Valley.
    - Site work has commenced in advance of construction by Western Pacific Housing of a 56-unit detached and multi-story duet subdivision on San Pablo Avenue at Hercules Avenue.
- Central Hercules District: Civic Quarter and Highway 4 Corridor:
    - Proposed Home Depot and revitalization of the remainder of Creekside Center.
    - Work is also underway on the 78-unit apartment home building along Sycamore Avenue, Rite-Aid is authorizing work to begin on constructing its approved building at Turquoise.
    - Relocation and expansion of the BART park-and-ride site at the corner of Sycamore and San Pablo.
    - Eden Housing is proposing to construct an affordable, multi-family residential building on a site to be created adjacent to the Library and City Hall sites.
- North Shore Business Park
    - Bio-Rad is submitting construction drawings for an approximately 300,000 square-foot first phase of a main campus expansion project.
    - Investigen has broken ground on its approximately 30,000 square-foot laboratory and general office building.
    - Redevelopment Agency staff has secured anchor leases for an approximately 38,000 square foot industrial condominium building.
- New Pacific District: Victoria by the Bay
    - In the Nottingham and Palisades subdivisions, construction is underway on model homes by Warmington Homes.
    - In the Bluffs and Shores subdivisions, advanced site work is being completed by Lyon Homes. Santa Clara Valley Housing and Eden Housing will be completing this 880-unit, award-winning, master-planned development, the largest residential brownfield remediation project in the United States.
- Refugio Valley District
    - On Refugio Valley Road, KB Home has begun site work for a 15-unit subdivision of detached single-family houses.
- Franklin Canyon District
    - City staff are overseeing the preparation of environmental analyses for Green Park's proposed residential subdivision

- 2007 ABAG projections: population increase from 23,600 in 2005 to 29,800 by 2035
- 2007 ABAG projections: employment increase from 2,870 in 2005 to 6,720 in 2035

Attached:
General Plan Land Use Map

City of Hercules Planning Department
Meeting Agenda

Date and Time of Meeting:	April 15, 2007; 8:30 a.m.
City Attendees:	Mr. Dennis Tagashira, Planning Director
Phone Number:	(510) 799-8243
WSMP Attendees:	Mark Caughey Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss New Pacific Properties Project and Franklin Canyon Project
   c. Discuss locations of densification activities: where and what type, particularly the various areas
   d. Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial and industrial uses changing.

4. **Timing of Development (10 minutes)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of existing uses

5. **Looking Beyond Planning Horizon (10 minutes)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the City's SOI boundaries change? If so, what land use changes could occur?

City of Lafayette Planning Department
Meeting Notes

Date and Time of Meeting:	May 30, 2007; 9:00 a.m.
City Attendees:	Mr. Greg Wolff, Senior Planner Mr. Michael Cass, Planning Technician
Phone Number:	(925) 299-3219
WSMP Attendees:	Mark Caughey, EBMUD Suet Chau, EDAW

Existing and Future Land Uses

- Most of the anticipated changes would be to low-density residential uses (FR1). Generally, in the northern portion of the city, changes would occur from 2010 to 2015. In the central portion of the city north of State Route 24 and the southern portion of the City, most of the changes are anticipated to occur by 2020
- Pockets of vacant lands would be converted to medium-density residential uses and mixed uses through the General Plan period
- A strip of land owned by EBMUD (where?) would remain open space (EOS)
- BART: three phase projection progress: first and second phases completed about 5 years ago for 30,000 square feet of retail and residential uses. The third phase has not yet been built. An office is planned although the City would prefer residential uses
- The Eastern Deer Hill Road area would be redeveloped as a low-density residential (FR1) and mixed use development (FMU R3) by 2020.
- The City has requested that EBMUD purchase the parcel north of Lafayette Reservoir. Regardless of the outcome, the area would be maintained as open space (EOS)
- One mixed used development (senior housing (FMU R4)) is anticipated outside the Mt. Diablo Avenue corridor and the Eastern Deer Hill Road area. Completion is anticipated by 2020
- Existing lands proposed for development on the southeastern edge of the City boundary are not served by EBMUD. Applicants have requesting annexation for water service. The outcome of the applications has not been determined

Trends and Vision

- The City does not intend to adjust their city/SOI boundaries
- The City is considering whether to require installation of purple pipes. Potential recycled water sites include a small cemetery near Park Hotel (south of SR 24 and west of Pleasant Hill Road), ballfields (near Bavarian and Jennie streets), and existing schools
- 2nd unit homes (primarily cottages) are built at a rate of approximately 5 to 10 per year
- Mr. Wolff envisions the City will generally stay the same in 2040/2060, with higher density in the downtown area (FMU R3 or FMU R4). The potential redevelopment area would be along Mt. Diablo Avenue between Risa and Pleasant Hill Road

City of Lafayette General Plan
Background Paper

Miscellaneous

- 2002 General Plan

Areas of Development

- Great interest in maintaining semi-rural character while revitalizing the commercial core. Residential is almost built out with encouragement of multifamily in downtown.
- SOI is consistent with County Urban Limit Line and almost the same as city limit line except 2 areas: NE area west of Taylor Blvd which has 44 vacant acres out of 130 acres and some existing large lot residential; SE area has 200 acres east of Pleasant Hill Rd and south of Hwy 24 with existing residential uses.
- Downtown: has vacant and underutilized lots with retail and multi-family residential potential. One and two-story buildings are to be maintained in the future. Redevelopment plan adopted in 1995 for 294 downtown acres. Ground floor uses: Retail only on ground floor with residential not allowed and office commercial discouraged.
- Rural Residential: most vacant or undeveloped land is designated rural residential and is located in environmentally constrained areas with steep hillsides, oak woodlands, and unstable soils.
- New single family homes will be on infill lots and in mixed use developments located downtown.
- Specific plans recommended for residential entryways: Acalanes Road, Mt Diablo Blvd from Acalanes Rd to Risa Rd, and Pleasant Hill Rd. Design features that would impact water consumption of new development within these SPs: limit height of development, use of native landscaping, and increase setbacks from the street.

Accessory unit constructed over garage in Lafayette

- Eastern Deer Hill Road recommended specific plan area: most significant undeveloped property in city because of its high visibility. Located north of Deer Hill Road is rural residential and single family residential; south of Deer Hill Road is administrative professional office.
- Housing element indicates residential buildout potential of vacant lands of 845 acres of 0.1 du/ac density (82 units) 711 acres of 0.2 to 2 du/ac density uses (44 ac outside city within SOI) (equal to 232 units); and 167 acres of 1 to 4 du/ac density uses (equal to 156 units).

Trends

- Infill of residential will continue.
- West end of downtown office buildings that support restaurants and personal services; and multifamily buildings. City wants to continue this mix of office and office related services and preserve multifamily housing.
- East end is predominately auto-oriented commercial. Some uses such as auto repair and heavy commercial such as lumber yard, have consolidated into larger more regionally centered locations. The Lafayette Park hotel is located here. City supports consolidation and redevelopment of underperforming properties. District appears to be ready for private redevelopment as buildings are old and properties are underutilized.
- People per dwelling unit averages 2.6 except high density multifamily residential which averages 2.1 pph.
- 2007 ABAG projections: population increase from 24,400 in 2005 to 26,400 in 2035
- 2007 ABAG projections: employment increase from 11,300 in 2005 to 12,060 in 2035

Attached:

General Plan Land Use Map

Eastern end of Mt. Diablo Blvd underutilized

City of Lafayette Planning Department
Meeting Agenda

Date and Time of Meeting:	May 30, 2007; 9:00 a.m.
City Attendees:	Mr. Greg Wolff, Senior Planner Mr. Michael Cass, Planning Technician
Phone Number:	(925) 299-3219
WSMP Attendees:	Mark Caughey, EBMUD Suet Chau, EDAW

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
    - Review and confirm existing land uses
    - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
    a. Review and confirm vacant lands and future land use designations
    b. Discuss locations of densification activities: where and what type.
    c. Discuss development trends City is seeing, if any, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial uses changing.
    d. Will the 2 unincorporated areas on east side be annexed? If so, when? When is 44 acres of vacant in northeast area near Taylor Rd anticipated to be developed?
    e. Have specific plans been developed for Eastern Deer Hill Road and residential entryways? If so, any intensity of use anticipated? Are the residential entryway SPs primarily to provide design guidelines?

4. **Timing of Development (10 min)**
    a. Identify the anticipated dates of development of future land uses (infill)
    b. Identify the anticipated dates of densification of developed uses

5. **Looking Beyond Planning Horizon (10 min)**
    a. What will City look like in 2060?
    b. What densification within the City may occur beyond the General Plan horizon?
    c. Will the City's SOI boundaries (or established Urban Growth Boundary) change? If so, where and what land use changes could occur?
    d. Could community decide to increase downtown densities and start undergrounding parking?
    e. What emerging economic sectors are anticipated to impact land uses in the city?

6. **ESA Facilitation Plan Meeting**
    EBMUD handout

Town of Moraga Planning Department
Meeting Notes

Date and Time of Meeting:	June 12, 2007; 1:00 p.m.
City Attendees:	Ms. Lori Salamack, Planning Director Mr. Ken Chew, City Councilmember
Phone Number:	(925) 376-5200
WSMP Attendees:	Mark Caughey, EBMUD Karen Johnson Suet Chau, EDAW

Existing and Future Land Uses

- Moraga is in transition. The Town could grow significantly or stay relatively the same; however, residents do not want change. Ms. Salamack provided the more conservative estimate of land use changes for the purposes of EBMUD's water projections
- Palos Colorados Project (located in northeast Moraga, portions within MOSO area): accommodate 123 du within a 460-acre site. Homes would be clustered to 2 du/ac; the area would contain ½ acre lots. This project was intended to receive recycled water, but now deferred because the golf course component was removed (FR1, 2015). It is unlikely this area would be developed with vineyards, because there may be restrictions by homeowner association rules and regulations
- Rancho Lagunita projects (east of Birchwood): Accommodate 35 du within the 180 acre site. If this area does not develop with homes, it is possible that it would be used for vineyards. Medium-density residential use is assumed (FR2, 2025)
- Moraga Open Space Ordinance (MOSO) designation (citizen initiative): allows 1 du/20 acres, which can be increased (but not required) if the land is not considered high risk (e.g., unstable soil, sensitive resources); however, there is a directive to cluster homes if development occurs. The designation permits agricultural uses, including vineyards without a permit. Areas designated in the general plan as MOSO include those that can be developed and those under conservation easements.
- No vineyards would be developed between the Palo Colorados and Rancho Lagunita projects, as this area is under a conservation easement
- St. Mary's College: facilities expansion would occur to meet existing needs. There are 2,500 undergraduates attending St. Mary's; only 1,500

Lamorinda vineyards allowed in low density areas housing units have been developed on campus

- Bollinger Canyon study area: a maximum of 126 du may be developed within 180 acres (0.7 du/acre). There is current opposition to the project particularly from the County residents to the east; approval may be difficult. Development may occur if recreational facilities (e.g., sports field, gym, etc.) were provided in fulfillment of the Parks and Recreation mandated ratio. The EIR will be completed next year, and Town Council will make a decision on the next steps in 2009 (FR1, 2030)
- Mitih Wineburg property: 80 acres. There's currently one single family home. No new development proposed at this site
- At Old Moraga Ranch (southern part of Town): improvements are under development for 10 lots. At Old Moraga Ranch north of the property with 10 lots: 6 lots have been proposed for development. Due to creek and landslide hazards, it would be a challenge to develop this site. The Town may approve the project; the land is valuable and could be developed.
- Sander's Ranch, surrounding the development along Mulholland Merrill, in the southeastern portion of the Town: No development is proposed. This area would unlikely be converted to vineyards
- Indian Valley: located adjacent to EBMUD watershed lands in the west. Within USL watershed. 180 units with 1.5 du per 100 acres. Similar to the Bollinger Canyon, this development may or may not occur. For planning purposes, approval of Indian Valley may occur by 2030 (FR1)
- Rheem Specific Plan. 7 vacant acres next to theatre to develop for commercial uses when land is sold
- Moraga Center Area Specific Plan. The Town intends to reinvest in the shopping center with improved landscaping and an additional 90,000 square feet of commercial space; 50,000 sq. ft. of office. A maximum of 720 du (3 du to 24 du/ac) would be developed, including senior housing (300), compact townhomes /condos (300), faculty/student units (50); workforce units – apartments (50) and detached single family homes (20). In addition, a 75-unit hotel, and local serving businesses (including restaurants) would be developed. The senior housing and compact homes are intended to accommodate the aging population, (FMU R3, between 2015 and 2020)

Trends and Vision

- Development of vineyards as part of individual residential development in Moraga, and generally in Lamorinda. Potable water is used to water these lands (e.g., home on Sandingham, across the shopping mall, has vineyards on its side slopes). Because the MOSO designation permits agriculture, there is no permitting involved in the development of backyard vineyards.
- In general, lands within Moraga, especially those owned by the Bruzzoni family would be slow to develop because the family is slow to develop existing lands with entitlements, such as those adjacent to the County Club. The family signed a 20-year development agreement and few homes have been developed to date. If these family lands were to be sold to a housing developer, development may occur sooner.
- There has been one application for an accessory unit (2^{nd} unit) since the state law allowed ministerial approval of such conversions – by the Bruzzoni family. Ms. Salamack suggests that 2^{nd} units may be more numerous in the future
- Vision: Moraga would be similar to what it is now. The remaining parcels would likely be slow to develop. The population is unlikely to change much by 2040.

Town of Moraga General Plan
Background Paper

Miscellaneous

- 2002 General Plan

Areas of Development

- The Moraga Open Space Ordinance (MOSO) limits densities to 1 du/20-, 10-, and 5-acres and prohibits development on slopes >20%.
- Most development will be infill residential.
- Moraga Center and Rheem Park Area Specific Plans to be prepared to create a community focal point and mixed use activity center of businesses and higher density res. Higher densities (10 du/ac and 16 du/ac) to be added to GP and allowed in these 2 SP areas.
- Rheem Park Area SP to also consider encouraging Research and Development uses.
- Bollinger Canyon Special Study Area is one of the few remaining areas for development. It will require a detailed study and area plan by property owner.

Trends

- Actual densities are being constructed at 80 percent of upper limit due to site constraints.
- Moraga Center Area SP to accommodate "evolving community needs" for small office and specialty retail uses.
- 2007 ABAG projections: population increase from 16,400 in 2005 to 18,700 in 2035
- 2007 ABAG projections: employment increase from 5,040 in 2005 to 6,300 in 2035

Attached:
General Plan Land Use Map

Shopping center in Moraga to be redeveloped with more intense uses

Town of Moraga Planning Department
Meeting Agenda

Date and Time of Meeting:	June 12, 2007; 1:00 p.m.
City Attendees:	Ms. Lori Salamack, Planning Director Mr. Ken Chew, City Councilmember
Phone Number:	(925) 376-5200
WSMP Attendees:	Mark Caughey Karen Johnson Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   - Review and confirm vacant lands and future land use designations
   - Discuss locations of densification activities: where and what type, particularly the downtown
   - Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial uses changing.
   - Have the two Specific Plans identified in the GP been prepared (Moraga Center Area and Rheem Park Area)
   - Has a Town Center facility been located and/or built?
   - Status of Bollinger Canyon Area Plan.

4. **Timing of Development (10 mins)**
   - Identify the anticipated dates of development of future land uses (infill)
   - Identify the anticipated dates of densification of developed uses

5. **Looking Beyond Planning Horizon (10 mins)**
   - What will City look like in 2060?
   - What densification within the City may occur beyond the General Plan horizon?
   - Will the City's SOI boundaries (or established Urban Growth Boundary) change? If so, where and what land use changes could occur?

6. **ESA Facilitation Plan Meeting**
   - EBMUD handout

City of Oakland Planning Department
Meeting Notes

Date and Time of Meeting: August 2, 2007 9:00 am
City Attendees: Mr. Eric Angstadt, Strategic Planning Manager
Phone Number: (510) 238-3941
WSMP Attendees: Mark Caughey, EBMUD WSID
Karen Johnson
Suet Chau, EDAW

Existing and Future Land Uses

Mr. Angstadt suggested we speak with the Port of Oakland separately with respect to future land use changes on Port lands.


Wide range of densities in Oakland

Future land use changes include the following:

- Oak Knoll (east of I-580, south of Keller): consists of 900 to 1,000 residential units and creek restoration. It also includes senior housing and some minor local-serving commercial uses (e.g., coffee shop). Because retail uses are minimal, they will not be accounted for in the future land use category. As such, the future designation would be FR3, developed by 2015.
- Areas surrounding Oak Knoll are constrained by slope and would be less dense (FR2) than the Oak Knoll development. Likely to develop by 2030.
- The hills east of I-580: Development would be constrained by slope and would likely be developed at lower densities (FR1) and may remain undeveloped until 2025. The exception is Leona Quarry, which will be fully built out by 2010 and is at a higher density (FR3). The areas surrounding the Leona Quarry will be at FR2 and would be developed by 2030.
- Oak to 9th Development (south of Embarcadero): consists of approximately 3,000 residential units, 200,000 square feet of ground-floor commercial, 32 acres of parks and public open space, two renovated marinas, and wetlands restoration. The neighborhood-serving commercial is not considered significant enough to call out as a mixed use. The development (FR5) is anticipated to be online by 2025.
- Wood Street (bounded by Wood Street, I-80, and 12th Street): approximately 1,600 residential units. The first phase is under construction. The development would be completed by 2010 (FR5).
- MacArthur BART: Transit oriented development consisting of 800 residential units or more. The development (FR6) is anticipated to be online in 2015
- Fruitvale BART: 500 residential units to be developed on the existing parking lot. The development is anticipated to be online 2015. The Fruitvale community has been

receptive to development, including plans for 8 to10 story buildings. The community would like the area to be a separate downtown, with nodes of population density and commercial activity.

- Downtown: multiple projects with 50 to 300 residential units each. There's currently 5,000 to 6,000 units total that are not yet built but have entitlements. Mr. Angstadt indicated it would be appropriate to show the FR6 overlay in this area. The overall area will develop by 2030, although multiple projects would likely be online before that time.
- Uptown Mixed Use Project (Forest City): The Fox Theatre has been renovated and surrounding lands are proposed for redevelopment. The Uptown project is bounded by San Pablo, Telegraph, 20th, and 18th streets. Mixed use residential development would be phased in over time but would likely be developed by 2030 (FR3)
- Mandela Parkway – areas north and south of Grand Avenue would likely be preserved as industrial uses and would not be redeveloped as mixed and/or residential uses in the future. Mr. Angstadt indicated that interests in the community have expressed a preference for preserving industrial uses throughout the city. However, the Mandela Parkway area near the West Oakland BART station will likely continue to develop with mixed uses (FMU R4, 2020)

High density lofts replacing or reusing Jack London Square industrial buildings

- Kaiser Medical Hospital: Kaiser is currently constructing new facilities north of Broadway and MacArthur to consolidate services and relocate its hospital functions. The existing hospital will be rebuilt for office use. (FP, 2015)
- Broadway (between 27th and 51st): The City intends to move the auto dealers from Broadway to the former Army Base. The area would then be recaptured for a regional commercial center, with department stores and other high end commercial uses. A Specific Plan will be developed for this area. Higher density residential uses are anticipated to support the new commercial uses (FMU R4, 2020).
- Telegraph Avenue: The Telegraph Avenue corridor in the Temescal neighborhood will intensify, but unlikely at the levels anticipated in the General Plan due to community opposition. Actual densities may be half of the allowable density.
- San Pablo Avenue: This corridor will likely intensify over the long term, as it is considered one of the Mayor's priorities. (FMU R4, 2020)
- Other Grow and Change transportation corridors: Mr. Angstadt confirmed the City's vision to intensify targeted transportation corridors through 2040. As such, the characterization of land use changes as depicted on the EBMUD future land use map was considered acceptable. The timing of corridor intensification will be between 2020 and 2030.

- Estuary Plan (west of Downtown): The ratio of residential to industrial uses (40:60, respectively) would unlikely change in the area. The future land use change to FC (2030) was considered acceptable.
- Army Base: Lands belonging to the City (OARB), not the Port, are planned for future commercial uses (e.g., film studios, ancillary facilities related to film studios, hotel, etc.). Car dealerships from Broadway are planned to be relocated to the Gateway Development Area (170 acres) along with large format retail, facilities to serve trucking or other port-related industries, and other commercial, light industrial, maritime, and recreational activities. There are current debates as to the specific types of commercial uses to bring the base. No major housing is proposed. The area is anticipated to be developed by 2025. There is no coordinated strategy on how to deploy the redevelopment money.

Trends and Vision

- The City is considering annexing a small area of existing residential lands within Contra Costa County on the eastern boundary of the city off Skyline. However, the City is not actively pursuing the annexation.
- Transportation corridors: the City has set development of transit corridors (lands within ¼ mile) and BART (lands within ½ mile) as priorities.
- The City intends to preserve most existing industrial uses.
- Telegraph Avenue: AC transit is requesting a dedicated lane for buses, which would either reduce parking or the number of travel lanes for other vehicles. The City acknowledges that the proposal is ambitious and that it may not be completed as envisioned by AC Transit.
- The demand for 2nd units is minimal because most garage conversions and easy to develop second units have already developed. There are currently more 2nd units in the flatlands than in the hills, many of which are illegal conversions. Of these conversions, many are legacy units that have been around since the 1970's and 1980's. Most of the activity by the City is for code enforcement of the illegal units rather than new activity.
- The City's vision for 2040 through 2060 is the intensification of the transportation corridors with tall buildings. The City will prepare itself for long-term future growth (20-25 years) in the next four years through the focus of City resources to such development. There is public support to develop the corridors.

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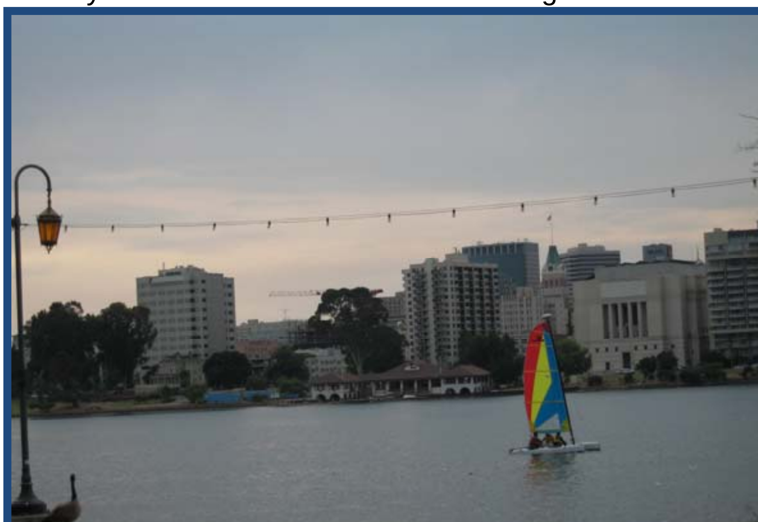


Downtown planned for high rise residential and office uses

City of Oakland General Plan
Background Paper

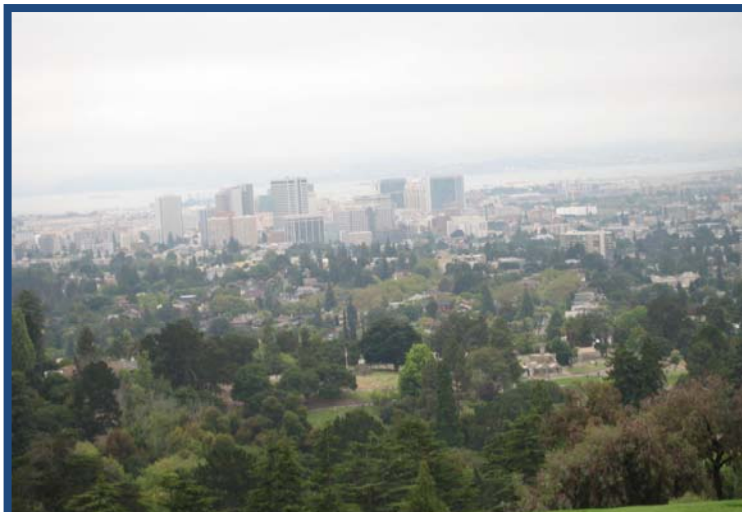
Miscellaneous

- 1998 Land Use Element of the General Plan
- No updated land use map available until early August; out of date map can be purchased

Areas of Development

- Downtown: A downtown area designated Urban Residential allows 125 dwelling units per acre (du/ac). Ground floor commercial is encouraged. The CBD designation is a more specific location which encourages high density mixed uses of regional importance. Large scale offices and high rise residential uses with 300 du/ac allowed. The "Broadway Spine" encourages the highest Floor Area Ratios (FARs) with Lake Merritt and Old Oakland lower FARs.
- Showcase Districts: Regional economic generators are centers of transformation for the future: Seaport, Downtown, Waterfront, Coliseum Area, Airport/Gateway. City to support infrastructure and other improvements to enable transportation to occur.
- Strategy Diagram: Corridors - long neglected thoroughfares upstaged by freeways are the target of strategies to concentrate commercial areas into nodes of activity. Corridors and areas are designated in the Strategy Diagram for Maintain and Enhance, and Grow and Change. These grow and change corridors should be identified on the future land use polygons for future mixed uses. The areas should reflect changed land uses from EO to FOH, EIL to FC.
- Strategy Diagram: Areas - Two Oakland Hills areas are identified as areas of change to FR2 or 3 depending on the designation of the map not yet available. It appears to be an area of new development like Leona Quarry. Also, lands straddling I-880 along the waterfront are targeted for grow and change through densification and infill.
- TODs: City defines as compact mixed use types of development. Fruitvale "Transit Village" has redeveloped in past 10 years. MacArthur BART Station is planned as a maximum access station with redevelopment surrounding it. Lands adjacent to and near the West Oakland BART station has redeveloped over the past 10 years, partly as a result of the Cypress structure/ Mandela Parkway redevelopment; a transit village with retail stores and community services and revitalization of the 7th street corridor near the station proposed. Eastmont town center encouraging mixed use living and working environment as part of revitalization.
- Neighborhoods: maintain and enhance through design features and encouragement of neighborhood activity centers. Community facilities, small open spaces, and housing for seniors and others that rely on public transit are encouraged.
- The Industry, Commerce, and Institutional classifications encompass several growth areas proximate to I-880 and the seaport, airport, and coliseum areas for large scale retail and commercial development. This classification encourages a mix of commercial, entertainment, and other regional drawing power uses, with lots of parking required.

- Airport/Gateway/Seaport: Oakland Airport capacity being expanded at this time. Improvements to Hegenberger Avenue have occurred to help revitalize the area. The Port will enhance capacity through outer harbor terminal expansion and modernization, channel deepening, consolidation of rail services, air passenger terminal expansion, air cargo expansion, improved BART access, and continued development of ferry service. Expansion of Port activities accomplished through reuse of Army Base lands. Some of these activities will likely result in changes to water demands.
- Waterfront: the Estuary Plan was a joint effort of the Port and City of Oakland. Jack London Square produce market is obsolete due to new distribution systems. Estuary Park through 9th Ave Terminal has greatest potential for redevelopment and a park, but the Oak to 9th Neighborhood Project is controversial. In Fruitvale Waterfront, the mix of industry, manufacturing, and housing is to be retained, but over time, industrial uses adjoining the shoreline may transition to uses that take advantage of estuary edge.
- Redevelopment Agency Plans. Legally-defined redevelopment plans have been formulated for the following areas: Stanford/Adeline; Broadway/MacArthur/San Pablo; West Oakland; Oakland Army Base; Oak Center; Acorn; Central District; Central City East; Oak Knoll, Coliseum Area. Specific land use maps are not included with most of the plans. Most plans have goals of stimulating infill development and land assembly opportunities on obsolete, underutilized , and vacant properties, and stimulating opportunities for adaptive reuse and preservation of existing building stock, and revitalize neighborhood commercial areas. The focus on most of the plans is streetscape and other visual improvements that will impact water demands indirectly by encouraging economic development and thus higher occupancy, densification, and development of infill parcels.



Oakland from Mountain View Cemetery

- Oakland Army Base Redevelopment Plan: Oakland Base Reuse Authority (OARB). 1,800 acres of former Army Base property plus adjacent lands, including Port of Oakland maritime area, the former Naval Fleet Supply Center, and an area including the former Amtrack station. Freeway auto mall, large format retail, facility to serve trucking or other port-related industries (and other commercial, light industrial, maritime, and recreational activities) being considered for Gateway Development Area (170 acres) adjacent to I-80 and EBMUD WWTP. Port Development Area (200 acres) adjacent with unknown plans. 16th Street/Wood Subdistrict to provide housing. (No redevelopment land use maps provided with the redevelopment plan.)

Trends

- City is planning for 11,200 new households to be added between years 1998 and 2015 located in Corridors, Downtown, TODs, Waterfront, and infill.
- City anticipates dramatic increases in shipping and distribution activities.
- Economic health and expansion potential is supported by: strong established industrial presence and room to grow, investment in transportation infrastructure, multiple nodes of commercial activity, large consumer market base to support retail, downtown high rise office employment hub, and sports and entertainment facilities in place.
- City to maximize usefulness of underutilized industrial buildings by cleaning up contaminated properties, reusing industrial buildings with non-traditional activities, and encouraging development in older industrial areas.

Fruitvale BART station redevelopment increased densities

- Downtown employment expected to increase by 30 percent with new office jobs being in government, business services, finance, communications, and high tech sectors. Accomplished through construction of taller buildings and revitalization and reuse of underutilized properties. High rise office buildings only allowed in downtown.
- Port experienced 74 percent growth in revenue tonnage from 1985 to 1995.
- Airport related jobs to increase dramatically from 1998 due to improvements made and being made including the expansion of traveler and cargo capacity.
- Densification: One accessory housing unit per property permitted outright in all residential zones if it meets requirements set up to encourage second units in new development and maybe in existing units. Orphan lots (substandard size) should be allowed to develop. Live-work in same location encouraged. Transit villages are intended to be attached multi-story developments with retail.
- Acorn redevelopment plan includes construction of senior housing on an unused part of the Jack London Gateway Center parking lot.
- 2007 ABAG projections: population increase from 410,600 in 2005 to 542,500 in 2035
- 2007 ABAG projections: employment increase from 202,570 in 2005 to 285,600 in 2035

City of Oakland Planning Department
Meeting Agenda

Date and Time of Meeting:	August 2, 2007 9:00 am
City Attendees:	Mr. Eric Angstadt, Strategic Planning Manager
Phone Number:	(510) 238-3941
WSMP Attendees:	Mark Caughey, EBMUD WSID Karen Johnson Suet Chau, EDAW

Agenda and Questions to Ask

1. **Introduction and Background (5 minutes)**

2. **Existing Land Uses (15 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (40 minutes)**
   a. Status on availability of an updated general plan land use map
   b. Review and confirm vacant lands, particularly in hills, and future land use designations
   c. Discuss locations of densification activities: where and what type, particularly the downtown
   d. Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; second units; commercial uses changing.
   e. Can we assume Grow and Change areas and corridors will have densification up to general plan density?
   f. San Pablo Ave subarea and Broadway/MacArthur subarea assume mixed use residential at 20 to 50 du/ac with retail on groundfloor?(FMUR4)

4. **Timing of Development (20 mins)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of developed uses, particularly downtown and Grow and Change areas

5. **Looking Beyond Planning Horizon (10 mins)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon of 2015?
   c. Will the City's SOI boundaries change? If so, where and what land use changes could occur?

6. **ESA Facilitation Plan Meeting**

   d. EBMUD handout

City of Orinda Planning Department
Meeting Notes

Date and Time of Meeting: May 31, 2007; 11:00 a.m.
City Attendees: Mr. Emmanuel Ursu, Planning Director
Phone Number: (925) 253-4210
WSMP Attendees: Mark Caughey, EBMUD WSID
Suet Chau, EDAW
Karen Johnson

Existing and Future Land Uses

- No significant land use changes in Orinda within the last decade
- Northern area
    - Per General Plan: low-density residential (FR1) between 2020 and 2040.
    - Sleepy Hollow Tennis Club, located in a cluster of lands designated for change in the northern portion of the City. Landowners has expressed interest in selling lands to the City
- Northwestern area
    - EBMUD watershed lands would remain as open space (EOS).
    - The parcels south of the watershed lands may develop between 2015 and 2040; the Johnson property is the western parcel (adjacent to the city boundary) immediately south of the watershed lands.
    - A zoning amendment to RL-20 is pending on the parcel to the east..
    - The Johnson property are currently not served by EBMUD; the landowner intends to develop if water service can be obtained.
- North Village, north of SR 24: the area is underutilized, and is constrained by PG&E transmission lines that run diagonally parallel to Camino San Pablo.
    - The eastern portion of Camino San Pablo Corridor, from Camino Sobrante to the SR 24 onramp, is anticipated to develop as mixed uses with 25 du/acre on average (FMU R4) by 2040
    - Senior Housing would be constructed at the former library site
    - The Santa Maria Church used to accommodate a school and playfields; closed down in the 1930s due to declining enrollment. A portion of the site may be developed as FR3, although the Church would like to reuse the site as a school
    - The new city hall (FP) west of Santa Maria is nearly ready for occupancy (water demand assigned to year 2010)
    - A mixed use development at the western end of Orinda Way (NW corner, adjacent to Camino San Pablo) would be developed as mixed uses (FMU R3) by 2030.
    - A 25 du/acre (FMU R4) development consisting of retail and condominiums between Avenida de Orinda and Camino Sobrante would be developed by 2015.
    - A mixed use development (FMU R3) east of Avenida de Orinda (between Orinda Way and Camino San Pablo) would be developed by 2015.
    - A 73 unit residential development is anticipated on the 11 acre former JFK University campus by 2020 (FR2).
- The east side of the BART parking lot would be developed with office uses (FC) by 2030. Noise precludes residential development at Orinda BART.

- Gateway Planning Area:
    - o 245 new homes would be developed within the 280-acre Gateway Planning Area.
    - o The majority of the area would consist of open space areas, dedicated to the EBRPD, Geologic Hazard Abatement District, and EBMUD.
    - o The planning area would also include public uses and an art and garden center.
    - o The planning area would be completed in a five year timeframe, with the first home built within a year.
    - o Five new playfields will be constructed within the unincorporated areas outside the City's SOI, west of the existing Gateway Planning Area. This area will be annexed by the City.
- Some of the future change areas identified in the City are either slope areas behind existing houses and should be identified as existing low density residential uses (ER1) or open space (EOS).
- Occasional consolidation of residential parcels, particularly in the northwestern part of the City, to create large parcels.

Subdivision of large lots results in higher density residential uses

City of Orinda General Plan
Background Paper

Miscellaneous

- 1994 General Plan

Areas of Development

- Gateway: the GP indicates OS with growth potential. Need current information on development going in now. Development to be allowed only in a small part of the total land area.
- Retail and office districts are to have a village character, meaning low density, small scale, low lying buildings (2 floors max). Office uses should support local community residents and businesses, not regional offices.
- All development – semi-rural character desirable to maintain.
- El Toyonal area (p. 6 in chapter 2) and Southwood Valley (p.7) had lots of decisions that needed to be made about development potential.
- Downtown- no expansion of lands designated for commercial uses.
- The remaining residential sites are the most expensive to develop.

Trends

- This is a very old GP without any current information.
- 2007 ABAG projections: population increase from 17,800 in 2005 to 19,100 in 2035
- 2007 ABAG projections: employment increase from 6,230 in 2005 to 6,920 in 2035

City of Orinda Planning Department
Meeting Agenda

Date and Time of Meeting: May 31, 2007; 11:00 a.m.
City Attendees: Mr. Emmanuel Ursu
Phone Number: 925-253-4238
WSMP Attendees: Mark Caughey
Karen Johnson
Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss locations of densification activities: where and what type, particularly the downtown
   c. Discuss development trends City is seeing, if any, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial uses changing.
   d. Status and land uses proposed and under construction for Gateway development.
   e. Will the retail and office districts continue to have a small scale density or are increasing densities being proposed?
   f. Will mixed uses be allowed in the future?
   g. Will Orinda maintain its semi-rural character in the future?
   h. Was El Toyonal area ever designated for residential development?
   i. Was Southwood Valley ever designated for development?

4. **Timing of Development (10 mins)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of developed uses

5. **Looking Beyond Planning Horizon (10 mins)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the City's SOI boundaries (or established Urban Growth Boundary) change? If so, where and what land use changes could occur?

6. **ESA Facilitation Plan Meeting**
   - EBMUD handout

City of Piedmont Planning Department
Meeting Notes

Date and Time of Meeting:	May 25, 2007; 8:30 a.m.
Town Attendee:	Ms. Kate Black, Planning Director
Phone Number:	510-420-3063
WSMP Attendees:	Jae Park, EBMUD Suet Chau, EDAW

Existing and Future Land Uses

- Piedmont contains some vacant lands within steep slopes; these areas may be constrain from development
- Homeowners have developed 2nd units on sloped areas within their property boundaries. Seven units have been developed since the last planning period (1996)
- A PG&E substation is currently located at the corner of Oakland Avenue and Howard Avenue. The parcel will be redeveloped as a multi-unit residential building containing 6 to 7 townhomes within a 16,000 square- foot lot (FR3). Application for this development is expected in the fall, and the development will likely be completed by 2010

Trends and Vision

- The City would like to densify the Grand Avenue commercial corridor (from city limits to Oakland Avenue) through the construction of mixed uses with retail on the first floor and housing above. Turnover of existing properties is slow, and the City anticipates the need to assemble land prior to selling properties. The City has not determined the density of future mixed uses
- Housing development would be expected in the future to meet fair share housing requirements, although none has been identified

Miscellaneous Notes

- The City is in the process of updating its General Plan, and anticipates it will be published early next year
- The southern boundary of the city limits as depicted on our maps will need to be extended further south
- The existing land uses for Piedmont Park (near Magnolia Avenue) needs to be clarified to distinguish it from the School District property

City of Piedmont General Plan
Background Paper

Miscellaneous

- 1996 General Plan
- City is 1.8 square miles devoted almost exclusively to residential uses (departure of this concept as a city of homes require majority vote by residents)
- Piedmont is essentially built out
- No industrial enterprises; commercial activity limited to retail establishments in two small areas: Civic Center area (adjacent to Highland Avenue and Vista Avenue) and commercial district along Grand Avenue (near the southern boundary with the City of Oakland)

Areas of Development

- One vacant parcel left within the City capable of subdivision. Some developed parcels capable of further subdivision.

Trends

- The trend of the City is captured in the General Plan's goal, which is to maintain the character of Piedmont as a residential community
- There is at present no great pressure to convert residential homes in the Grand Avenue area to commercial uses.
- 2007 ABAG projections: population increase from 11,000 in 2005 to 11,200 in 2035
- 2007 ABAG projections: employment increase from 2,090 in 2005 to 2,140 in 2035

Attached:
Land Use Map
Zoning Map

City of Piedmont Planning Department
Meeting Agenda

Date and Time of Meeting:	May 25, 2007; 8:30 a.m.
Town Attendee:	Ms. Kate Black, Planning Director
Phone Number:	510-420-3063
WSMP Attendees:	Jae Park, EBMUD Suet Chau, EDAW

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss locations of densification activities: where and what type, particularly the downtown
   c. Discuss development trends the City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial uses changing.

4. **Timing of Development (10 mins)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of developed uses

5. **Looking Beyond Planning Horizon (10 mins)**
   a. What will the City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the Town's SOI boundaries (or established Urban Growth Boundary) change? If so, where and what land use changes could occur?

City of Pinole Planning Department
Meeting Notes

Date and Time of Meeting: May 15, 2007, 11:00 a.m.
City Attendees: Ms. Elizabeth Dunn, Planning Manager/Director
Phone Number: 510-724-9038
WSMP Attendees: Mark Caughey
Suet Chau

Existing and Future Land Uses

- Ms. Dunn characterized Pinole as mostly built out
- Duncan Canyon: no pending projects
  - o Development of this area is controversial and contentious because access would likely occur through existing cul-de-sacs, affecting nearby residents;
  - o Future development at very low density is beyond the WSMP 2040 horizon.
- Kaiser Medical Campus: (60,000 sq. ft, 2 story building) is currently under construction on the Gateway East parcel and will be completed by 2010. Kaiser will transfer other facilities outside Pinole to the Gateway West parcel by 2010, although such plans have not yet been submitted
- Potential changes of vacant lands on the east side of the city (identified for low-density residential use according to the General Plan) are not expected to occur within the WSMP planning horizon. The area is constrained by slopes, and the underlying zoning is open space. (General Plan Land use map color may be in error)
- Change to low density residential use at the eastern gateway (south of Adobe) is not anticipated within the WSMP 2040 horizon; it will remain open space

City is encouraging higher densities in downtown Pinole

- RV Storage Yard in the northeastern part of the City may be developed to residential use (FR2) beyond the WSMP 2040 horizon
- Ms. Dunn did not comment on land use changes within the unincorporated areas

Trends and Vision

- San Pablo Avenue corridor: promote mixed use developments.
    - Change would occur gradually through 2040; demand for this type of use is not present; land assembly difficult;
    - The intent is to include commercial/office uses on the ground floor with housing above (FMUR3);
    - limited size of the lots (6,000 to 10,000 sq. ft.) = less than 10-19.9 du/acre
- The City is not interested in annexing unincorporated areas west of the city limits

Miscellaneous Notes

- Pinole Vista Shopping Centers: No change within WSMP 2040 horizon.
- Old Town: the area is defined by Buena Vista, Peach, and Oak Ridge streets; the area is currently undergoing revitalization to commercial/office space. (no pending applications)
- 2nd unit conversions – few legal conversions; garage conversions without permits are a continuing problem.

Redevelopment results in denser utilization of land

City of Pinole General Plan
Background Paper

Miscellaneous

- General Plan (1995); General Plan currently being updated
- Housing Element (adopted May 6, 2003)
- Pinole Planning area includes the City and the unincorporated areas in the county to the east and south stretching to El Sobrante ridgeline, Pinole/Hercules ridgeline and the City of Richmond limits
- Pinole Redevelopment Agency: focus on funding local improvements, commercial retail development and affordable housing, with special attention to improvements in Old Town and along San Pablo Avenue
- Annexation proposal: Montara Bay

Areas of Development

- San Pablo Avenue redevelopment
- Pinole Vista Shopping Center

Trends

- Increases in jobs will exceed the expected increase in residents
- San Pablo Avenue corridor, and the City as a whole except for medical offices near Doctors Hospital, will have less office/industrial demand than was estimated when the Specific Plan was adopted in 1986
- The primary constraint to developing/redeveloping San Pablo Avenue will be the high cost and time requirements for land assembly
- The primary constraint to enhancing activity in Old Town is the lack of capital and adequate parking
- The vacancy rate in some neighborhood shopping areas has increased. Centers with higher vacancy rates may need to look to alternative land uses, such as residential or mixed use
- Future commercial/residential growth: most employment growth will occur at Pinole Vista Shopping Center; improvements are also expected along San Pablo Avenue; no significant change to existing residential areas are anticipated and no further large housing developments are projected
- Encourage affordable housing production by allowing mixed residential/ commercial projects
- Promote retail and housing development that make better use of currently underutilized land and build on the strengths of San Pablo Avenue as a regional transportation route
- Modify the mid-San Pablo Avenue area to allow office, retail, medium density residential, and mixed use residential/commercial uses
- Provide a mix of light industrial, retail, services and multi-family residential use in the West San Pablo Avenue area.
- 2007 ABAG projections: population increase from 19,700 in 2005 to 22,400 by 2035
- 2007 ABAG projections: employment increase from 5,840 in 2005 to 8,070 in 2035

Attached:
General Plan Land Use Map

Pinole Planning Department
Meeting Agenda

Date and Time of Meeting:	May 15, 2007, 11:00 a.m.
City Attendees:	Ms. Elizabeth Dunn, Planning Manager/Director
Phone Number:	510-724-9038
WSMP Attendees:	Mark Caughey Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   - Review and confirm vacant lands and future land use designations
   - Discuss locations of densification activities: where and what type
   - Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial and industrial uses changing.
     - i. San Pablo Avenue
     - ii. Pinole Vista shopping center

4. **Timing of Development (10 minutes)**
   - Identify the anticipated dates of development of future land uses (infill)
   - Identify the anticipated dates of densification of existing uses (e.g., San Pablo Ave corridor)

5. **Looking Beyond Planning Horizon (10 minutes)**
   - o What will City look like in 2060?
   - o What densification within the City may occur beyond the General Plan horizon?
   - o Will the City's SOI boundaries change? If so, what land use changes could occur?

City of Richmond Planning Department
Meeting Notes

Date and Time of Meeting:	May 10, 2007, 1 p.m.
City Attendees:	Mr. Richard Mitchell, Planning Director
Phone Number:	(510) 620-6706
WSMP Attendees:	Mark Caughey, EBMUD WSID Suet Chau, EDAW

Existing and Future Land Uses

- Richmond is currently updating its General Plan, and is about half way through that process
- In general, land uses would change primarily to residential, commercial, or office uses in the future from vacant uses
- Few mixed use developments are anticipated within the general plan horizon
- Future residential development would be at FR3, FR4, and FR5 levels.
- Where mixed use development with retail on the first floor is anticipated, the amount of such space would be so minimal that we identified the future use as residential on the future land use map, per Mr. Mitchell's advice (exceptions are the Campus Bay and Ford Assembly Plant Reuse Projects with significant non-residential components),
- Polygons identified for future commercial uses would generally develop by 2015.
- More housing development is anticipated along the shoreline in the general vicinity of the Richmond Marina Bay, although some of these areas were identified for future commercial uses in the general plan;
- Currently vacant areas in the eastern portion of the city boundaries anticipated to change to medium-density residential uses (FR2) by 2015 would be less dense than anticipated due to slope constraints;
- Hilltop: scattered residential development, but no major changes;

Trends and Vision

- Remaining growth areas are Campus Bay and the area west of Richmond Parkway
- Resistance by the public to building on industrial spaces within the City;
  - Opponents argue the need for more open space,
  - Staff asserts that there is adequate open space
- San Pablo Avenue corridor – joint Specific Plan with El Cerrito is in progress – will encourage mixed use development
- Some intensification along McDonald Avenue anticipated by 2010 to 2015
- 10 to 15 percent Increase in 2nd units anticipated in the central district, serving multi-generational families
- Earliest SOI adjustments would occur in 2020;
  - The City would possibly absorb the unincorporated areas in the west and El Sobrante area in the east
  - Richmond provides services to most of these areas currently
- The Point San Pablo area (west of the refinery) will be the subject of a future specific plan considering residential and commercial uses

Miscellaneous Notes

- The City would like to relocate the industrial areas south of I-580 and consolidate them with industrial uses at Chevron
- Chevron planning modification to refine sour crude, which will result in increased water demand. Chevron is considering the use of brown water and desalination
- Confirm land use changes within the SOI with the County

New commercial shopping center in Richmond

City of Richmond General Plan
Background Paper

Miscellaneous

- 1994 General Plan (includes revisions through May 1998)
- City divided into 11 areas: 1) Shoreline Areas (General, West Shoreline, South Shoreline including the subareas of Point Isabel), Marina Bay and Santa Fee Channel, North shoreline); 2) City Center; 3) Iron Triangle; 4) Pullman; 5) Knox Freeway/Cutting Boulevard Corridor; 6) El Sobrante Valley; 7) Hilltop; 8) Central/East Richmond; 9) Cortex/Stege Coronada (North); 10) Cortex/Stege Coronada (South); Potrero / Panhandle / Annex.
- City of Richmond SOI inlcudes unincorporated areas of North Richmond, El Sobrante Valley, and East Richmond Heights

Areas of Development

- WSAs received from Campus Bay Project (condos/townhouses, neighborhood center, restaurant), Ford Assembly Building Reuse Project (mixed use: commercial/residential/office/museum), and Edgewater Park
- The areas of potential development are captured in the area specific guidelines, described below
- Shoreline Areas
    - West Shoreline: Infill development in Point Richmond and Brickyard Cove; commercial recreation complex at Brickyard Cove;
    - South Shoreline: multiple use of vacant portion of the Stege Sanitary District property
    - Marina Bay: marina complex with 2,000 boats and supporting facilities and commercial uses, low to high density residential and other uses
    - Santa Fe Channel Area: water-related industrial uses and industry
    - North Shoreline: promote development of commercial and recreation enterprises
- City Center: Refer to City Center Specific Plan
- Iron Triangle: Revitalize and enhance the City Center and surrounding housing, community and commercial facilities as an integrated urban core; produce higher density housing.
- Pullman: Encourage, develop, and maintain focal points to establish sense of identity and neighborhood design
- Knox Freeway/Cutting Boulevard Corridor: Refer to Knox Freeway/Cutting Boulevard Corridor Specific Plan
- Cortez/Stege/Coronado (North and South): Support residential development
- Potrero/Panhandle/Annex: Support residential development
- El Sobrante Valley: Discourage strip commercial development; promote infilling

Trends

- 2007 ABAG projections: population increase from 102,700 in 2005 to 132,700 in 2035
- 2007 ABAG projections: employment increase from 41,050 in 2005 to 66,430 in 2035

Attached:
Richmond General Plan Area Specific Maps (6 maps)
Richmond General Plan Land Use Map (4 maps)

City of Richmond Planning Department
Meeting Agenda

Date and Time of Meeting: May 10, 2007; 1 p.m.
City Attendees: Mr. Richard Mitchell, Planning Director
Phone Number: (510) 620-6706
WSMP Attendees: Mark Caughey
Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss the Campus Bay Project, Ford Assembly Building Reuse Project, Edgewater Park
   c. Discuss locations of densification activities: where and what type
   d. Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial and industrial uses changing.

4. **Timing of Development (10 minutes)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of existing uses

5. **Looking Beyond Planning Horizon (10 mins)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the City's SOI boundaries change? If so, what land use changes could occur?

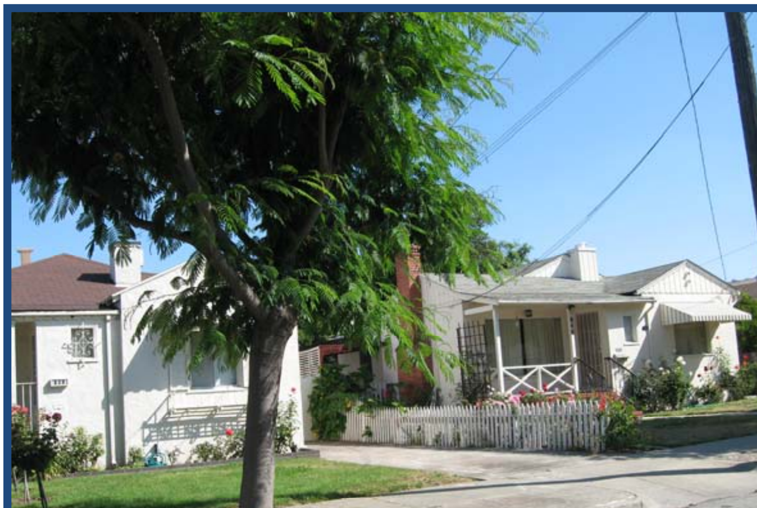
City of San Leandro Planning Department
Meeting Notes

Date and Time of Meeting: May 16, 2007, 1:30 p.m.
City Attendees: Ms. Debbie Pollart, Planning Manager
Phone Number: 510-577-3327
WSMP Attendees: Mark Caughey
Suet Chau

Existing and Future Land Uses

Ms. Pollart reviewed the existing and future land use polygons and discussed land use changes that are anticipated in the next 30 years. She indicated that the City is mostly built out, although there is opportunity for densification. The areas where changes are anticipated are highlighted below:

- Kaiser site: The 64 acre site next to the Marina off-ramp would be divided into two portions – the northern part of the site would accommodate a hospital. The southern part would consist of a Lifestyle Center (described as similar to Santana Road in San Jose), which would accommodate big box uses and small amounts of residential uses(FC and FR3, 2015). The interchange is considered substandard and improvements will have to be made first at that site before the hospital develops. For planning purposes, the hospital (FC) has been identified for completion by 2020.
- Waterfront: the City did not receive federal funding for dredging the channel this year, a similar situation faced by other communities. Without dredging, many of the larger boats will not be able to access the harbor. Due to the expense of dredging, the City may not be able to afford this operation in the long term. As such, the City is conducting a constraints analysis to determine whether the harbor should be kept open. The area used to be guided by the "Connectors Plan," which had proposed hotels and restaurants at the site. However, that plan will be superceded by the findings of the constraints analysis. There are many options on the table for changing this area. If the City decides to close the harbor, then it will release a RFQ for a master developer to determine what to do with the site, including the inland areas.



San Leandro has a mix of housing

- Hudson Property: This property, located west of Washington between the train tracks, will be used for storage of a 300,000 refrigeration unit.

- Downtown and vicinity: The City received a grant from the MTC to conduct a study for a transit-oriented-development (TOD) in the downtown and surrounding area. The epicenter of the TOD is Davis and 14th street, and the boundaries extend ½ mile from the epicenter. The area would consist of densities/intensities higher than that envisioned in the General Plan, thus requiring zoning amendments. The TOD will need to be driven by private developers; the planning horizon for the TOD is 2030. Ms. Pollart directed us to review the website for more information.
  - Cannery – West Lake Property: A draft Plan and an EIR has been completed for a proposal on this site. The planning and zoning implementation of this area will go together.
  - BART is considering development of a mixed-use development in the east parking lot of the San Leandro BART station and a parking structure in the west parking lot, to compensate parking loss at a ratio of 1:1. However, the cost of the parking structure would be expensive, and there is question of who will pay for this structure.
  - The redevelopment agency purchased land at the corner of 14th and Davis. The Town Hall Square project may develop there in the future.
- A TOD study is being conducted at Bayfair BART, to determine the feasibility of constructing a high density residential use on the BART parking lot.
- MacArthur Boulevard corridor: the streetscape project was completed recently. The City hopes such improvements would attract more development. The City is working with Oakland on improving the entire corridor in both cities.
- 14th Street corridor: The South Area Development Strategy covers the 14th Street corridor between Thornton and Bayfair. Intensification is proposed along the corridor, and has thus far prompted two developments to date: a townhouse development and senior housing project. More changes are anticipated along that route.
- PG&E substation: no change is anticipated
- No changes are anticipated at the northeastern neighborhoods, including Bay-O-Vista, Broadmoor, and Estudillo Estates

Trends and Vision

- The City does not intend to annex any SOI areas
- The City intends to increase densification through the long-term, but will need to wait for private development to initiate the change. There will be increased intensity of commercial uses along major corridors, including 14th Street, MacArthur Boulevard, and Washington. The City also envisions more townhomes (FR2 and FR3) in the City.

City of San Leandro General Plan
Background Paper

Miscellaneous

- General Plan (2002)
- The City is built-out with limited vacant land
    - By mid-2001, about 130 acres of vacant land remain, most of which are located in industrial areas and along major arterials; some vacant lands in the hills, but are constrained by steep slopes/limited access
- Ashland, Hilllcrest Knolls, and parts of Castro Valley as well as the open lands east of the City is included in the City's SOI; there are no plans to annex Ashland or western Castro Valley; the City is interested in expanding its sphere to include the former San Leandro Rock Quarry, located east of the City on Lake Chabot Road
- Redevelopment project areas have been formed in most of the City's industrial districts to adapt older industrial buildings and sites to contemporary uses
- Employment districts in San Leandro: Downtown, industrial and office areas, shopping centers, commercial corridors, and the Marina

City is encouraging downtown San Leandro densification

- Other sources of information (not reviewed):
    - Downtown Plan and Urban Design Guidelines (adopted 2001)
    - North Area Plan (adopted in 1991) – focus on commercial districts along East 14th Street, Bancroft Avenue, San Leandro Boulevard and MacArthur Boulevard.

Areas of Development

- Vacant lands
    - Largest vacant sites: Hoehener meat packing plant on West Davis St. (22 ac), Hudson Lumber pencil factory on San Leandro Blvd 914 ac), Del Monte Cannery west of the Downtown BART (7 ac), area at the north end of Preda St (8 ac), parcels on Alvarado St. at San Leandro Creek (9 ac), former Evergreen Nursery at San Leandro Marina (10 ac)
- Potential residential development within the neighborhoods include (see San Leandro General Plan "Residential Neighborhoods" Map):
    - Northeast: new mixed use development along East 14th St. and MacArthur Boulevard on the west and east edges

  - North: revitalizing commercial areas located on the western and eastern fringes of neighborhood
  - Central: opportunities for new residential development concentrated around the BART Station, along East 14th Street, and along Washington Avenue; some may be mixed use projects with ground floor retail or offices and upper story housing
  - Davis corridor: largest remaining vacant site – north end of Preda Street – approved for 69 new single-family homes. Handful of vacant lots in the neighborhood
  - Halcyon-Foothill: enhancing East 14th Street
  - Floresta/Springlake: limited new residential development opportunities
  - Washington Manor/Bonaire: no significant land use changes are anticipated in the next 15 years
  - West of Wicks: no land use changes are anticipated in this area
  - Marina: few areas for infill housing; potential for additional dwellings on existing lots
  - Bay-O-Vista: a few parcels that are vacant or can be subdivided. Constraints include topography (steep)
- Potential changes in land use of business / industrial areas include:
  - Downtown BART: mixed use “transit village” with office, medium and high-density residential, and office-serving retail uses
  - West San Leandro Business District - Hobeneer Property: reuse with an industrial or office/flex use
  - South of Marina Business District: facilitate transition to light industrial (light manufacturing, office/flex, research and development, bio-medical, e-commerce and similar uses)
  - Mid-Washington Business District: pursue light industrial, office, or commercial service development on vacated sites/buildings
- Focus Areas for immediate or gradual land use changes (see San Leandro General Plan “Focus Areas” Map):
  - Downtown: complementary uses and activities to revitalize area
  - East 14th Street corridor: opportunity for new housing and pedestrian-oriented retailing; reuse of older structures and infill development
  - Bayfair: promote mix of uses (retail, shops, restaurants, entertainment and offices)
  - Downtown BART Station Area: relocation of 32-space surface parking at Juana and San Leandro Boulevard to 3- to 4-story parking structure; redevelopment of the vacant, former Del Monte Cannery lot (combined office and high density housing considered)
  - San Leandro Boulevard corridor: mixed use development envisioned north of Davis Street; phase out residential uses south of Williams street, as well as promote more light industrial uses
  - Marina Boulevard and South-of-Marina (SOMAR):continued development of the Marina Boulevard frontage with new auto dealerships and regional retail uses; long-term transition away from trucking and distribution toward technology-related activities in SOMAR area; high quality light industrial and R&D area; strategies for SOMAR are long-range
  - West San Leandro Business District; new employment generating uses (general industrial and business service type uses); preserve an environmental suitable for industrial and technology activity

    - San Leandro Marina: mix of water-oriented uses, particularly in uses which will accommodate airport-related travelers (hotels, restaurants, and conference/meeting facilities0
    - MacArthur corridor: mixed use, but with clusters of areas for commercial and pockets for residential
    - Mid-Washington corridor: replace existing uses with higher value uses as sites become available for reuse
- Long-range plans for unincorporated areas:
    - Ashland: revitalization of the East 14th and Lewelling business districts (Ashland-Cherryland Business District Specific Plan)
    - Hillcrest Knolls/Fairmont ridge: due to steep slopes and aesthetic and ecological value of the area, the ridge is envisioned as a conservation area; undeveloped lands at the south end of Fairmont Ridge face an uncertain future
    - Western Castro Valley: County Plan anticipate minimal amount of new homes and jobs and emphasize compatible infill development
    - Former San Leandro Rock Quarry: envision annexation and development to low-density residential uses in previous San Leandro General Plan; this GP considers it as a "Future Study Area"

Trends

- The local economy has shifted from one primarily based on manufacturing to one that is more diverse
- The General Plan favors transportation modes and development patterns that conserve energy and reduce the need for automobiles
- "Smart Growth" – reintroduce village scale development to a few carefully selected locations within the City
- Underutilized commercial/industrial property are opportunities for new housing, retail, and office uses
- Policies that will guide residential development include:
    - Allow second units in appropriate residential zones
    - Encourage a mix of residential development types
    - Encourage mixed use projects along major transit corridors
    - Provide opportunities for live-work development as a buffer between residential and non-residential uses
    - Conversion of non-residential land to housing and public uses
- Policies that will guide business and industrial land use development include:
    - Emphasize mixed use infill projects
    - Facilitate the transformation of East 14th St. from commercial "strip" to distinct mixed use neighborhood centers, each with a distinct mixed use neighborhood identify and mix of uses.
    - Promote revitalization of Bayfair Mall
    - Encourage mixed-use development along the MacArthur corridor
    - Encourage additional shopping opportunities along Marina Boulevard
- 2007 ABAG projections: population increase from 81,300 in 2005 to 94,100 in 2035
- 2007 ABAG projections: employment increase from 41,650 in 2005 to 60,630 in 2035

Attached:

GP Land Use Map
GP Residential Neighborhoods Map
GP Focus Area Maps
San Leandro Unincorporated Areas Map

City of San Leandro Planning Department
Meeting Agenda

Date and Time of Meeting:	May 16, 2007, 1:30 p.m.
City Attendees:	Ms. Debbie Pollart, Planning Manager/Director
Phone Number:	510-577-3327
WSMP Attendees:	Mark Caughey Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss locations of densification activities: where and what type particularly in Focus Areas:
      i. Downtown
      ii. East 14^{th} Street corridor
      iii. Bayfair
      iv. Downtown BART Station Area
      v. San Leandro Boulevard corridor
      vi. Marina Boulevard and South-of-Marina (SOMAR)
      vii. West San Leandro Business District
      viii. San Leandro Marina
      ix. MacArthur corridor
      x. Mid-Washington corridor
   c. Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial and industrial uses changing.

4. **Timing of Development (10 minutes)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of existing uses

5. **Looking Beyond Planning Horizon (10 minutes)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the City's SOI boundaries change? If so, what land use changes could occur?

City of San Pablo Planning Department
Meeting Notes

Date and Time of Meeting: April 10, 2007
City Attendees: Mr. Avan Gangapuram, Planning Director
Mr. Kanwal Sandhu, Assistant Planner
Phone Number: (510) 215-3201
WSMP Attendees: Mark Caughey
Suet Chau
Karen Johnson

Existing and Future Land Uses

Mr. Gangapuram did not identify any significant changes in land uses in the last decade.

Using the maps showing the existing and future land use polygons, Mr. Gangapuram identified future land use changes anticipated in the City and their timing, which ranged from 2010 to 2030. He covered the districts where significant changes are anticipated, as follow (please refer to the maps for land use category and timing information):

- Giant Trade Center: existing manufacturing uses would be converted to residential uses. The GP identified two areas as commercial, although they are intended for future residential uses or open space uses. The density of the project at Giant Road/Lake (Devon Square Project) was provided by Mr. Sandhu via email; it is 74 units on a 4.31 acre site and designated as FR3 (17.2 units/acre). The Giant Road Family Apartments are located directly north of Devon Square and would be designated FR4 (86 units on 2.6 acres or 33 units/acre); date of completion is expected to be 2010. The parcel west of Stonington is designated EOS because it is contaminated and has been capped.
- Giant Trade Center In between the two parcels described above, a higher density residential use may be developed in the future, although it is outside the GP horizon. Higher density residential uses (FR3) may be developed in the future (for the purposes of the future land uses, we have designated the area as FR3 in 2015).
- Rumrill Boulevard Area: A future commercial parcel at the southwest corner of Brookside/Giant Road would be converted into residential uses (132 units within a 6.6-acre site or 20 units/acre – FR3) adjacent to a mixed use area (commercial and high density residential development – FMU R3). Both are anticipated to occur by 2010
- Old Town area: Between Market and Chesley, immediately east of the city boundaries, a series of soccer fields would be constructed by 2015). A portion of that area is already irrigated. An existing trailer park at the southwestern part of the City would be changed to FMU R3 (2020)
- 23rd Street: The entire corridor will be developed as FMU R4 (between 2015 through 2030).
- El Portal Center/Public Transit District: several mixed use development would be constructed in the area (FMU R4)
- Alvarado District, an existing trailer park would be converted to FMU R4 (2015). Mr. Gangapuram is unaware of any expansion in the undeveloped lands of the cemetery.

- San Pablo Dam Road District: The currently identified FMU would be EOS
- Southwest of the San Pablo Dam Road District, the residential uses would be constrained by slope, and thus would be lower density.

Trends and Vision

- There would be less industrial uses and more commercial, mixed use, higher density development
- Number of individuals per household in San Pablo is currently 3.4, compared to 2.7 for the county. Two to three families live in one house. Illegal conversions occur frequently within the City. New units in the future would be for 1st time buyers.
- 2040/2060 – development of more mixed use corridors and replacement of trailer parks. There would be mostly single-family homes and 2nd units would be rare (as average lot sizes are shallow or narrow, averaging 2,000 to 3,000 sq. ft.)

Conversion of San Pablo garage to living space

Miscellaneous Notes

- The City is trying to daylight water channels
- The City does not have adequate open space area
- Casino – no anticipated changes
- Some military property is located at Contra Costa College. If the military moves to another City, some land swapping would occur and there would be major land use changes within that property. No base reuse committee has been established.

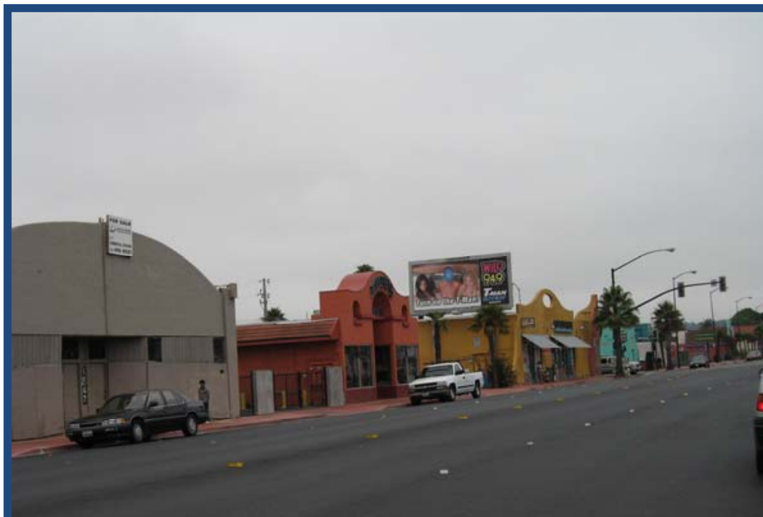
City of San Pablo General Plan
Background Paper

Miscellaneous

- 1996 General Plan
- Rollingwood residential area and Hillside neighborhood are within the SOI
- Other sources of info: Environmental Conditions Background Report (dtd 10/13/95) and Economic Validation Analysis (dtd 9/18/95)
- 86 gross acres of existing vacant land; 0 acres of existing vacant land under the updated GP

Areas of Development

- The areas of potential development is captured in the community visions
- Gateway District: Entertainment/Regional Serving District promoting local and regional entertainment and recreation activities
- El Portal Center/Public Transit District: revitalized historic downtown area with local serving commercial uses, regional serving uses, and residential development to underutilized property; redevelopment as a mixed use central place
- 23rd Street District: focal point for neighborhood life; "themed" shopping district (neighborhood serving commercial; encourage urban open spaces)
- Market Avenue District: mix of residential, public facilities and scaled neighborhood serving retail or office uses
- Rumrill Boulevard: mixed use area serving Old Town residential and retail and heavier community service activities (commercial/high density residential/heavy commercial/light industrial)
- Alvarado District: integrate master planned residential, commercial, and Civic Center with system of open spaces, plazas, paseos, courtyards, and parks
- Northwest Entrance and Rumrill Bayview Neighborhood Residential Area: capitalize on new Richmond Parkway as a regional entrance and promote appropriate uses in proximity to Giant Trade Center (business park)
- Giant Trade Center Business Center: potential reuse (industrial/high density residential, future industrial development in San Pablo include supplier, distributors, wholesalers from biotechnology industry)
- San Pablo Dam Road/Hillside District: land use patterns that optimize and improve freeway accessibility and encourage the use of the new shopping center



23rd Street in San Pablo planned for increased densities

(in the south, multifamily residential land uses and open space; commercial center)

Trends

- Most new development has been multi-family; strong demand for multi-family development
- Oversupply of retail space in residential areas
- Little professional office space in the City
- Recommendations / Opportunities:
    - Focus retail uses in strategic locations,
    - Reposition El Portal as the new downtown,
    - Make the most of freeway sites, take advantage of the Richmond Parkway,
    - Provide new improved housing where commercial zoning is reduced
    - Convert commercial acreage into mid- and high-density residential uses
    - Redirect regional serving retail towards San Pablo Dam Road
    - Capture biotechnological suppliers and wholesalers and expand industrial development with the advent of the Richmond Parkway
    - Expand the existing Redevelopment Project Area
- 2007 ABAG projections: population increase from 31,000 in 2005 to 33,000 in 2035
- 2007 ABAG projections: employment increase from 5,950 in 2005 to 9,170 in 2035

Attached:
General Plan Neighborhood Map
General Plan Land Use Map

City of San Pablo Planning Department
Meeting Agenda

Date and Time of Meeting: May 10, 2007; 10 a.m.
City Attendees: Mr. Avan Gangapuram, Planning Director
Phone Number: (510) 215-3201
WSMP Attendees: Mark Caughey
Karen Johnson
Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss locations of densification activities: where and what type, particularly the neighborhoods
   c. Discuss mixed use districts and identify categories
   d. Discuss development trends City is seeing, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial and industrial uses changing.

4. **Timing of Development (10 mins)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of developed uses

5. **Looking Beyond Planning Horizon (10 mins)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the City's SOI boundaries change? If so, what land use changes could occur?

City of San Ramon Planning Department
Meeting Notes

Date and Time of Meeting:	June 5, 2007, 8:30 a.m.
City Attendees:	Mr. Phil Wong, Planning Services Director Ms. Debbie Chamberlain, Division Manager
Phone Number:	(925) 973-2560
WSMP Attendees:	Mark Caughey, EBMUD WSID Suet Chau, EDAW

Existing and Future Land Uses

- Northwest Specific Plan: a mix of proposed land uses (residential uses from 0.2 to 50 du/ac, community facilities, open space, and parks) anticipated to be complete by 2010
- Old Range Estates II (north of Old Ranch and east of Alcosta): 10,000 sq. ft. lots with 54 units and 25 2nd units. The City required 2nd units to meet affordable housing requirements.
- Ashworth – one house and a telecommunications tower exist on the site; unlikely to develop within general plan horizon
- 105 senior housing and 3 townhomes to be located west of San Ramon Valley Road, east of Talus
- Lauder Hill (north of Crow Canyon, west of Old Mill): proposed attached single family homes with 2nd units; no mixed-use anticipated (FR3, 2010)
- The vacant lot north of the existing school site (at the end of Lilac Ridge) would be developed to medium-density residential uses (FR2, 2010)
- City center – mixed use with residential. This is a current project. Bishop Ranch 2 was demolished for construction of the City Center. (FMU R3, 2010)
- The linear PG&E transmission corridor of Springdale is unlikely to develop (EOS)
- Many parcels identified as future low-density residential use are steeply-sloped and should be designated EOS

Trends and Vision

- City's SOI (west of City boundaries) –annexation unlikely due to lack of contiguity
- Vision 2040/2060: The City will be built out by 2020, with no significant change in boundaries. It is not the City's character to densify. There may be opportunities for redevelopment of retail centers to mixed use, including some residential component
- The City would like to revive its business-to-business technology sector to increase revenue

Miscellaneous Notes
- The population includes many multigenerational households, particularly in Dougherty Valley
- Two 2nd unit homes are constructed per year with permits. Staff is aware of illegal conversions, but the number is small
- ABAG population projections reflect corrections requested by San Ramon. ABAG's employment projections do not seem accurate.

City of San Ramon General Plan
Background Paper

Miscellaneous

- 2002 General Plan
- 2006 Northwest Specific Plan

Areas of Development

- Non-residential: gained 8,000 employees from 1995 to 2000. Larger industry groups are services, manufacturing and wholesale trade including high technology, and retail trade. Bishop Ranch business park (6.4m sf) has the following uses located throughout: office, manufacturing, warehouse, retail, and commercial services. Crow Canyon (4.9m sf): retail and office. Southern San Ramon(<1m sf): retail, office, and other commercial uses.
- Bishop Ranch Subarea: The City Center Project (11 acres at northeast corner of Bollinger Canyon Rd and Camino Ramon; and a 7.5 ac parcel across the street) is a potential site for a more pedestrian-oriented retail area. It is to combine civic, recreational, and commercial activities with a high level of intensity.
- Bollinger Canyon Subarea: almost entirely outside of City limits but within SOI. The small developable part is within the Northwest SP (755 du). Remainder of lands are to remain rural but can develop less than 40 new units; must be clustered if more than 4 units.
- Crow Canyon Subarea: This area includes highest number of sites the city considers to be underutilized. Redevelopment of Crow Canyon is for infill with mixed uses strengthening local businesses and providing higher density of housing within walking distance of retail. Location: north side of Crow Canyon east of 680 and both sides west of 680.
- Dougherty Hills Subarea: 960 units have been added since 1995. Built out now.
- Dougherty Valley Subarea: most of subarea is out of service area except for northwestern and southwestern areas.
- Southern San Ramon Subarea: 410 units and 3 shopping areas have been built since 1995. Redevelopment of Alcosta Blvd on south side of Blvd mostly east of 680. The

New housing in San Ramon reflects wide range of densities

Alcosta redevelopment area is 30 acres of residential, 11 acres shopping center, and 6 acres park.

- Twin Creeks Subarea: fully developed. Some new homes, retail commercial, and parks developed since 1995.
- Westside Subarea: Area along San Ramon Walley Blvd is designated for residential and some commercial. Is a part of Westside SP. Wiedemann Ranch is about 370 large lots. Most of subarea is outside city limits now and is 1du/200 acres (no likely to be served by EBMUD).
- Tassajara Valley Subarea: the city does not propose any development plans at the time of the GP.
- Rural and hillside residential designations do not allow for development on slopes greater than 20 percent.
- Mixed use category requires dividing equally between residential and non-residential uses. This probably translates to FMUR2.
- Table 4.5-1 provides an inventory of developable units by subarea Table 4.5-2, non-residential.

Trends

- GP acknowledges that there is little vacant land left and they have two choices: further annexation and intensification within the built city.
- Overall, urban densities to be increased to achieve growth targets. Existing retail shopping centers to designated mixed use to provide opportunities for office, service, and housing development. Higher density housing and mixed use designations to yield smaller, more affordable units.
- Want to continue the office park character while accommodating higher proportions of population serving jobs such as retail, services, and other economic sectors. About 18m sf of office, retail, service, and other employment space is planned for. These increases would take place on lands not currently in urban use, infill lands, and development in a new mixed use land use designation.
- 2007 ABAG projections: population increase from 51,700 in 2005 to 87,200 in 2035
- 2007 ABAG projections: employment increase from 40,000 in 2005 to 62,540 in 2035

Attached:
General Plan Map
Northwest Specific Plan Map
Planning Subareas
Sewer and Water District Boundaries

City of San Ramon Planning Department
Meeting Agenda

Date and Time of Meeting: June 5, 2007; 8:30am
City Attendees: Mr. Phil Wong
Phone Number: (925) 973-2560
WSMP Attendees: Mark Caughey, EBMUD
Suet Chau, EDAW

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years
   - What is office vacancy rate now? Projected for future?
   - Is Bishop Ranch built out?

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss locations of densification activities: where and what type.
   c. Discuss development trends City is seeing, if any, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial uses changing.
   d. Will the unincorporated areas be annexed? If so, when?
   e. Is Wiedemann Ranch built out?
   f. Status of Tassajara Valley: still no development plans by the city?
   g. Voter review of Urban Growth Boundary in 2010. Any changes anticipated?
   h. Is City Center progressing as planned? Could it be denser than general planned for now?

4. **Timing of Development (10 min)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of developed uses

5. **Looking Beyond Planning Horizon (10 min)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the City's SOI boundaries (or established Urban Growth Boundary) change? If so, where and what land use changes could occur?
   d. What emerging economic sectors are anticipated to impact land uses in the city?
   e. Where could residential densities increase in existing neighborhoods (flag lots, second units, etc)?

City of Walnut Creek Community Development Department Meeting Notes

Date and Time of Meeting: June 6, 2007; 3:00 p.m.
City Attendees: Mr. Andy Smith, Senior Planner
Phone Number: (925) 943-5899, x213
WSMP Attendees: Mark Caughey, EBMUD
Suet Chau, EDAW
Karen Johnson

Existing and Future Land Uses

- Significant changes in the last decade include:
  - Intensification in northwest Walnut Creek near Lindsay Museum
  - Several new blocks of retail redevelopment within the Walnut Creek core area (e.g., Olympia Place and Plaza Esquela, which includes a movie theatre and numerous retail such as Cost Plus Tiffany's, Andronicos, as well office uses); the majority of the changes within Walnut Creek have occurred in this core area
  - Expansion of Target
  - Development of Alma Park (two new complexes)
  - Within the SOI (northeastern portion of the City), a 60,000 square foot medical office has been proposed. The County is allowing the development to move ahead with a use permit, although it is inconsistent with the City general plan and other requirements
  - A 4-story senior care facility was built in the last decade on Tice Valley Road, within Walnut Creek's SOI
- 16 change areas have been identified in the most recent General Plan (expected to occur within the planning horizon of 2025). These densification projects (with limited infill) would require land use designation and zoning updates. Areas that would have water consumption changes have been mapped and are described below.
  - Area 2: encompasses a large area on the north and south side of Mt. Diablo Blvd of underutilized lands. The area is identified by the General Plan as mixed use commercial emphasis, with anticipated 14-22 du/acre. The residential uses are not mandatory, and 100% commercial use may be developed if the market demands this type of use. The Mt. Diablo corridor would likely develop as commercial uses. The Long's property is considered an opportunity site although the owners have not yet expressed interest in changing anything.(FMU R3, 2020)
  - Area 3: between Botelho and Newell, and I-680 and Main. This area is designated by the General Plan as mixed use commercial emphasis. Similar to Area 2, this area could be redeveloped entirely as commercial uses, except the existing creek, which would remain (EOS). However, Mr. Smith indicated that with fair share housing requirements, it is possible that the City will need to accommodate housing demand in this area and Area 2 sometime within the General Plan horizon. (FMU R4, 2020)
  - Area 5: east of Main Street, at Quail Ct. This area is designated by the General Plan as mixed use commercial emphasis, with 22-33 du/acre.

The area is currently built-up and contains minimal vacant land and thus would involve redevelopment of the site. (FMU R4, 2025)

- Area 6: North Main Street, south of Ygnacio Valley Road. This area is designated by the General Plan as mixed use commercial emphasis, with 50 – 100 du/ac. Existing uses include a Chevron gas station, motel, and auto yard. (FMU R5, >2025)
- Area 7, including the BART parcel to the east: Walnut Creek BART station and the eastern parcel, between I-680 and California. The area would accommodate 50 – 100 du/acre. The City has received an application for development of the parcel across from the BART station. The area currently is used primarily for BART parking and would contain mostly residential uses with some convenience commercial uses. (FR5, 2015)
- Area 8: between Main Street and Broadway, north of Central. Current uses include service commercial (e.g., print shop, dance studio). The area is expected to change to auto sales likely later than 2025. Because the area would remain commercial, no future changes are identified on the map.
- Area 9: Lawrence way, east of I-680. Current uses at the site include a corporation yard and traffic control center. The area would accommodate auto sales in the future. However, because the City has not found a relocation site for its corporation yard, changes to the area would not occur immediately. (FC, 2025)

Redevelopment of Plaza Escuela resulted in greater intensity of commercial uses

- Area 10: California, north of Bonanza. The area is identified by the General Plan as mixed use commercial emphasis, with anticipated 14-22 du/acre. (FMU R3, 2020). Across from this site, on California Ave, California Bank purchased a number of buildings. Some change is anticipated, but because it would remain commercial, future land use changes are not identified on the map.
- Area 21: Between Main and Broadway, south of Pine. This is an area the city wants to enhance existing auto sales and related services and move some auto sales to here, however the changes in this area would be associated with increased height. Increasing height limitations requires a city-wide vote. Toyota currently owns some of these lands.
- Area 24: To preserve the duplexes encompassed within this area (generally, within the following streets: Almond, Dora, Shuey, Brooks, and Stow), the City would increase set back and lower heights for the development around the housing area. No future change has been identified
- Area 27: Golden Triangle, located between I-680 and Main, and south of Parkside. This area is designated by the General Plan as mixed use

commercial emphasis, with height limitations. Approved condos are currently going in at the northern end at 50 du/acre to accommodate high end residential with shared parking with the Marriott, as well as shared concierge service (similar to the Four Seasons). (FR5, 2010)
  - Area 28: Mercer development, east of California south of Cole, across from Growers Square and under construction now. Approved density is 62.4 du/acre. This development also contains commercial uses. (FMU R5, 2010)
  - Area 14: Palos Verdes shopping center, west of Camino Verdes in northwest area off of Geary/Taylor. This area is designated by the General Plan as mixed use commercial emphasis, with 14-22 du/ac. Height limit proposed to change from 20 to 30 feet. To approve that change, a city-wide election would be required. The property owner does not have current plans to develop. (FMU R3, 2025)
  - Area 18: This area will not change, it just needs a land use designation that reflects what is actually existing (22 du/ac within the 14-22 du/ac classification), and as such, should be designated as ER4.
- In addition to the Change Areas, other locations of densification include:
  - Cole and LaCassie – application for high density residential uses (FR4, 2015)
  - Downtown core, a pocket within Area 2 would remain as a proposed high-density residential change (FR4, 2030). The area north of Area 2 would remain FR4, 2010
- The area surrounding the existing church, between Lawrence Ramp and California, has been built out with no anticipated changes before 2025. It should be identified as ER4
- Much of the lands with slopes, identified for residential development, including the Rossmoor Area, would remain as open space (EOS)
- Rossmoor would likely densify in the future, but no official communication on this point with the city to date. The open space area around the community is unlikely to develop
- Small parcels of future low- to medium-density residential scattered throughout the city would develop by the planning horizon

Subdividing large lots increases densities

Trends and Vision

- Mr. Smith indicated that the City is looking for infill and densification opportunities
- Large condo units being developed, but fewer in number
- Most of the growth would occur in the downtown area
- The City is open to annexation of lands within its SOI, if its residents make the request. The County would like the City to annex the Pleasant Hill BART area (outside of EBMUD service area) after development of the area occurs
- No city limit boundary adjustments are anticipated within the planning horizon

Miscellaneous Notes

- ABAG's population projections are based on the City's projections
- Batch Plant on North Main Street almost to Geary Blvd.: Dirito Brothers purchased the site with intent to relocate a dealership to this location. However, the relocation did not occur, and it is unknown what will happen at this site. The concrete plant is still in operation
- Some of the County pockets in the SOI do not have adequate infrastructure (e.g., overhead utility, no curbs and bad drainage) and residents are not interested in annexation. As such, would unlikely be annexed in the near future
- The City provided EBMUD with population/household data by Traffic Area Zones

Walnut Creek neighborhood with established landscaping

City of Walnut Creek General Plan
Background Paper

Miscellaneous
- 2006 General Plan

Areas of Development
- Downtown economic development extensive, healthy, diverse, and continuing to grow spatially and in density.
- City encouraging small hotel and conference facility downtown, biotech and genetics research institutes to locate here, and needs more professional office space to allow expansion of small businesses and medical and professional firms.
- Shadelands is out of the District service area, but 25% of the business park was underutilized as of 2004. How is downtown and WCK BART office utilization?
- Upper North Main Street is out of service area but improvements may result in more valuable lands closer to Ygnacio Valley Road, thus densification
- City has greatest quantity of city-owned open space land in the US.
- General plan indicates minor changes in distribution and intensity of land uses; almost fully developed. Looking to create opportunities for mixed use development.
- Multifamily housing will be permitted in all commercial districts (except Shadelands and auto sales and service) to reduce traffic congestion.
- Core Area: commercial with some residential infill. Discourage residential in Traditional Downtown area.
- Growth Management: new commercial development (except Shadelands) is limited to 75,000 square feet per year. No restrictions on residential development.
- North Main Street / Ygnacio Valley Road Specific Plan: higher density throughout.
- North Gate SP (1991): It is a transitional area between ag and low density homes with public services; county and city prepared SP to maintain and enhance the semi-rural character of the area. Limit densities on hillside properties with slopes between 15 and 26%. Encourage continuance of equestrian and ag activities (high water users).
- East Mt Diablo Blvd SP (1996): for 3 sites for 6.5 acres total in downtown. Encourages mix of uses: retail, hotel, theater, office.

Trends
- Low historic annual average growth rate of 0.5 percent between 1990 and 2004. Decline in average household size. 63 percent of new residential development is multi-family units. Senior population is 25 percent and increasing.
- Effort to encourage mixed use development
- High end of density development not guaranteed; contingent on site conditions.
- 2007 ABAG projections: population increase from x in 2005 to x in 2035
- 2007 ABAG projections: employment increase from x in 2005 to x in 2035

City of Walnut Creek Planning Department
Meeting Agenda

Date and Time of Meeting:	June 6, 2007; 3:00 p.m.
City Attendees:	Mr. Andy Smith
Phone Number:	(925) 943-5899 x 213
WSMP Attendees:	Mark Caughey Karen Johnson Suet Chau

Agenda and Questions to Ask

1. **Introduction and Background (10 minutes)**

2. **Existing Land Uses (5 minutes)**
   - Review and confirm existing land uses
   - Identify significant land use changes in past 10 years
   - What is office vacancy rate now? Projected for future? Shadelands is out of the District service area, but does it impact downtown office space?

3. **Future Land Uses (25 minutes)**
   a. Review and confirm vacant lands and future land use designations
   b. Discuss locations of densification activities: where and what type.
   c. Discuss development trends City is seeing, if any, e.g., more mixed uses, higher densities from second units or expansions of existing homes; conversions of single family homes to duplexes; commercial uses changing.
   d. Will the unincorporated pockets be annexed? If so, when?

4. **Timing of Development (10 min)**
   a. Identify the anticipated dates of development of future land uses (infill)
   b. Identify the anticipated dates of densification of developed uses

5. **Looking Beyond Planning Horizon (10 min)**
   a. What will City look like in 2060?
   b. What densification within the City may occur beyond the General Plan horizon?
   c. Will the City's SOI boundaries (or established Urban Growth Boundary) change? If so, where and what land use changes could occur?
   d. What emerging economic sectors are anticipated to impact land uses in the city?
   e. Do you expect on-line retailing to impact retail land uses?
   f. Will auto dealers remain in the city in the future? Will auto support services be replaced with higher value commercial?
   g. Where could residential densities increase (west of 680, near Rudgear, etc)

TECHNICAL REPORT: ECONOMIC AND DEMOGRAPHIC DATA ANALYSIS IN SUPPORT OF LAND USE WATER DEMAND FORECAST ADJUSTMENTS

Prepared for:

EAST BAY MUNICIPAL UTILITY DISTRICT

OCTOBER 2007

CBRE CONSULTING, INC.
Sedway Group

CBRE
CB RICHARD ELLIS

CBRE CONSULTING, INC.
Sedway Group

October 10, 2007

John S. Hurlburt, P.E., EBMUD Demands Program Manager
Karen Johnson, Water Resources Planning, Demands Manager
Kara Demsey, Project Engineer, EDAW Inc.
East Bay Municipal Utility District
375 – Eleventh Street
Oakland, California 94607

Re: Water Demand Forecast Adjustments - DRAFT

Dear Mr. Hurlburt, Ms. Johnson, and Ms. Demsey:

CBRE Consulting, Inc./Sedway Group ("CBRE Consulting") is pleased to submit this technical report regarding our participation in the Water Supply Management Program 2040 Demands Study for the East Bay Municipal Utility District and EDAW Inc.

This report presents demographic, economic, and real estate trends that have influenced the demand for water in the past and may affect future water demand. The intent of this report is to assist in the creation of adjustments to the water demand forecast model in order to incorporate these future trends.

Sincerely,

Amy L. Herman, AICP
Senior Managing Director

Pipi Ray Diamond
Senior Consultant

Enclosure

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I. DATA AND METHODOLOGY

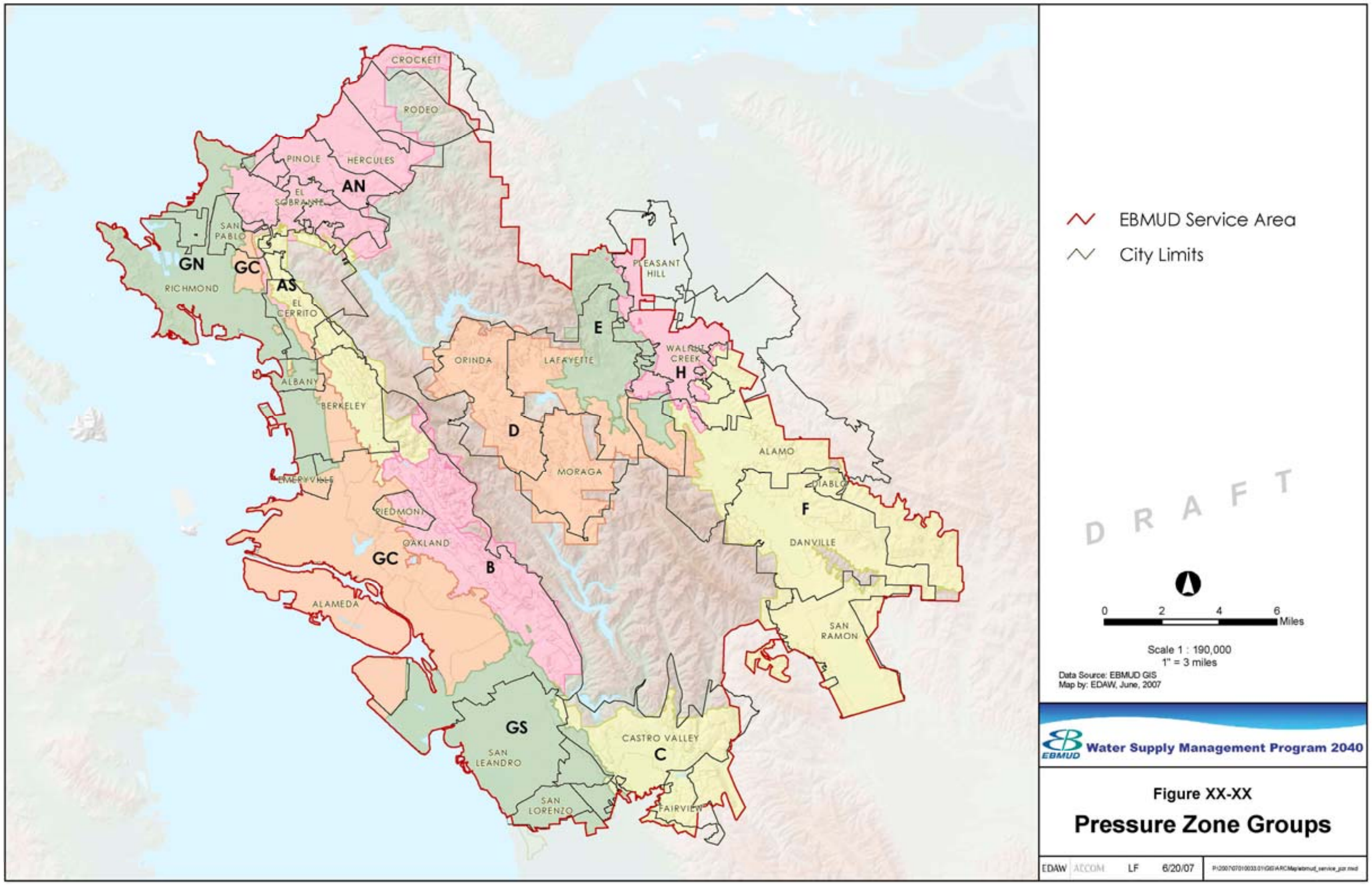
INTRODUCTION

CBRE Consulting is part of a team lead by EDAW to produce the Water Supply Management Program 2040 (WSMP) Demands Study for the East Bay Municipal Utility District ("EBMUD" or "the District"). This technical report presents economic, demographic, and real estate data to support the development of water demand projections through the year 2040. Specifically, this analysis supports efforts to adjust current District land use based consumption patterns to reflect changing future conditions. The water demands are being projected for each of the eleven pressure zone regions ("PZR") in the EBMUD Service Area ("District service area") by land use. Figure 1 shows the District service area boundaries by PZR. The boundaries of cities are also shown. In many cases PZRs span several cities, are located only partially in some cities, and/or encompass some unincorporated parts of Alameda and Contra Costa counties. A few data sources can be queried by PZR, but most sources are only available by city. For data by city, proxies were created to estimate the PZRs. Using a geographic information system (GIS), it is possible to determine the share of total 2007 estimated population in each city served by PZR. The GIS system has layers indicating the boundaries of the PZRs as well as the city boundaries. A third layer contains the population data by census block group. Appendix B shows the output of the mapping analysis. Once it is determined how many persons there are in each PZR by city, the share is calculated. For example, 40.8 percent of the population in Walnut Creek is served by PZR H. Those shares were applied to city data to create proxies for PZRs. Maps 1 through 11 in Appendix A display each PZR along with the boundaries of the relevant cities and unincorporated areas within each region. PZRs "east of the hills" comprises PZRs D, E, H and F. The remaining PZRs are considered "west of the hills". Appendix B lists each area within each PZR and indicates whether the area is an incorporated city or an unincorporated census designated place. Full data are not always available for census designated places.

The results from the mapping analysis of population by PZR were examined for reasonableness and some adjustments were made. In addition, because the mapping analysis is based on where the population lives, if the shares are applied to employment data, the results could be misleading. The distribution of employment in each city is often different from the distribution of homes. Therefore, a second set of adjustments were made to the shares when they were applied to employment data. The adjustments are fully explained and documented below after a description of each data source used in providing demographic, housing, economic, and commercial property trend data relevant to the PZRs. Many exhibits are referenced in the data source discussion. These exhibits are all included in Appendix E. The exhibits are grouped by type of data, e.g., all demographic exhibits are presented first. Some resources were used to provide more than one type of data, such as the Association of Bay Area Governments for both demographic and employment trend data. A portion of the data adjustment discussion is presented by data source. As a consequence, the reference to exhibits is not solely chronological.

Water demand data were available for 1996 and 2005. Whenever possible, data were collected and presented in this time period so that trends could be compared to water demands. The water demand projections extend to 2040 in five-year increments. Not many data sources forecast to 2040, but the ABAG forecasts, which go to 2035, were extended to 2040 by applying the 2000 to 2035 compound annual average growth rate to the 2035 figures.

Figure 1
EBMUD District Service Area and City Limits



DEMOGRAPHIC, HOUSING, AND SELECT ECONOMIC DATA

The following is a discussion about the data sources used to provide demographic, housing, and economic trends for the PZRs.

State Department of Finance

The California Department of Finance's Demographic Research Unit ("DOF") produces county population forecasts from 2010 to 2050 in 10-year increments. The most recent DOF forecast was completed in July 2007. Unfortunately, the DOF does not produce household forecasts or population forecasts by city. However, these projections provide an overall perspective on population trends that are occurring in the two counties located in the District service area.

Exhibit 1 presents the DOF population projections for Alameda County, Contra Costa County, and the State of California. California's average annual growth rate from 2000 to 2010 is projected to be 1.4 percent. Contra Costa County's growth rate is similar to the state's rate at 1.2 percent. In the following ten years Contra Costa County's average annual growth rate is expected to grow to 1.4 percent while the state's growth rate is expected to slow to 1.2 percent. Alameda County is estimated to be growing at a significantly slower rate than Contra Costa County or the state. From 2000 to 2010, Alameda County's average annual growth rate is projected at 0.6 percent and is only expected to increase slightly to 0.7 percent in the following ten years. However, these growth rates by county are misleading when analyzing conditions within the District's Ultimate Service Boundary (USB). Many of the high population growth areas, such as Brentwood and Dublin, are not served by the District, whereas many employment centers within the two counties are.

The DOF also produces housing estimates by type of housing product. These data were collected through Economic Sciences Corporation and are discussed later in this section.

Association of Bay Area Governments

The Association of Bay Area Governments' ("ABAG") latest document, *Projections 2007,* projects population, households, household size, and jobs by industry for each city in the District service area. These data are provided in five-year increments, from 2000 to 2035. ABAG estimates provided in the study exhibits for 1995 are from the *Projections 2000* document, as *Projections 2007* data only go back to 2000. No current ABAG resources provide data for interim years between 1995 and 2000. In order to interpolate 1996 data needed to compare historical conditions since the last District water demands analysis published in 2000, CBRE Consulting applied the average annual compound growth rate from 1995 to 2000 to the 1995 estimates.

Population and Households. For Exhibits 2 and 3, population and households by PZR were approximated by taking the share of each city based on GIS analysis. These percentages were then applied to the ABAG population and households data by city and summed to determine the total within each PZR for the five-year increments provided by ABAG. CBRE Consulting projected figures for 2040 by applying the average annual compound growth rate from 2000 to 2035 to the 2035 figures.

For Exhibits 2 and 3 one major adjustment was required. In PZR F, much of the growth in the City of San Ramon took place in Dougherty Valley, which lies outside of the District service area. However, the ABAG data include Dougherty Valley in the City of San Ramon's figures. In order to isolate the relevant area of San Ramon, CBRE Consulting determined the population and household increases attributed to Dougherty Valley and subtracted them from the ABAG data. Growth in Dougherty Valley was determined by the difference between city building permits (which exclude Dougherty Valley since the county issued the permits) and the growth in housing stock. The building permits issued by the City of San Ramon account for 23 percent of development within San Ramon. The remaining 77 percent represents the amount of development in Dougherty Valley. Given that by 2005 Dougherty Valley was half developed, CBRE Consulting assumed that the second half would be completed by 2010, with a corresponding doubling of new households and persons. These new households and persons were taken out of 2005 and 2010 figures. As this growth represented 18.5 percent of total population in 2010, 18.5 percent of the population figures for San Ramon was subtracted out of each forecast year starting in 2015. Similar adjustments were made to Walnut Creek, Pleasant Hill, and Hayward data since the District does not serve these cities in their entirety. These other adjustments are discussed in detail later in this report.

In Exhibit 4, city population figures from Exhibit 2 are divided by household figures from Exhibit 3 to approximate persons per household by PZR.

Employment. Exhibits 18 through 28 display ABAG jobs data adjusted to approximate each PZR. CBRE Consulting applied the percentage share of population by city within each PZR to ABAG jobs data and then summed these figures to approximate jobs projections for each PZR. See Appendix B for these adjustment factors. Job sectors in the ABAG Projections are defined using classifications from the North American Industrial Classification System (NAICS):

- Agriculture and Natural Resources (NAICS sectors 11 and 21) comprises agriculture, fishing, forestry, and mining jobs;
- Manufacturing, Wholesale and Transportation (NAICS sectors 22, 31-33, 42 and 48-49) comprises utilities, manufacturing, wholesale, transportation, and warehousing jobs;
- Retail (NAICS sectors 44 and 45) comprises retail jobs;
- Financial and Professional Services (NAICS sectors 52-56) comprises finance and insurance, real estate, rental and leasing, professional, scientific and technical services, management of companies and enterprises, administrative, support, waste management, and remediation services jobs;
- Health, Educational, and Recreation (NAICS sectors 61, 62, 71, 72, and 81) comprises educational services, health care and social assistance, arts, entertainment and recreation, accommodation, and food services jobs; and
- Other Jobs (NAICS sectors 23, 51, and 92) comprises construction, information, and public administration jobs. According to U.S. Government publications, the main components of the information sector include publishing industries, including software, motion picture, and sound recording industries, broadcasting, telecommunications industries, information services, and data processing industries.[1]

Jobs projections for 2040 in each PZR were created by applying the average annual compound growth rate from 2000 to 2035. As with the ABAG demographic data, no 1995 job figures are provided in *Projections 2007*. Accordingly, there is no ABAG time series data benchmarked to 2000 that also includes 1995 estimates. Jobs for 1996 were estimated via adjustments derived

[1] "North American Industry Classification System, United States, 1997," Executive Office of the President, Office of Management and Budget, page 495.

from the State of California Employment Development Department Data ("EDD") for 1995 and 2000 for economic sectors paired as closely as possible to the sectors analyzed by ABAG. Such EDD data are only available by county. Therefore, city jobs for 1996 in each PZR were estimated by dividing the 2000 city jobs by the annual average compound growth rate by industry at the county level from 1996 to 2000. Alameda County growth rates by the sectors matched as closely as possible to ABAG's sectors were:

- Agriculture and Natural Resources at -7.65%;
- Manufacturing, Wholesale, and Transportation at 3.58%;
- Retail at 1.92%;
- Financial/Professional Services at 6.34%;
- Health, Education, and Recreation at 1.80%; and
- Other jobs at 0.86%.

Contra Costa County growth rates by sector were:

- Agriculture and Natural Resources at 21.79%;
- Manufacturing, Wholesale, and Transportation at 0.77%;
- Retail at 1.71%;
- Financial/Professional Services at 3.86%;
- Health, Education, and Recreation at 3.15%; and
- Other Jobs at 3.13%.

CBRE Consulting used the sphere of influence ABAG jobs data to more closely approximate the number of jobs within the PZRs. However, there were still some unincorporated areas not accounted for in some of the PZRs. Thus, it was necessary to calculate the remaining share of unincorporated areas within each of the PZRs. As further illustrated in Appendix C, CBRE Consulting applied the percentage share of the population within each census designated place (unincorporated land) and then summed these figures to produce the total unincorporated population within the PZR. Dividing this total unincorporated population figure for each PZR by the total unincorporated population count by county produces the estimated percentage share of total unincorporated population by PZR.

For instance, as jobs data in census designated places (CDPs) Rodeo and Crockett are available in *Projections 2007*, CBRE Consulting excluded these areas in the calculation of the percentage share of total unincorporated population within PZR AN in order to avoid counting jobs for these areas twice. In PZR C, no calculation of the percentage share of total unincorporated population was necessary as jobs data for CDPs Castro Valley, Cherryland, and Fairview are available in *Projections 2007*. In PZR GS, the only census designated place for which jobs data were not available was Ashland; therefore, Ashland is the only CDP represented in the percentage share of total unincorporated population for PZR GS.

Claritas

Claritas, Inc. provides estimates and projections of population, households, housing units, housing units by type (single-family, two-units, 3 to 19 units, etc.), percent vacant units, and average household size for each PZR. This is the only identified source of demographic and economic data that can be customized by PZR because it is GIS based. However, these data are only available for years 1990, 2000, 2007, and 2012. Figures for 1996 and 2005 were interpolated by applying the average annual compound growth rates between 1990 and 2000 and between 2000 and 2007. Housing unit data are available only for the time period 2000 to 2012.

In Exhibits 5 and 6, a combination of historical and projected population and household trends are produced using the data for the years previously specified. In addition, CBRE Consulting has created figures for the total percentage change and the compound average annual growth rates for the periods 1996 to 2005 and 2005 to 2012. In Exhibits 7 and 8, average household size and total housing unit data are produced similarly though these data are only available for the period 2000 to 2012, as cited earlier. Therefore, no percentage change is available for the period 1996 to 2005. In Exhibits 9 through 14, housing stock data by type are given for the 2000 to 2012 time period. Figures for 2007 are estimates of housing stock generated by Claritas while 2005 figures are interpolations by CBRE Consulting. In addition, CBRE Consulting has included the percentage share of the given housing type to the total housing stock by PZR in these exhibits. Exhibit 15 shows the percentage of total units vacant by PZR and also the projected change in percent vacant from 2005 to 2012. Claritas provides dwelling unit estimates along with household estimates, allowing for the calculation of a ratio to adapt ABAG household data into dwelling unit data. Although not discussed further here, this was used in the demands analysis of unit demand adjustment factors when comparing ABAG data to city and county general plan land use data.

Economic Sciences Corporation

Economic Sciences Corporation provides population and housing stock figures annually by city for: total stock of housing units, single units (attached and detached), 2-4 units, 5 and more units, and mobile home units.

In Exhibit 16, CBRE Consulting has calculated the average annual compound growth rate of each housing type within the PZRs over the period 2000 to 2005 and also derived the total percentage change over this period. CBRE Consulting has separated this housing stock data into low density (up to 4 units) and high density (5 units and more including mobile homes). CBRE Consulting distinguished between high density and low density in this way in order to relate the data to land use designations relevant to the EBMUD water demand projections.

In order to approximate the PZR's, share adjustments from Appendix B were applied to the data. For example, in PZR AN, only 22.6 percent of the population of Richmond are served by the PZR; therefore, instead of the total amount only 22.6 percent of the ABAG population estimates for Richmond are summed into the totals for that PZR. As with the ABAG data for PZR F, housing estimates for San Ramon were adjusted to take out the growth in Dougherty Valley, which is not located in the District service area. Again, it was assumed that 77 percent of housing growth from 2000 to 2005 in San Ramon took place in Dougherty Valley. These units were taken out of the 2005 figures and the same methodology was employed as in the ABAG population exhibits.

RealFacts Apartment

RealFacts, Inc. provides market summary reports for institutional-grade apartment buildings with 50 or more units. For Exhibit 17, CBRE Consulting used Real Facts apartment unit stock and vacancy trend data from 1997 through 2005 to show annual additions to inventory and occupied stock. Data from 1996 were unavailable. These data allow for the assessment of growth in higher density rental housing (i.e., residential rental projects with over 50 units) in each PZR. PZRs AS, B, D, and E were excluded because there were few apartment buildings covered by RealFacts in those regions. All the apartment buildings were geocoded and assigned to a PZR so that the data could be aggregated.

COMMERCIAL PROPERTY DATA

CBRE Consulting used CBRE local market reports in conjunction with the resources of its local research departments in Oakland and Walnut Creek to produce trends in leased office and industrial space for cities in the District service area. As local market definitions and CBRE data do not correspond directly to PZRs, these data are simply shown by city. Furthermore, because some markets are not large enough to warrant tracking (such as the office market in Rodeo), brokerage reports do not cover the entire District service area and are only available for certain years. The purpose of these data will be to identify the larger historic growth patterns in occupied inventory by office and industrial land use, and to identify historic trends in occupancy. Retail space is not characterized by strong statistical coverage within the brokerage community; therefore, retail inventory data were unavailable. However, retail stock was estimated using reported taxable sales.

Industrial Space Data

Exhibit 29 shows occupied stock, total stock, and occupancy rates for industrial space in the cities that are located within the District service area. This “industrial” market is comprised of warehouse, manufacturing, and “flex” space. The areas tracked west of the hills include Richmond, Berkeley, Emeryville, Oakland, Alameda, San Leandro, San Lorenzo, and Hayward. The only city covered east of the hills is San Ramon, as most major industrial centers east of the hills are located outside of the District service area in Dublin, Pleasanton, and Livermore. In addition, the net percentage change in total space, occupied space, and occupancy over the 1997 through 2005 period is included.

Office Space

Exhibit 30 shows occupied stock, total stock, and occupancy rates for office space in the cities within the Interstate 80 Corridor and Tri-Valley Office Markets that are located within the District service area. The areas covered within the I-80 Corridor include: City of Alameda, Berkeley Central Business District, West Berkeley, Emeryville, Oakland Airport, Oakland Central Business District, Oakland Jack London Square, and San Leandro. The submarkets covered within the Tri-Valley Market are Walnut Creek Downtown, Walnut Creek Ygnacio, Pleasant Hill BART, Pleasant Hill, Lamorinda, Alamo, Danville, and San Ramon. The office markets are composed of office classes A, B, and C and include both direct and subleased spaces. Net percentage change of occupied stock, total stock, and occupancy rate is also included. Some data were only available starting in 1998 or 1999.

Retail Sales

The California Board of Equalization (“BOE”) collects sales tax from California retailers and thereby keeps track of all taxable sales. The data are collated and reported by city and county. Nontaxable sales generally occur in drug and grocery stores. These nontaxable sales can be inferred but because of the lack of detailed data on each city in the District service area, only taxable sales were collected. Although the BOE collects these data, CBRE Consulting acquired the data from Economic Sciences Corporation to facilitate the ease of analysis. Data were acquired for 1996 and 2005 in order to measure growth.

Exhibit 31 displays the retail sales data. The 1996 sales data were inflation-adjusted based on the consumer price index for all urban consumers in the San Francisco-Oakland-San Jose metropolitan areas. All sales are presented in 2005 dollars. Each city's sales are adjusted using the employment share adjustments detailed in the last section of this chapter. Unincorporated areas were disregarded for this exhibit because presentation of a share of unincorporated retail sales in each PZR would be misleading. The changes in inflation-adjusted retail sales from 1996 to 2005 reveal a proxy for the amount of new retail development in each PZR. In Exhibit 32 the 1996 sales data are converted to a base square foot number by dividing by an average of $350 sales per square foot. This is a generalized retail industry sales per square foot metric. This provides a proxy for a base of retail space.

Non-Residential Building Permits

CBRE Consulting collected data from the Construction Industry Research Board on the dollar volume of non-residential building permits by type annually going back to 1996 by city. The value of building permits for each year from 1996 through 2005 was summed by city and by permit type (office, retail, hotel, and industrial). A construction cost index from RS Means *2007 Square Foot Costs, 28th Edition* was used to inflation-adjust all years to 2005 dollars. These figures were converted to space estimates by dividing by an estimated cost per square foot. Assumptions for costs per square foot were based on Marshall & Swift's *Valuation Service*. The 2005 construction costs per square foot assumptions were as follows: industrial, $85; retail, $105; office, $186; and hotel, $161. These figures include a 20 percent gross up for soft construction costs.

Exhibits 32 through 37 display the non-residential permit data. Exhibit 32 shows an estimate of the retail square footage base existing in each city in 1996 estimated from Exhibit 31 (i.e., derived from retail sales). The growth in retail construction space in each city is shown and then adjusted for the share of each city in the PZR. The share adjustments incorporate the distribution of employment. See the discussion of employment adjustments in the last section of this chapter for details. Unincorporated areas of each PZR were disregarded because it was too difficult to determine the share of unincorporated sales to apply to each PZR and the results would be misleading.

Exhibit 32 estimates the percent change in retail space from the 1996 base by PZR. Exhibit 33 shows the same retail building permit data as in Exhibit 32, but the retail base comes from employment estimates in Exhibits 18 through 28. The retail employment for 1996 is multiplied by an industry-standard square foot estimate of retail space per employee of 500 to convert employment to space.

Exhibit 34 combines office and industrial permit data in order to conform to the land use definitions in the Water Supply Management Program 2040 Demands Study. Industrial and office data are shown separately in Exhibits 35 and 36. The base for office and industrial space in Exhibit 34 comes from EBMUD data on the number of acres by PZR in land use codes EO (Office and Industrial), EOH (High Density Office), and EIL (Low Intensity Industrial). The number of acres in each PZR are multiplied by a generally standardized floor area ratio of .35 and converted to square feet to establish the base. Because land uses are combined for office and industrial, Exhibits 35 and 36 do not have a base. There is also no hotel base data available for the hotel permit data displayed in Exhibit 37.

SCHOOL ENROLLMENT AND EMPLOYMENT DATA

The California Department of Education keeps track of public and private school enrollment and employment through the California Basic Educational Data System. Data were examined for the 1995-1996 school year (fall 1995 through spring 1996) as compared to the 2004-2005 school year (fall 2004 through spring 2005) by school district. The purpose of gathering this data is to estimate the total number of persons generating water demand at school sites. The data include all children enrolled as well as the full time equivalents for teachers, administrators, and school staff. In general, employment represents less than 10 percent of the total enrollment and employment figures. Exhibits 38 and 39 display detail for each of the school years examined. Exhibit 40 compares enrollment and employment for the two school years by PZR. The total change in persons as well as percent change is presented.

The PZRs were approximated as closely as possible with groupings of school districts adjusted for the share of population of each school district's city in each PZR. Most school districts correspond to city boundaries, but there were a few exceptions. The West Contra Costa County School District covers many different cities in the District service area. For those cities and unincorporated areas in the school district (Hercules, Richmond, Pinole, San Pablo, El Sobrante, El Cerrito, and Kensington) it was necessary to go to the more detailed data by school to determine enrollment by city. Employment data were not available by individual school and so are excluded. A second exception is the Acalanes Union High School District, which covers students in Orinda, Moraga, Lafayette, and Walnut Creek. A third exception is Mt. Diablo Unified School District which is located in Walnut Creek and Pleasant Hill. Detailed data by school were used to determine enrollment by city for these exceptions.

For some school districts that are located in more than one area, the shares of the areas in each PZR were combined before being applied to the enrollment total. This was done for the John Swett Unified School District, which is located in Rodeo and Crockett, the Acalanes High School District, which is located in Orinda, Moraga, Lafayette, and Walnut Creek, and the San Ramon Valley Unified School District, which is located in San Ramon, Danville, Alamo, and a limited area of Walnut Creek. The same technique was applied to estimate the share of private school 1995-1996 enrollment in this school district in each PZR. For the 1995-1996 school year, detailed school data were not available for private schools in West Contra Costa Unified School District. See Appendix D for the detailed calculations.

Hayward was excluded from regions C and GS because only a small percentage of Hayward's population is in the District service area. Hayward has a very large school district, so taking even the small share that is in the school district (4.0 percent in each region) would probably exaggerate the actual school population in the District service area.

ADJUSTMENTS TO THE DATA

EBMUD PZRs do not conform to city boundaries, but most of the data sources are organized by city. To facilitate the analysis, CBRE Consulting obtained the GIS PZR map layers from EDAW. Maps 1 through 11 in Appendix A display each PZR along with the boundaries of the relevant cities and unincorporated areas within each PZR. Using the GIS layers, it was determined what share of the total 2007 estimated population in each city is located in each PZR. Appendix B lists each area within each PZR and the sometimes different shares assumed for population and employment data.

Adjustments for Population

Some of the data from the GIS analysis were adjusted for the realities of the PZR boundaries. In the GIS system there is a layer, which came from EDAW, indicating the boundaries of each PZR. In addition, there is a layer with 2007 Claritas population estimates by block group and a layer of city boundaries. Block groups are smaller units than census tracts, but they still do not perfectly match the boundaries of the PZRs. If the centroid of a block group is within a PZR, all the population of that block group is counted as being in the PZR. In certain areas where block groups happen to cross outside the PZR, the estimates of population for the PZR may not be accurate. For instance, the map layers found 99.7 percent of Orinda population and 91.5 percent of Moraga population living in PZR D. In fact, EBMUD services all of both cities. Therefore, the shares of Orinda and Moraga in PZR D were changed to 100 percent each. Another similar example is the City of Danville. The mapping system found 97.7 percent of Danville's population within PZR F, but in fact the entire city is serviced by EBMUD so the share of Danville's population in PZR F was increased to 100 percent. Below is a list of other adjustments made to the population shares:

- Although some of Martinez's population was found by the mapping system to be located within the District service area, EBMUD does not service the City of Martinez; therefore, Martinez shares were taken out of Appendix B.
- The map layers showed that 8.5 percent of Walnut Creek's population lives in PZR D. The only area of Walnut Creek served by PZR D is a portion of Rossmoor. This is estimated to comprise one-third of Rossmoor's residential area. This percentage figure was adjusted to 4.7 percent to correspond with the share of Rossmoor's population in PZR D. A corresponding adjustment was made to PZR E, which includes the balance of Rossmoor's population.
- The map layers determined that 11.5 percent of El Cerrito's population lives in PZR AN. However, PZR AN does not serve El Cerrito so those shares were moved to PZR AS, which does serve El Cerrito. This error probably occurred because of an inaccurate mapping layer.

Adjustments for Employment

For the exhibits displaying non-residential data such as jobs and non-residential building permits, adjustments were made to reflect that employment is not necessarily geographically distributed in the same way that resident population is distributed. For example, PZR B includes the Oakland hills area, which is a primarily residential area without much employment other than Montclair Village, schools, and neighborhood commercial areas. Therefore, 95 percent of the share of Oakland in PZR B was moved to PZR GC (Oakland flatlands). The following are other adjustments made for employment distribution:

- PZR AS contains the primarily residential area of the El Cerrito hills. Therefore, 95 percent of the share of El Cerrito in PZR AS was moved to PZR GN (El Cerrito flatlands).
- PZR AS contains the Berkeley hills, which have a proportionately small part of the city's employment. However, because of the University, there is more employment in the Berkeley hills as compared to the El Cerrito hills. Therefore, instead of decreasing the share by 95 percent, 70 percent of the share of Berkeley in PZR AS was moved to PZR GN.
- The City of Lafayette is served by PZRs D and E. Approximately 41.3 percent of the population in Lafayette is served by PZR D and 58.5 percent is served by PZR E.

However, given the distribution of employment nodes, approximately 90 percent of employment in Lafayette is located in PZR E. To adjust for this, 31.5 percent of the share of Lafayette in PZR D was moved to PZR E.

- There is a small amount of employment at Rossmoor. It was assumed that those jobs are located in PZR E. Therefore, Walnut Creek's share of employment in Rossmoor was given to PZR E.
- The part of Albany located in PZR GC contains very little employment. Therefore, the share of Albany in PZR GC was reduced to one percent, and the rest of the shares were moved to PZR GN.
- The parts of Pleasant Hill in the District service area have very little employment. Therefore, the shares of Pleasant Hill in PZR H were reduced from 21.9 percent to one percent.
- Most employment in the City of Piedmont is located in the western part of the city on Grand Avenue versus the Downtown area. To adjust for this the share of Piedmont in PZR GC was increased from 39.3 to 80.0 percent and the share of Piedmont in PZR B was decreased from 60.7 to 20.0 percent.
- The part of Walnut Creek that is located in PZR F has a very small amount of employment. To adjust for that, the share of Walnut Creek in PZR F was reduced from 8.2 to 1.0 percent. According to the GIS map analysis, EBMUD only services about 66.1 percent of the resident population. However, given the distribution of major employment nodes, it was estimated that 80 percent of employment in Walnut Creek is in the District service area. Approximately 90 percent of the share of Walnut Creek employment in the District service area was estimated to be in PZR H. Therefore, the share of Walnut Creek in PZR H was increased from 40.8 to 72.0 percent (or 80.0 percent multiplied by 90.0 percent). Walnut Creek's share in PZR E was assigned the remaining share of employment, 7.0 percent.

Appendix B displays the shares of each city based on population as well as the shares adjusted for the geographic distribution of employment.

II. ANALYSIS OF DATA BY PRESSURE ZONE REGION

The first section of this chapter reviews the overall real estate and urban economic trends in the Bay Area that will be affecting each PZR in the next 33 years, i.e. to the year 2040. The following sections examine the historical and projected data for each PZR.

OVERALL TRENDS

The PZR likely to have the most changes in land uses and density over the next 33 years is PZR GC. Oakland and Alameda will be driving the trends in this region. PZR GC will be the most dynamic, at least in part, because this region has two major military bases that will be redeveloped: the Oakland Army Base and the Alameda Naval Air Station. In Oakland, there are several ongoing trends:

- Underutilized land in various contexts. Some industrial areas will be transitioning to residential use and mixed-used. Oakland also has several neighborhoods with BART stations (such as the Fruitvale, MacArthur, and Coliseum BART stations) that will experience more dense development as transit villages are built. Downtown Oakland and Uptown Oakland both have many underutilized parcels that will be developed with high-density housing, high-rise office space, and mixed uses.
- Increasing residential density. Development of multifamily high-density housing will continue, and likely intensify.
- Retail following housing development. As a critical mass of new housing and population develops in Oakland, retail services will follow. Besides neighborhood-oriented retail serving these new residents, Oakland is likely to attract more big-box retail stores.

In Alameda, new development will be less dense than in Oakland. New residential development is more likely to be single-family homes than multifamily projects. Construction of commercial and industrial space in Alameda will continue. New retail development in Alameda is expected, but the type of retail, with the possible exception of Alameda Point, is expected to be neighborhood-oriented, not big-box store or lifestyle malls.

The next most dynamic PZR relative to land uses and density changes will be PZR GN. This area's trends are dominated by the City of Richmond, which has many industrial areas that will be redeveloped to residential and mixed-uses. In general this area is likely to become denser over the next 33 years with more multifamily projects and denser commercial developments.

PZR B, consisting mainly of the Oakland hills, is likely to see new low-density residential development. This development will come from continued rebuilding of homes after the 1991 Oakland hills fire as well as development in the Oak Knoll and Leona Quarry areas. Not much commercial, retail, or industrial development is expected in this region.

PZR H contains the commercial core of Walnut Creek as well as the Pleasant Hill BART station. These are the main areas in PZR H that could experience densification of retail and office space. Given the recent successes in the development of multifamily for-sale housing in Walnut Creek, more multifamily development is likely to follow; however, this will be on a more limited or small-scale basis than in other areas due to political considerations.

PZR F is composed of Alamo, Danville, and San Ramon. Alamo is not likely to have any multifamily development, but Danville and San Ramon will have more condominium development in the future, as this type of housing has recently become more accepted in these areas. This PZR contains the Bishop Ranch office park; however, this park is already built out and will not significantly contribute to future office development. Although there has been a trend over the past 15 years in higher utilization of office space, square feet per office employee has now stabilized and is not likely to decrease further.

In PZR AS, no major changes are expected except for areas around the University of California at Berkeley's campus and in Downtown Berkeley. In Downtown Berkeley, there is likely to be a densification with new office and mixed-use developments as well as the conference center/hotel/museum project that is currently in planning.

PZRs GS and AN can be considered similar in terms of likely future changes. Neither region is likely to experience great changes in land uses or density. In PZR GS, which consists primarily of San Leandro, there could be some industrial intensification in which warehouse space is converted to higher value industrial or retail space. However, San Leandro is not expected to have much new retail development. San Leandro and parts of Oakland are the only places in the District service area where new warehouse development is likely to occur. In general, however, warehouse space is moving to areas with cheaper land such as the City of Tracy in San Joaquin County. San Leandro also has some infill space that could be developed with higher-density residential projects. In PZR AN there is already a lot of retail, especially in Pinole. There is unlikely to be new retail development, although old retail centers could be refurbished, much as has been happening in the Hilltop Mall area on an ad-hoc basis. Hercules may get a small amount of new retail through their Downtown revitalization/creation, but generally there will be few changes. There are some high water users in PZR AN such as the C&H Factory. Changes with these high water users could have the largest impacts on water demand in this region.

The PZRs likely to be the least dynamic, with few changes in land uses or density, are PZRs C, D, and E. PZR C consists largely of the Castro Valley area. This area is made up of suburban residential neighborhoods, neighborhood retail centers, and rural areas. There is currently not much office, industrial, or retail space, nor are there likely to be new commercial developments. While there could be some intensification and densification around the Castro Valley BART station, minimal additional change is expected.

PZR D, collectively called Lamorinda, is composed of Lafayette, Moraga, and Orinda. In this affluent area, the focus of development will likely be the redevelopment or expansion of single-family homes. There are not likely to be many new multifamily developments built in this area nor any large scale commercial, industrial, or retail developments. There could be some small office space built or densification of current commercial areas, but in the long-run not much new development will occur in region D. New retail is not likely to be big-box stores, but neighborhood-oriented retail.

Lafayette and western Walnut Creek make up most of PZR E. This area is primarily residential and generally built out. There are not likely to be new multifamily developments built here or any major commercial developments over a long timeframe.

Caveat about Retail Development:
In general, based on current trends in the retail landscape, the future of retail in the District service area predominantly consists of big-box stores and lifestyle malls. There will also be some attempts at Downtown revitalization, which could result in some new retail space.

However, it is important to note that retail is the most dynamic land use and the one with the fastest rate of obsolescence. Thirty-three years from now there will be many retailers, styles of retailing, and retail space formats that do not exist now. It is therefore problematic to opine or predict future retail development trends over a long timeframe.

Below summary data from each PZR are presented and analyzed. Each table references certain exhibits in Appendix D; those exhibits are listed after each table. In addition, housing stock growth rates are referenced from Exhibit 16, apartment data are referenced from Exhibit 17, industrial space figures are referenced from Exhibit 29, and office space figures are referenced from Exhibit 30. Retail sales figures come from Exhibit 31 and retail building permit data are from Exhibits 32 and 33.

PRESSURE ZONE REGION AN

Composition of PZR

Map 1 in Appendix A shows PZR AN in red. The entire City of Hercules and almost all of the population of the City of Pinole are in this PZR. PZR AN extends into about 9 percent of northern San Pablo and 23 percent of northern Richmond (the area around Hilltop Mall). There are several unincorporated communities served by this PZR. The entire communities of Tara Hills and Rollingwood are in this PZR as well as 66 percent of Bayview-Montalvin, 92 percent of El Sobrante, 86 percent of Crockett, and 93 percent of Rodeo.

It is important to consider which cities/areas dominate the trend figures. Table 1 shows the composition of PZR AN. In terms of population, in 2000, 42 percent of this region's population lived in unincorporated areas of Contra Costa County. However, very few jobs are located in these areas other than the C&H Sugar plant, and ConocoPhillips refinery and related industries. Richmond's population made up only 20 percent of total population but provided 44 percent of total employment in the region. The City of Hercules made up 18 percent of the population and 13 percent of the employment; the City of Pinole had a similar share of population to Hercules, but provided 28 percent of total jobs. This is not surprising since Hercules is largely a residential bedroom community whereas Pinole has a large retail sector.

Table 1
Share of 2000 ABAG Adjusted Total Population/Employment in PZR AN by City/Unincorporated Area

City/Unincorporated Area	Share of Population	Share of Employment
Unincorporated Contra Costa County	42%	1%
Richmond	20%	44%
Hercules	18%	13%
Pinole	17%	28%
San Pablo	3%	3%
Rodeo/Crockett	N/A	11%

Note: ABAG city population data used do not include persons living in the spheres of influence. The ABAG city employment data, however, does include the spheres of influence. Therefore Rodeo and Crockett are included in the share of population in unincorporated Contra Costa County, but their employment is listed separately.
Sources: Exhibits 2 and 18.

Summary Demographic Trends

Table 2 displays summary demographic data for PZR AN. Historically, from 1996 to 2005, total population in PZR AN has had an average annual growth rate of between 1.0 and 1.2 depending on the data source. ABAG adjusted data suggests that the growth rate will decrease to 0.7 percent in the 2005 to 2040 time period. Claritas data only forecasts to 2012, with the annual growth rate increasing slightly to 1.1 percent. Total households show similar rates of growth. Average household size, at approximately 2.9 in 2005, is projected to decrease slightly to 2.7 by 2040.

Table 2
Demographic Summary Table for PZR AN

Demographic Statistic	Population/Household Figures			Average Annual Growth Rate		
	Estimated 1996	Estimated 2005	Projected 2040	1996 – 2005	2005 – 2012	2005 – 2040
Persons						
ABAG Data Adjusted	105,659	117,497	147,855	1.2%	N/A	0.7%
Claritas Data	96,729	106,257	N/A	1.0%	1.1%	N/A
Households						
ABAG Data Adjusted	37,344	41,069	54,096	1.1%	N/A	0.8%
Claritas Data	34,575	37,575	N/A	0.9%	1.1%	N/A
Persons Per Household/ Average Household Size						
ABAG Data Adjusted	2.8	2.9	2.7	0.1%	N/A	-0.1%
Claritas Data	N/A	2.8	N/A	N/A	0.6%	N/A

Sources: Exhibits 2-7.

Summary Housing Trends

Low density housing units (single-family and 2- to 4-unit buildings) grew at an average annual growth rate of 1.3 percent from 2000 to 2005. High density housing grew at a higher rate of 2.2 percent during the same time period. There are no forecasts for housing unit growth.

Apartment occupancy in PZR AN ranged from 89.4 to 99.6 percent from 1997 to 2005. During this same time period the total stock of apartments increased by 24.1 percent. The higher occupancy rates occurred during the late 1990s. Most recently, in 2005, the occupancy rate was 91.1 percent with 3,260 units tracked by RealFacts.

Summary Employment Trends

Table 3 displays a summary of jobs trends in PZR AN. Since Richmond and Pinole provide the largest number of jobs to this region, their trends will dominate the figures. The largest job type category was health, education and recreation jobs. These types of jobs grew by a total of 25.1 percent from 1996 to 2005 and are expected to grow by 131.1 percent by 2040. Manufacturing, wholesale, and transportation jobs make up the next largest share of total jobs. Although the total number of these types of jobs decreased slightly between 1996 and 2005, they are projected to increase by 63.8 percent by 2040. In general, all categories of jobs are expected to increase with the largest increases expected in the financial/professional services (contributing to demand for office space); heath, education and recreation; and other jobs (construction, informational and public administration) categories.

Table 3
Jobs Summary Table for PZR AN

Type of Job	2000 Jobs	Share of Total	Total % Change 1996 – 2005	Total % Change 2005 – 2040
Agriculture and Natural Resources	87	0.4%	66.4%	49.6%
Manufacture, Wholesale, Transportation	5,289	24.3%	-0.5%	63.8%
Retail	2,902	13.3%	9.9%	86.3%
Financial/Professional Services	3,198	14.7%	18.8%	151.7%
Health, Education, and Recreation	7,436	34.2%	25.1%	131.1%
Other Jobs	2,837	13.0%	19.2%	121.0%
Total	21,749	100%		

Source: Exhibit 18.

Summary Commercial and Industrial Trends

Although data for inventory of office and industrial space is not available by PZR, it is useful to look at the trends in the City of Richmond, which provides the largest number of total jobs to this region. The commercial markets in Pinole are not tracked. Industrial space data indicate that total space in Richmond grew from 12.0 million square feet in 1998 to 12.9 million square feet in 2005, an increase of 6.3 percent. Occupancy declined in that same period from 95.6 percent in 1998 to 93.6 percent in 2005. The result was that occupied industrial space in Richmond grew 4.3 percent during the 1998 to 2005 time period.

Office space in Richmond grew 39.9 percent from 1999 to 2005. In 2005 there was 1.4 million square feet of office space, although the occupancy rate was low at 75 percent. In 1998 occupancy was 93.6 percent. Clearly, demand for office space in Richmond has not been strong enough to completely absorb the new supply; this has contributed to a falling occupancy rate. Still, occupied space grew 25 percent from 1999 to 2005.

Interviews with city planners revealed that the office sector in this PZR is likely to increase from the expansion of the North Shore Business Park in Hercules and the construction of a Kaiser medical campus in Pinole.

Taxable retail sales in PZR AN grew from $441.4 million (adjusted for inflation) in 1996 to $598.9 million in 2005, an increase of 35.7 percent. A similar rate of growth in the value of retail building permits occurred over the same period, indicating a strong increase in the PZR's retail space.

PRESSURE ZONE REGION AS

Composition of PZR

Map 2 in Appendix A shows PZR AS in orange. Almost half of Berkeley (eastern hills areas) and El Cerrito (eastern hills areas) are in this PZR. PZR AS extends into less than 1 percent of eastern Richmond, about 1 percent of San Pablo, and 1 percent of north Oakland. There are three unincorporated communities served by this PZR. The entire community of East Richmond Heights, 92 percent of Kensington, and 8.5 percent of El Sobrante are served by this PZR.

Table 4 shows the composition of PZR AS. In terms of population, in 2000, 62 percent of this region's population lived in the City of Berkeley. An even greater share of employment in this PZR, 80 percent, is located in Berkeley. Sixteen percent of the population lived in unincorporated areas of Contra Costa County, although those areas have few jobs. El Cerrito contributes 14 percent of the total PZR's population although very little of the employment. Although Oakland only provides 7 percent of PZR AS's population, it provides 17 percent of total jobs.

Table 4
Share of 2000 ABAG Adjusted Total Population/Employment in PZR AS by City/Unincorporated Area

City/Unincorporated Area	Share of Population	Share of Employment
Berkeley	62%	80%
Unincorporated Contra Costa County	16%	<1%
El Cerrito	14%	1%
Oakland	7%	17%
Richmond	1%	1%
San Pablo	<1%	<1%

Sources: Exhibits 2 and 19.

Summary Demographic Trends

Table 5 displays summary demographic data for PZR AS. This region's population base is very stable. Historically, from 1996 to 2005, total population in PZR AS grew at an average annual rate of between -0.3 and 0.1 percent depending on the data source. ABAG adjusted data suggests that the growth rate will increase to 0.5 percent in the 2005 to 2040 time period. Claritas data only forecasts to 2012, with the annual growth rate increasing to 0.1 percent. Total households show similar rates of growth. Average household size, at between 2.2 and 2.4 in 2005 depending on the data source, is projected to be 2.4 in 2040.

Table 5
Demographic Summary Table for PZR AS

Demographic Statistic	Population/Household Figures			Average Annual Growth Rate		
	Estimated 1996	Estimated 2005	Projected 2040	1996 – 2005	2005 – 2012	2005 – 2040
Persons						
ABAG Data Adjusted	76,130	77,102	91,585	0.1%	N/A	0.5%
Claritas Data	72,549	70,785	N/A	-0.3%	0.1%	N/A
Households						
ABAG Data Adjusted	30,963	32,349	38,207	0.5%	N/A	0.5%
Claritas Data	30,176	29,971	N/A	-0.1%	0.0%	N/A
Persons Per Household/ Average Household Size						
ABAG Data Adjusted	2.5	2.4	2.4	-0.3%	N/A	0.0%
Claritas Data	N/A	2.2	N/A	N/A	0.3%	N/A

Sources: Exhibits 2-7.

Summary Housing Trends

Low density housing units (single-family and 2- to 4-unit buildings) grew at an average annual growth rate of 0.2 percent from 2000 to 2005. High density housing has grown at a higher rate of 0.6 percent during the same time period. There are no forecasts for housing unit growth.

Because of the small number of institutional-sized apartment buildings tracked in this PZR, it was not possible to get statistics on apartment stock or occupancy trends. However, the City of Berkeley, with its large university student population, generally has high occupancy in apartment buildings.

Summary Employment Trends

Table 6 displays a summary of jobs trends in PZR AS. Since the City of Berkeley provides the largest number of jobs to this region, its trends will dominate the figures. The largest job category was health, education and recreation jobs. These types of jobs grew by a total of 7.3 percent from 1996 to 2005 and are expected to grow by 31.8 percent by 2040. Finance and Professional Services jobs grew faster than any other category, by 26.3 percent from 1996 to 2005. In general, all categories of jobs except for Agriculture and Natural Resources are expected to increase, with the largest increases expected in the health, education and recreation; and other jobs (construction, informational and public administration) categories.

Table 6
Jobs Summary Table for PZR AS

Type of Job	2000 Jobs	Share of Total	Total % Change 1996 – 2005	Total % Change 2005 – 2040
Agriculture and Natural Resources	18	0.1%	0.1%	-15.9%
Manufacture, Wholesale, Transportation	1,822	9.8%	1.6%	10.3%
Retail	1,197	6.4%	1.7%	23.5%
Financial/Professional Services	2,641	14.1%	26.3%	25.3%
Health, Education, and Recreation	6,543	35.0%	7.3%	31.8%
Other Jobs	6,451	34.5%	3.2%	31.1%
Total	18,672	100%		

Source: Exhibit 19.

Summary Commercial and Industrial Trends

Although data for inventory of office and industrial space is not available by PZR, it is useful to look at the trends in the City of Berkeley, which provides the largest number of total jobs to this region.

Berkeley's inventory of industrial space is located mainly in west Berkeley outside of PZR AS. A discussion of Berkeley's industrial space, therefore, can be found under PZR GN.

Berkeley's central business district is partially located in PZR AS. Total office space grew from 1.34 million square feet in 1998 to 1.40 million square feet in 2005, an increase of 4.2 percent. Occupancy declined in that same period from 95.9 percent in 1998 to 88.6 percent in 2005. The result was that occupied office space in Berkeley's central business district declined -3.6 percent during that time period.

Taxable retail sales in PZR AS grew from $173.2 million (adjusted for inflation) in 1996 to $186.0 million in 2005, an increase of 7.4 percent. Retail building permits over the same period show a somewhat faster increase of 13.9 percent.

PRESSURE ZONE REGION B

Composition of PZR

Map 3 in Appendix A shows PZR B in light green. This PZR serves the Oakland hills, which is about 17 percent of the City of Oakland's estimated 2007 population. Almost two-thirds of the City of Piedmont, or 61 percent of its population, is served by this PZR and less than 1 percent of Berkeley is in PZR B. There are no unincorporated communities served by this PZR.

It is important to consider which cities/areas dominate the trend figures. Table 7 shows the composition of PZR B. In terms of population, in 2000, 91 percent of this region's population lived in the City of Oakland and 9 percent lived in the City of Piedmont. Less than one percent of the population lived in Berkeley. The shares for employment are fairly similar with Oakland providing 95 percent of jobs in this region and Piedmont providing 4 percent of total jobs in the region.

Table 7
Share of 2000 ABAG Adjusted Total Population/Employment in PZR B by City

City/Unincorporated Area	Share of Population	Share of Employment
Oakland	91%	95%
Piedmont	9%	4%
Berkeley	<1%	1%

Sources: Exhibits 2 and 20.

Summary Demographic Trends

Table 8 displays summary demographic data for PZR B. The two sources of data reveal differing trends for this PZR. ABAG adjusted data indicates that population grew at an annual 0.6 percent rate from 1996 to 2005 and will grow 0.9 percent per year in the future. The Claritas data, however, indicates that between 1996 and 2005 population decreased at an annual rate of -0.2 percent and that this rate is likely to continue. Given the pipeline of new housing that is planned for the Oakland hills, the ABAG forecast is likely to be more accurate than the Claritas forecast. Total households show similar rates of growth. Average household size, at between 2.5 and 2.7 in 2005 depending on the data source, is projected to be 2.6 by 2040.

Table 8
Demographic Summary Table for PZR B

Demographic Statistic	Population/Household Figures			Average Annual Growth Rate		
	Estimated 1996	Estimated 2005	Projected 2040	1996 – 2005	2005 – 2012	2005 – 2040
Persons						
ABAG Data Adjusted	71,922	76,173	102,675	0.6%	N/A	0.9%
Claritas Data	76,098	75,050	N/A	-0.2%	-0.2%	N/A
Households						
ABAG Data Adjusted	26,961	28,482	39,042	0.6%	N/A	0.9%
Claritas Data	30,301	29,915	N/A	-0.1%	-0.2%	N/A
Persons Per Household/ Average Household Size						
ABAG Data Adjusted	2.7	2.7	2.6	0.0%	N/A	0.0%
Claritas Data	N/A	2.5	N/A	N/A	0.2%	N/A

Sources: Exhibits 2-7.

Summary Housing Trends

Low density housing units (single-family and 2- to 4-unit buildings) grew at an average annual growth rate of 0.2 percent from 2000 to 2005. High density housing grew at a higher rate of 1.0 percent during the same time period. There are no forecasts for housing unit growth; however, general trends show that low density housing is likely to grow faster than high density housing in this PZR.

Because of the small number of institutional-sized apartment buildings tracked in this PZR, it was not possible to get statistics on apartment stock or occupancy trends. However, as stated earlier, the Oakland hills are likely to see continued single-family home development, but limited multifamily development.

Summary Employment Trends

Table 9 displays a summary of jobs trends in PZR B. Since Oakland provides the largest number of jobs to this region, its trends will dominate the figures. However, in this case the data may be misleading. PZR B is located in the Oakland hills where there is limited office, and no industrial space, but some neighborhood retail and schools (including colleges). The data were adjusted so that the total number of jobs reflects PZR B's small share of total Oakland jobs, but no adjustment was made for job sectors. Table 9 shows that retail jobs make up 7.1 percent of total jobs in PZR B, but given the lack of industrial and office space in the Oakland hills, it is likely that retail jobs have a greater share of total jobs in this PZR. This is to be kept in mind while reading the discussion below regarding how a percentage of the total employment data is applied to this PZR. There may be some additional analysis needed beyond the scope of this study to reallocate the jobs within each category; however, the overall numbers are probably represented adequately.

The largest job type category was health, education, and recreation jobs. These types of jobs grew by a total of 11.7 percent from 1996 to 2005 and are expected to grow by 63.0 percent by 2040. Manufacturing, wholesale, and transportation jobs make up the next largest share of total jobs, which may not reflect actual conditions. These jobs grew by 5.9 percent from 1996 to 2005 and are projected to increase by 22.0 percent by 2040. There are virtually no agriculture and natural resources jobs in the PZR, and very little growth projected for the future. All the remaining categories of jobs are expected to increase, with the largest percent increases expected in the heath, education and recreation; retail; and financial/professional services jobs categories, which appears to be realistic considering the types of existing uses in PZR B.

Table 9
Jobs Summary Table for PZR B

Type of Job	2000 Jobs	Share of Total	Total % Change 1996 – 2005	Total % Change 2005 – 2040
Agriculture and Natural Resources	15	0.1%	-47.3%	3.1%
Manufacture, Wholesale, Transportation	2,463	23.1%	5.9%	22.0%
Retail	758	7.1%	7.1%	52.0%
Financial/Professional Services	2,006	18.8%	25.2%	51.6%
Health, Education, and Recreation	3,634	34.0%	11.7%	63.0%
Other Jobs	1,799	16.9%	6.2%	35.4%
Total	10,675	100%		

Source: Exhibit 20.

Summary Commercial and Industrial Trends

Given the low inventory of office and industrial space in PZR B, brokerage data for the City of Oakland is not relevant. A discussion of Oakland office and industrial trends can be found in PZR GC.

Taxable retail sales in PZR B grew from $113.5 million (adjusted for inflation) in 1996 to $136.0 million in 2005, an increase of approximately 19.8 percent. Retail building permits over the same period show a similar increase of 21.9 percent.

PRESSURE ZONE REGION C

Composition of PZR

Map 4 in Appendix A shows PZR C in gray. Most of this PZR serves the unincorporated areas of Castro Valley, Fairview, and Cherryland in Contra Costa County. About 91 percent of both Castro Valley and Fairview are in PZR C as well as six percent of the population of Cherryland. In addition, 4 percent of the population of Hayward and 1 percent of San Leandro are served by PZR C.

Table 10 shows the composition of PZR C. In terms of population, in 2000, 91 percent of this region's population lived in unincorporated Alameda County, eight percent lived in Hayward, and one percent in San Leandro. The employment data breaks out the unincorporated areas. Almost three-quarters of the jobs in this PZR are located in Castro Valley, 18 percent of jobs are in Hayward, and six percent are in the Cherryland/Fairview areas. In addition, three percent of the jobs are located in San Leandro.

Table 10
Share of 2000 ABAG Adjusted Total Population/Employment in PZR C by City/Unincorporated Area

City/Unincorporated Area	Share of Population	Share of Employment
Unincorporated Alameda County	91%	N/A
Hayward	8%	18%
San Leandro	1%	3%
Castro Valley	N/A	72%
Cherryland/Fairview	N/A	6%

Note: ABAG city population data use do not include persons living in the spheres of influence. The ABAG city employment data, however, does generally include the spheres of influence. Therefore Castro Valley and Cherryland/Fairview are included in the share of population in unincorporated Alameda County, but their employment is listed separately.
Sources: Exhibits 2 and 21.

Summary Demographic Trends

Table 11 displays summary demographic data for PZR C. Historically, from 1996 to 2005, total population in PZR C grew at an average annual rate of between 0.7 and 1.3 percent depending on the data source. ABAG adjusted data suggests that the growth rate will decrease to 0.6 percent in the 2005 to 2040 time period. Claritas data only forecasts to 2012, with the annual growth rate decreasing to 0.2 percent. Total households show similar rates of growth. Average household size, at between 2.6 and 2.8 in 2005 depending on the data source, is projected to be 2.8 in 2040.

Table 11
Demographic Summary Table for PZR C

Demographic Statistic	Population/Household Figures			Average Annual Growth Rate		
	Estimated 1996	Estimated 2005	Projected 2040	1996 – 2005	2005 – 2012	2005 – 2040
Persons						
ABAG Data Adjusted	68,084	76,779	93,732	1.3%	N/A	0.6%
Claritas Data	66,654	71,142	N/A	0.7%	0.2%	N/A
Households						
ABAG Data Adjusted	24,642	27,089	32,909	1.1%	N/A	0.6%
Claritas Data	25,631	26,728	N/A	0.5%	0.0%	N/A
Persons Per Household/ Average Household Size						
ABAG Data Adjusted	2.8	2.8	2.8	0.3%	N/A	0.0%
Claritas Data	N/A	2.6	N/A	N/A	1.3%	N/A

Sources: Exhibits 2-7.

Summary Housing Trends

Low density housing units (single-family and 2- to 4-unit buildings) grew at an average annual growth rate of 0.4 percent from 2000 to 2005. High density housing increased 0.3 percent annually during the same time period. There are no forecasts for housing unit growth.

Apartment occupancy in PZR C ranged from 92.8 to 98.1 percent from 1997 to 2005. During this same time period, the total stock of apartments decreased by 2.5 percent. Most recently, in 2005, the occupancy rate was 94.6 percent with 1,230 units tracked by RealFacts. Apartment stock can decrease as buildings are converted to condominiums, which probably accounted for this downward trend.

Summary Employment Trends

Table 12 displays a summary of jobs trends in PZR C. Since Castro Valley and Hayward provide the largest number of jobs to this region, their trends will dominate the figures. The largest job type category by far was health, education and recreation jobs. These types of jobs only grew by a total of 1.5 percent from 1996 to 2005, but are expected to be the fastest growing sector in this area, increasing by 53.8 percent by 2040. Financial and professional services jobs make up the next largest share of total jobs. This sector had the fastest growth in the 1996 to 2005 period, growing by 20.0 percent. This growth is expected to continue with a projected increase of 42.6 percent by 2040. The retail sector, despite having lost jobs in the 1996 to 2005 period, is expected to be another fast growing sector with a 43.8 percent increase by 2040. Other jobs (construction, informational and public administration) declined -5.0 percent from 1996 to 2005, but are expected to grow by 28.6 percent by 2040.

Table 12
Jobs Summary Table for PZR C

Type of Job	2000 Jobs	Share of Total	Total % Change 1996 – 2005	Total % Change 2005 – 2040
Agriculture and Natural Resources	61	0.4%	-29.3%	1.4%
Manufacture, Wholesale, Transportation	2,069	12.3%	-1.7%	22.2%
Retail	1,765	10.5%	-3.5%	43.8%
Financial/Professional Services	2,888	17.1%	20.0%	42.6%
Health, Education, and Recreation	7,551	44.8%	1.5%	53.8%
Other Jobs	2,512	14.9%	-5.0%	28.6%
Total	16,847	100%		

Source: Exhibit 21.

Summary Commercial and Industrial Trends

The office and industrial markets in PZR C are relatively small and are not tracked. Taxable retail sales data for PZR C may be misleading. Only incorporated cities report taxable sales, so retail in Castro Valley is not captured in the figures. In addition, retail building permits were not specifically available for Castro Valley, but only for the entire unincorporated areas of Alameda County. Nonetheless, retail sales in PZR C grew from $72.9 million (adjusted for inflation) in 1996 to $80.1 million in 2005, an increase of 9.9 percent. Retail building permits grew 21.1 percent during the same time period. This strong growth in permits may reflect trends in San Leandro and Hayward that are not necessarily located in PZR C.

PRESSURE ZONE REGION D

Composition of PZR

Map 5 in Appendix A shows PZR D in dark green. Although the map shows that some areas are located outside of PZR D, in fact the entire cities of Orinda and Moraga are served by this PZR. About 41 percent of the population of Lafayette and less than one percent of the population living in the unincorporated area of Alamo is in PZR D. The map also shows some parts of Walnut Creek in PZR D, which comprises part of the Rossmoor senior community.

Table 13 shows the composition of PZR D. Orinda provides the largest share, 37 percent, of total population in this PZR and 51 percent of total employment. Moraga provides 35 percent of the population and 40 percent of the jobs. About 21 percent of the population in PZR D live in the City of Lafayette although only nine percent of the region's jobs are in Lafayette. Only 6 percent of total population lives in Walnut Creek and it is assumed that any jobs relating to the Rossmoor community are located in PZR E; therefore, PZR D has 0 percent of the jobs in Walnut Creek. A very small percentage, less than one percent, of the population and jobs are located in unincorporated areas of Contra Costa County.

Table 13
Share of 2000 ABAG Adjusted Total Population/Employment in PZR D by City/Unincorporated Area

City/Unincorporated Area	Share of Population	Share of Employment
Orinda	37%	51%
Moraga	35%	40%
Lafayette	21%	9%
Unincorporated Contra Costa County	<1%	<1%
Walnut Creek	6%	0%
Alamo	N/A	<1%

Note: ABAG city population data use do not include persons living in the spheres of influence. The ABAG city employment data, however, does generally include the spheres of influence. Therefore Alamo is included in the share of population in unincorporated Contra Costa County, but its employment is listed separately.
Sources: Exhibits 2 and 22.

Summary Demographic Trends

Table 14 displays summary demographic data for PZR D. This region's population base is very stable. Historically, from 1996 to 2005, total population in PZR D grew at an average annual rate of 0.3 percent. ABAG adjusted data suggests that the growth rate will remain the same in the 2005 to 2040 time period while Claritas data forecasts the annual growth rate increasing to 0.5 percent by 2012. Total households show similar rates of growth. Average household size, at between 2.4 and 2.7 in 2005 depending on the data source, is projected to be 2.6 in 2040.

Table 14
Demographic Summary Table for PZR D

Demographic Statistic	Population/Household Figures			Average Annual Growth Rate		
	Estimated 1996	Estimated 2005	Projected 2040	1996 – 2005	2005 – 2012	2005 – 2040
Persons						
ABAG Data Adjusted	46,160	47,548	53,432	0.3%	N/A	0.3%
Claritas Data	47,791	49,110	N/A	0.3%	0.5%	N/A
Households						
ABAG Data Adjusted	17,267	17,744	20,953	0.3%	N/A	0.5%
Claritas Data	19,354	19,779	N/A	0.2%	0.5%	N/A
Persons Per Household/ Average Household Size						
ABAG Data Adjusted	2.7	2.7	2.6	0.0%	N/A	-0.1%
Claritas Data	N/A	2.4	N/A	N/A	-0.3%	N/A

Sources: Exhibits 2-7.

Summary Housing Trends

Low density housing units (single-family and 2- to 4-unit buildings) grew at an average annual growth rate of 0.1 percent from 2000 to 2005. High density housing increased annually at a rate of 0.5 percent during the same time period. There are no forecasts for housing unit growth; however, it was stated earlier that this Lamorinda area is unlikely to see significant multifamily development in the next 33 years, although the cities are planning on some increases.

Because of the small number of institutional-sized apartment buildings tracked in this PZR, it was not possible to get statistics on apartment stock or occupancy trends.

Summary Employment Trends

Table 15 displays a summary of jobs trends in PZR D. Since Orinda and Moraga provide most of the jobs to this region, their trends will dominate the figures. The largest job type category was health, education and recreation jobs. These types of jobs grew by a total of 20.0 percent from 1996 to 2005 and are expected to grow by 18.6 percent by 2040. One quarter of all jobs in this region are in the financial and professional services sector with a total increase of 21.1 percent expected by 2040. Manufacturing, wholesale, and transportation jobs lost -4.6 percent between 1996 and 2005; this sector is expected to continue to shrink with a -2.4 percent total change by 2040.

Table 15
Jobs Summary Table for PZR D

Type of Job	2000 Jobs	Share of Total	Total % Change 1996 – 2005	Total % Change 2005 – 2040
Agriculture and Natural Resources	62	0.5%	116.5%	-0.4%
Manufacture, Wholesale, Transportation	856	7.0%	-4.6%	-2.4%
Retail	1,129	9.2%	5.3%	12.8%
Financial/Professional Services	3,144	25.6%	12.9%	21.1%
Health, Education, and Recreation	5,461	44.5%	20.0%	18.6%
Other Jobs	1,627	13.2%	13.7%	10.1%
Total	12,280	100%		

Source: Exhibit 22.

Summary Commercial and Industrial Trends

The stock of industrial space in PZR D is very small and is not tracked.

Office space in Lamorinda is tracked by CBRE. In 1997 there was 1.07 million square feet of office space with an occupancy rate of 96.6 percent. This office stock has remained fairly constant, decreasing slightly by -0.6 percent by 2005. Occupancy in 2005 was 95.6 percent. The result was that occupied space fell by -1.6 percent from 1997 to 2005.

Taxable retail sales in PZR D grew from $149.8 million (adjusted for inflation) in 1996 to $154.5 million in 2005, an increase of 3.1 percent. There were no retail building permits recorded during the same time period in Lamorinda.

PRESSURE ZONE REGION E

Composition of PZR

Map 6 in Appendix A shows PZR E in pink. Over 60 percent of the City of Lafayette's population is in this region along with 37 percent of Walnut Creek. Less than one percent of Pleasant Hill's population is served by PZR E. Only two percent of the unincorporated area of Alamo is served by this PZR.

Table 16 shows the composition of PZR E. Over 60 percent of the population in PZR E lives in Lafayette, although a higher percent of total jobs, 79 percent, is located in Lafayette due to the proximity of the Downtown area and most Mt Diablo Avenue businesses. Walnut Creek makes up 37 percent of the population and 20 percent of the jobs in PZR E. A very small proportion of persons and jobs are located in Pleasant Hill and in unincorporated areas of Contra Costa County.

Table 16
Share of 2000 ABAG Adjusted Total Population/Employment in PZR E by City/Unincorporated Area

City/Unincorporated Area	Share of Population	Share of Employment
Lafayette	61%	79%
Walnut Creek	37%	20%
Unincorporated Contra Costa County	2%	<1%
Pleasant Hill	<1%	<1%
Alamo	N/A	<1%

Note: ABAG city population data use do not include persons living in the spheres of influence. The ABAG city employment data, however, does generally include the spheres of influence. Therefore Alamo is included in the share of population in unincorporated Contra Costa County, but its employment is listed separately.
Sources: Exhibits 2 and 23.

Summary Demographic Trends

Table 17 displays summary demographic data for PZR E. This PZR is the smallest in the District service area with less than 25,000 persons estimated in 2005. Historically, from 1996 to 2005, total population in PZR E grew at an average annual rate of 0.5 percent. ABAG adjusted data suggests that the growth rate will decrease slightly to 0.4 percent in the 2005 to 2040 time period while Claritas data forecasts the annual growth rate remaining the same to 2012. Total households show similar rates of growth. Average household size, at between 2.3 and 2.4 in 2005 depending on the data source, is projected to be 2.3 in 2040.

Table 17
Demographic Summary Table for PZR E

Demographic Statistic	Population/Household Figures			Average Annual Growth Rate		
	Estimated 1996	Estimated 2005	Projected 2040	1996 – 2005	2005 – 2012	2005 – 2040
Persons						
ABAG Data Adjusted	22,552	23,559	26,951	0.5%	N/A	0.4%
Claritas Data	23,726	24,802	N/A	0.5%	0.5%	N/A
Households						
ABAG Data Adjusted	9,367	9,735	11,721	0.4%	N/A	0.5%
Claritas Data	10,236	10,783	N/A	0.6%	0.6%	N/A
Persons Per Household/ Average Household Size						
ABAG Data Adjusted	2.4	2.4	2.3	0.1%	N/A	-0.1%
Claritas Data	N/A	2.3	N/A	N/A	-0.4%	N/A

Sources: Exhibits 2-7.

Summary Housing Trends

Low density housing units (single-family and 2- to 4-unit buildings) grew at an average annual growth rate of 0.3 percent from 2000 to 2005. High density housing has grown at a higher rate of 0.7 percent during the same time period. There are no forecasts for housing unit growth.

Because of the small number of institutional-sized apartment buildings tracked in this PZR, it was not possible to get statistics on apartment stock or occupancy trends.

Summary Employment Trends

Table 18 displays a summary of jobs trends in PZR E. Lafayette contributes almost 80 percent of the jobs in this area with Walnut Creek providing the remaining jobs. The largest job category was health, education and recreation. These types of jobs grew by a total of 25.1 percent from 1996 to 2005 and are expected to grow by 13.3 percent by 2040. Financial and professional services jobs make up the next largest share of total jobs. These jobs increased by a total of 17.6 percent between 1996 and 2005 and are projected to increase by 20.7 percent by 2040. Manufacture, wholesale, and transportation jobs are projected to continue to decline, by -10.0 percent by 2040.

Table 18
Jobs Summary Table for PZR E

Type of Job	2000 Jobs	Share of Total	Total % Change 1996 – 2005	Total % Change 2005 – 2040
Agriculture and Natural Resources	23	0.2%	31.1%	-19.2%
Manufacture, Wholesale, Transportation	920	7.5%	-3.1%	-10.0%
Retail	1,408	11.5%	8.0%	7.8%
Financial/Professional Services	3,725	30.3%	17.6%	20.7%
Health, Education, and Recreation	4,546	37.0%	25.1%	13.3%
Other Jobs	1,670	13.6%	18.8%	4.5%
Total	12,293	100%		

Source: Exhibit 23.

Summary Commercial and Industrial Trends

The industrial market in PZR E is relatively small and not tracked. There is no office market tracked in Lafayette. The office market tracked in Walnut Creek is for the Downtown area and the suburban Ygnacio office markets; however, these areas (especially Downtown) are located in PZR H. See the commercial and industrial trends section for PZR H for a discussion of those markets.

Taxable retail sales in PZR E grew from $198.4 million (adjusted for inflation) in 1996 to $228.6 million in 2005, an increase of 15.2 percent. Retail building permits over the same period indicate a 4.1 percent increase in retail space.

PRESSURE ZONE REGION F

Composition of PZR

Map 7 in Appendix A shows the location of PZR F in blue. All of the City of Danville is served by this PZR. The city boundaries of San Ramon have changed over the last ten years as the Dougherty Valley area has been annexed to the city. The city boundaries on the map do not reflect those changes. PZR F covers all of the old City of San Ramon boundaries. As discussed earlier, adjustments were made to reflect the reality that EBMUD does not service Dougherty Valley. In addition, 8 percent of Walnut Creek's population is served by this region. There are three unincorporated communities served by this PZR. The entire community of Diablo is in this PZR as well as 78 percent of Blackhawk-Camino Tassajara and 67 percent of Alamo.

Table 19 shows the composition of PZR F. In terms of population, in 2000, San Ramon and Danville together made up 73 percent of this region's population, 38 percent in San Ramon and 35 percent in Danville. San Ramon, however, provided 68 percent of the jobs while jobs in Danville only made up 25 percent of total jobs in the region. Twenty-two percent of the population lives in unincorporated areas of Contra Costa County, although those areas have few jobs. Four percent of the population of this region lives in Walnut Creek, but there are virtually no jobs located in these parts of Walnut Creek. Six percent of total jobs are located in the unincorporated areas of Alamo and Blackhawk.

Table 19
Share of 2000 ABAG Adjusted Total Population/Employment in PZR F by City/Unincorporated Area

City/Unincorporated Area	Share of Population	Share of Employment
San Ramon	38%	68%
Danville	35%	25%
Unincorporated Contra Costa County	22%	<1%
Walnut Creek	4%	<1%
Alamo/Blackhawk	N/A	6%

Note: ABAG city population data use do not include persons living in the spheres of influence. The ABAG city employment data, however, does generally include the spheres of influence. Therefore Alamo /Blackhawk is included in the share of population in unincorporated Contra Costa County, but its employment is listed separately.
Sources: Exhibits 2 and 24.

Summary Demographic Trends

Table 20 displays summary demographic data for PZR F. Historically, from 1996 to 2005, total population in PZR F grew at an average annual rate of between 1.4 and 1.7 percent depending on the source. ABAG adjusted data suggests that the annual growth rate will decrease to 0.8 percent in the 2005 to 2040 time period while Claritas data forecasts the annual growth rate decreasing to 1.2 percent between 2005 and 2012. Total households show similar rates of growth. Average household size, at 2.7 in 2005, is projected to decrease slightly to 2.6 in 2040.

Table 20
Demographic Summary Table for PZR F

Demographic Statistic	Population/Household Figures			Average Annual Growth Rate		
	Estimated 1996	Estimated 2005	Projected 2040	1996 – 2005	2005 – 2012	2005 – 2040
Persons						
ABAG Data Adjusted	109,024	123,094	162,783	1.4%	N/A	0.8%
Claritas Data	103,356	120,047	N/A	1.7%	1.2%	N/A
Households						
ABAG Data Adjusted	39,855	45,583	63,544	1.5%	N/A	1.0%
Claritas Data	37,062	43,646	N/A	1.8%	1.4%	N/A
Persons Per Household/ Average Household Size						
ABAG Data Adjusted	2.7	2.7	2.6	-0.1%	N/A	-0.2%
Claritas Data	N/A	2.7	N/A	N/A	-0.8%	N/A

Sources: Exhibits 2-7.

Summary Housing Trends

Low density housing units (single-family and 2- to 4-unit buildings) grew at an average annual growth rate of 0.7 percent from 2000 to 2005. High density housing has grown at an annual rate of 0.8 percent during the same time period. There are no forecasts for housing unit growth.

Apartment occupancy in PZR F ranged from 90.4 to 96.1 percent from 1997 to 2005. During this same time period, the total stock of apartments increased by 35.2 percent. Most recently, in 2005, the occupancy rate was 90.4 percent, with 4,093 units tracked by RealFacts.

Summary Employment Trends

Table 21 displays a summary of jobs trends in PZR F. San Ramon contributes 68 percent of the jobs in this region, with most of the remaining jobs located in Danville. The largest job type category is financial and professional services. These types of jobs grew by a total of 14.3 percent from 1996 to 2005 and are expected to be the fasting growing sector in the future with 69.0 percent total growth expected by 2040. The next two largest sectors are health, education and recreation and other jobs (construction, informational and public administration). Both of these sectors are expected to grow by over 50 percent by 2040. The retail sector, while only making up 10.7 percent of total jobs in the region, is expected to have strong growth in the future, with a 48.2 percent total increase by 2040.

Table 21
Jobs Summary Table for PZR F

Type of Job	2000 Jobs	Share of Total	Total % Change 1996 – 2005	Total % Change 2005 – 2040
Agriculture and Natural Resources	562	0.9%	119.9%	-13.1%
Manufacture, Wholesale, Transportation	7,438	12.5%	-5.1%	27.6%
Retail	6,373	10.7%	6.7%	48.2%
Financial/Professional Services	17,703	29.8%	14.3%	69.0%
Health, Education, and Recreation	12,953	21.8%	21.9%	54.3%
Other Jobs	14,362	24.2%	15.4%	54.7%
Total	59,391	100%		

Source: Exhibit 24.

Summary Commercial and Industrial Trends

Although data for inventory of office and industrial space are not available by PZR, it is useful to look at the trends in the City of San Ramon, City of Danville, and in unincorporated Alamo. The industrial market in San Ramon is tracked. In 1999, there was a stock of 1.29 million square feet and an occupancy rate of 100 percent. By 2005, the stock had increased by 4.1 percent and occupancy had dropped to 97.4 percent. This resulted in occupied stock increasing by 1.5 percent between 1999 and 2005. Industrial space is not tracked in Danville or Alamo.

Office space data for San Ramon indicate an inventory of 4.67 million square feet in 1998, growing 27.8 percent to 6.47 million in 2005. In the same time period, occupancy dropped from 96.2 percent to 87.4 percent. The result was a 20.5 percent increase in occupied office space from 1998 to 2005. This increase in space largely reflects the building of the Bishop Ranch business park which has been completed.

Danville and Alamo's office markets are tracked, although they are fairly small. In 1999 Danville had 364,500 square feet of office space with an occupancy rate of 96.2 percent. By 2005, the stock of space grew by 15.7 percent to 432,500 square feet with an occupancy rate of 91.8 percent. The result was an increase in occupied office space of 11.7 percent from 1999 to 2005. In 1999, Alamo had 123,200 square feet of office inventory with a 99.7 percent occupancy rate. By 2005 the inventory had not changed but occupancy fell by 5.5 percent. The result was that occupied office space decreased by 5.5 percent from 1999 to 2005.

Given the relative sizes of the office inventories for the cities that comprise this PZR, the trend for San Ramon dominates the overall PZR trend. By combining the office market trend data for San Ramon, Danville, and Alamo, the overall trend in occupied inventory over the 1999 to 2005 time period comprises a 12.7 percent increase. This shows a very healthy rate of growth although several other PZR's have had even more growth.

Taxable retail sales in PZR F grew from $733.1 million (adjusted for inflation) in 1996 to $861.5 million in 2005, an increase of 17.5 percent. Retail building permits over the same period grew 24.4 percent, indicating a strong increase in the PZR's retail space.

PRESSURE ZONE REGION GC

Composition of PZR

Map 8 in Appendix A shows PZR GC in dark green. Virtually all of the City of Alameda and almost three-quarters of the City of Oakland are located in PZR GC. Forty percent of Piedmont is located in this region as well as 40 percent of the population of Emeryville. PZR GC extends north into 33 percent of Berkeley, 20 percent of El Cerrito, 11 percent of Albany, 8 percent of Kensington, 7 percent of San Pablo, and 13 percent of Richmond.

Table 22 shows the composition of PZR GC. In terms of population, in 2000, 68 percent of this region's population lived in the City of Oakland. The City of Alameda provides the next largest share of total population at 17 percent. Berkeley contributes 8 percent and Richmond 3 percent. These four cities provide a similar share of total jobs to PZR GC. The other cities and unincorporated areas served by PZR GC contributed a small number of both persons and jobs.

Table 22
Share of 2000 ABAG Adjusted Total Population/Employment in PZR GC by City/Unincorporated Area

City/Unincorporated Area	Share of Population	Share of Employment
Oakland	68%	69%
Alameda	17%	11%
Berkeley	8%	10%
Richmond	3%	2%
Emeryville	1%	6%
El Cerrito	1%	1%
Piedmont	1%	<1%
Unincorporated Contra Costa County	<1%	<1%
San Pablo	<1%	<1%
Albany	<1%	<1%

Sources: Exhibits 2 and 25.

Summary Demographic Trends

Table 23 displays summary demographic data for PZR GC. This is by far the largest PZR in the District service area with over 435,000 persons estimated in 2005. Historically, from 1996 to

2005, total population in PZR GC grew at an average annual rate of between 0.3 and 0.5 percent depending on the source. ABAG adjusted data suggests that the annual growth rate will increase to 0.8 percent in the 2005 to 2040 time period while Claritas data forecasts the annual growth rate remaining consistent with the 1996 to 2005 trend at 0.3 percent between 2005 and 2012. Total households show similar rates of growth. Average household size is projected to remain at 2.6 persons.

Table 23
Demographic Summary Table for PZR GC

Demographic Statistic	Population/Household Figures			Average Annual Growth Rate		
	Estimated 1996	Estimated 2005	Projected 2040	1996 – 2005	2005 – 2012	2005 – 2040
Persons						
ABAG Data Adjusted	417,199	435,171	582,662	0.5%	N/A	0.8%
Claritas Data	411,857	423,711	N/A	0.3%	0.3%	N/A
Households						
ABAG Data Adjusted	159,681	169,240	228,327	0.6%	N/A	0.9%
Claritas Data	161,858	163,696	N/A	0.1%	0.2%	N/A
Persons Per Household/ Average Household Size						
ABAG Data Adjusted	2.6	2.6	2.6	-0.2%	N/A	0.0%
Claritas Data	N/A	2.5	N/A	N/A	1.6%	N/A

Sources: Exhibits 2-7.

Summary Housing Trends

Low density housing units (single-family and 2- to 4-unit buildings) grew at an average annual growth rate of 0.2 percent from 2000 to 2005. The stock of high density housing grew at a rate 0.9 percent during the same time period. There are no forecasts for housing unit growth.

Apartment occupancy in PZR GC ranged from 92.2 to 98.9 percent from 1997 to 2005. During this same time period the total stock of apartments increased by 21.6 percent. Most recently, in 2005, the occupancy rate was 94.0 percent with 7,547 units tracked by RealFacts. The result was that occupied apartment units increased 17.9 percent from 1997 to 2005.

Summary Employment Trends

Table 24 displays a summary of jobs trends in PZR GC. Since Oakland provides the largest number of jobs to this region, its trends will dominate the figures. The largest job type category was health, education and recreation jobs. These types of jobs grew by a total of 11.4 percent from 1996 to 2005 and are expected to be the fastest growing sector with a total increase of 69.7 percent by 2040. Manufacturing, wholesale, and transportation jobs make up the next largest share of total jobs. The total number of these types of jobs increased by 5.4 percent between 1996 and 2005. This sector is projected to increase by 25.4 percent by 2040. The retail, financial/professional services and other jobs (construction, informational and public administration) sectors are expected to see significant increases in the next 35 years.

Table 24
Jobs Summary Table for PZR GC

Type of Job	2000 Jobs	Share of Total	Total % Change 1996 – 2005	Total % Change 2005 – 2040
Agriculture and Natural Resources	294	0.1%	-26.9%	0.9%
Manufacture, Wholesale, Transportation	50,612	20.7%	5.4%	25.4%
Retail	19,629	8.0%	6.3%	56.8%
Financial/Professional Services	46,602	19.0%	32.1%	57.3%
Health, Education, and Recreation	88,628	36.2%	11.4%	69.7%
Other Jobs	39,220	16.0%	6.2%	42.2%
Total	244,985	100%		

Source: Exhibit 25.

Summary Commercial and Industrial Trends

Although data for inventory of office and industrial space is not available by PZR, it is useful to look at the trends in the City of Oakland and the City of Alameda.

Industrial space data indicate that total space in Oakland decreased by 5.8 percent from 1998 to 2005. In 2005, total stock was at 33.4 million square feet. Industrial space occupancy has increased from 90.5 percent in 1998 to 95.9 percent in 2005. The result was that occupied stock remained the same at about 32.0 million square feet. The City of Alameda had 2.2 million square feet in 1998. By 2005 industrial stock grew 50.5 percent to 4.4 million square feet. There was a major drop in occupancy as the market struggled to fill the new space, but occupied stock still managed to increase by 40.3 percent over the time period. As stated earlier, this trend of increasing industrial space in the City of Alameda is expected to continue.

There are three separate office markets tracked in the City of Oakland. The largest is the central business district which had 9.0 million square feet of office space in 1998, growing 23.8 percent to 11.8 million square feet in 2005. Occupancy has ranged from 84.4 percent to 97.0 percent in that time period. The office market surrounding the Oakland Airport has not changed much over the same time period with about 1.9 million square feet and occupancy of between 79.3 to 93.7 percent. Occupied space decreased by 5.9 percent from 1998 to 2005. The 2005 occupancy rate of 79.4 percent indicates a weak demand for office space in this part of Oakland. This office market is less desirable because the relatively remote location and low quality of buildings. The Jack London Square office market is small, but has been growing quickly from 734,300 square feet of office space in 1998 to 865,200 square feet in 2005. As the stock grew 15.1 percent, occupancy has dropped 6.1 percent to 88.2 percent in 2005. This resulted in an increase in occupied stock of 10.0 percent between 1998 and 2005.

The office market in the City of Alameda has grown 24.4 percent from 1998 to 2005 with occupancy ranging from a high of 95.5 percent in 1999 to a recent low of 74.9 percent in 2005. There was a stock of 3.7 million square feet of office space in Alameda in 2005. The result was that occupied stock grew 12.5 percent from 1998 to 2005.

Taxable retail sales in PZR GC grew from $2.94 billion (adjusted for inflation) in 1996 to $3.38 billion in 2005, an increase of 15.1 percent. Retail building permits over the same period have grown 24.6 percent.

PRESSURE ZONE REGION GN

Composition of PZR

Map 9 in Appendix A shows PZR GN in yellow. Most of the City of Albany (89 percent) and most of the City of San Pablo (83 percent) are served by PZR GN. Sixty percent of Emeryville is located in PZR GN as well as almost two-thirds of the population of the City of Richmond. Thirty-five percent of the City of El Cerrito and 22 percent of the City of Berkeley is served by PZR GN. The unincorporated area of Bayview-Montalvin has 35 percent of its population in this PZR. One percent of north Oakland is also in this region.

Table 25 shows the composition of PZR GN. In terms of population, in 2000, 44 percent of this region's population lived in the City of Richmond, 18 percent lived in San Pablo, 16 percent lived in Berkeley, and 10 percent lived in Albany. In terms of jobs, Berkeley supplied the most with 42 percent of total jobs in the region followed by 27 percent of jobs located in Richmond. Although Emeryville only provides 3 percent of total population, 12 percent of jobs in PZR GN are located in Emeryville.

Table 25
Share of 2000 ABAG Adjusted Total Population/Employment in PZR GN by City/Unincorporated Area

City/Unincorporated Area	Share of Population	Share of Employment
Richmond	44%	27%
San Pablo	18%	5%
Berkeley	16%	42%
Albany	10%	7%
El Cerrito	6%	5%
Oakland	3%	2%
Emeryville	3%	12%
Unincorporated Contra Costa County	2%	<1%

Sources: Exhibits 2 and 26.

Summary Demographic Trends

Table 26 displays summary demographic data for PZR GN. Historically, from 1996 to 2005, total population in PZR GN grew at an average annual rate of 0.9 percent. Both data sources project that the annual rate will decrease to 0.7 percent in the future. Estimated at 2.7 in 2005, average household size is projected to be 2.6 persons in 2040. Although city planners in the region stated that a major trend is an increasing average household size due to multigenerations sharing housing units, this trend may be overshadowed by the aging of the population, which is resulting in an increasing number of small elderly households. This could explain why the average household size is projected to decrease.

Table 26
Demographic Summary Table for PZR GN

Demographic Statistic	Population/Household Figures			Average Annual Growth Rate		
	Estimated 1996	Estimated 2005	Projected 2040	1996 – 2005	2005 – 2012	2005 – 2040
Persons						
ABAG Data Adjusted	136,466	147,674	186,334	0.9%	N/A	0.7%
Claritas Data	137,464	148,545	N/A	0.9%	0.7%	N/A
Households						
ABAG Data Adjusted	52,353	55,375	72,285	0.6%	N/A	0.8%
Claritas Data	51,999	54,326	N/A	0.5%	0.6%	N/A
Persons Per Household/ Average Household Size						
ABAG Data Adjusted	2.6	2.7	2.6	0.3%	N/A	-0.1%
Claritas Data	N/A	2.7	N/A	N/A	1.3%	N/A

Sources: Exhibits 2-7.

Summary Housing Trends

Low density housing units (single-family and 2- to 4-unit buildings) grew at an average annual growth rate of 0.4 percent and higher density housing grew at an average annual growth rate of 1.2 percent from 2000 to 2005. There are no forecasts for housing unit growth.

Apartment occupancy in PZR GN ranged from 90.8 to 99.0 percent from 1997 to 2005. During this same time period the total stock of apartments increased by 24.1 percent. The result was an 18.6 percent increase of occupied units from 1997 to 2005. In 2005, the occupancy rate was 93.2 percent with 2,885 units tracked by RealFacts.

Summary Employment Trends

Table 27 displays a summary of jobs trends in PZR GN. Although jobs in this region are located in several cities, most of the jobs are located in Berkeley and Richmond and thus the figures will be dominated by overall trends in these two cities. The largest job type category was health, education and recreation. These jobs grew by a total of 11.6 percent from 1996 to 2005 and are expected to grow by 46.0 percent by 2040. The next largest category of jobs was financial and professional services. This was the fastest growing sector in PZR GN with a total increase of 101.9 percent from 1996 to 2005. Strong growth is expected to continue with a 56.6 percent total increase by 2040. Although the total number of manufacturing, wholesale and transportation jobs decreased slightly between 1996 and 2005, they are projected to increase by 30.2 percent by 2040. The retail and other jobs (construction, informational and public administration) sectors are expected to see significant increases in the next 35 years.

Table 27
Jobs Summary Table for PZR GN

Type of Job	2000 Jobs	Share of Total	Total % Change 1996 – 2005	Total % Change 2005 – 2040
Agriculture and Natural Resources	237	0.2%	6.8%	-11.2%
Manufacture, Wholesale, Transportation	16,991	17.0%	-0.2%	30.2%
Retail	12,605	12.6%	4.8%	59.5%
Financial/Professional Services	18,951	18.9%	101.9%	56.6%
Health, Education, and Recreation	38,086	38.0%	11.6%	46.0%
Other Jobs	13,241	13.2%	8.1%	38.0%
Total	100,111	100%		

Source: Exhibit 26.

Summary Commercial and Industrial Trends

Although data for inventory of office and industrial space is not available by PZR, it is useful to look at the trends in Berkeley and Richmond. These two areas provide the largest number of total jobs to this region. Berkeley's inventory of industrial space increased from 6.9 million square feet in 1998 to 7.5 million square feet in 2005. This indicates an increase of 7.6 percent. Occupancy has remained steady during the same time period varying from 95.4 to 99.4 percent. The result was that occupied industrial space in Berkeley also increased by 7.6 percent. Research into the composition of Berkeley's industrial stock indicated that this increase is not likely a reflection of actual growth in the market. Instead, the coverage of the market has improved over time, coincident with some building conversions, such that the market in general did not expand over this time period. However, the finding regarding strong occupancy remains.

Richmond's inventory of industrial space grew from 12.1 million in 1997 to 12.9 million in 2005. This represents an increase of 6.3 percent. In the same time period, occupancy fell -2.2 percent from 95.6 percent in 1998 to 93.6 percent in 2005. As a result, occupied industrial inventory in Richmond increased 4.3 percent from 1998 to 2005.

West Berkeley's office market is tracked separately from Berkeley's central business district. PZR GN encompasses the West Berkeley office market, which had an inventory of 855,300 square feet of office space in 1998. This stock grew 32.3 percent to 1.3 million square feet in 2005. Occupancy has ranged between 74.6 percent and 95.2 percent. The result was that occupied office space grew by 33.7 percent during the time period.

The office market in Richmond is similar in size to the West Berkeley market. It grew 39.9 percent from 1999 to 2005. Occupancy ranged from a high of 97.4 percent in 2000 to a low of 60.6 percent in 2004. The low occupancy followed a large increase in inventory. By 2005, occupancy had recovered to 75 percent. There was a stock of 1.4 million square feet of office space in Richmond in 2005. The result was that occupied stock grew 25.0 percent from 1999 to 2005.

Taxable retail sales in PZR GN grew from $1.6 billion (adjusted for inflation) in 1996 to $2.0 billion in 2005, an increase of 22.5 percent. Retail building permits grew even faster during the same period at 31.4 percent, indicating a strong increase in the PZR's retail base.

PRESSURE ZONE REGION GS

Composition of PZR

Map 10 in Appendix A shows PZR GS in dark blue. Almost the entire City of San Leandro is served by this PZR. PZR GS extends into about 8 percent of east Oakland and 4 percent of Hayward. There are several unincorporated communities served by this PZR. The entire communities of San Lorenzo and Ashland are in this PZR as well as 94 percent of Cherryland and 7 percent of Castro Valley.

Table 28 shows the composition of PZR GS. In terms of population, in 2000, 43 percent of this region's population lived in the City of San Leandro. An even greater share of employment in this PZR, 60 percent, is located in San Leandro. Unincorporated areas of Alameda County provided 36 percent of total population, but only a small share of jobs. Eighteen percent of the population lives in Oakland and Oakland provides 23 percent of total jobs in this PZR.

Table 28
Share of 2000 ABAG Adjusted Total Population/Employment in PZR GS by City/Unincorporated Area

City/Unincorporated Area	Share of Population	Share of Employment
San Leandro	43%	60%
Unincorporated Alameda County	36%	1%
Oakland	18%	23%
Hayward	3%	4%
San Lorenzo	N/A	5%
Cherryland/Fairview	N/A	3%
Castro Valley	N/A	1%
Ashland	N/A	4%

Note: ABAG city population data use do not include persons living in the spheres of influence. The ABAG city employment data, however, in many cases includes the spheres of influence. Therefore San Lorenzo, Cherryland/Fairview, Castro Valley, and Ashland are included in the share of population in unincorporated Alameda County, but their employment is listed separately.
Sources: Exhibits 2 and 27.

Summary Demographic Trends

Table 29 displays summary demographic data for PZR GS. Although this region had population growth in the recent past, forecasts show this growth slowing significantly in the next 30 years. From 1996 to 2005, total population in PZR GS grew at an average annual rate of between 0.6 and 1.2 percent depending on the data source. ABAG adjusted data suggests that the growth rate will decrease to 0.6 percent in the 2005 to 2040 time period. Claritas data only forecasts to 2012, with the annual growth rate decreasing to 0.1 percent. According to ABAG adjusted numbers, average household size grew from 2.6 to 2.7 persons between 1996 and 2005, but will remain at 2.7 going forward.

Table 29
Demographic Summary Table for PZR GS

Demographic Statistic	Population/Household Figures			Average Annual Growth Rate		
	Estimated 1996	Estimated 2005	Projected 2040	1996 – 2005	2005 – 2012	2005 – 2040
Persons						
ABAG Data Adjusted	169,509	189,402	233,991	1.2%	N/A	0.6%
Claritas Data	169,567	179,378	N/A	0.6%	0.1%	N/A
Households						
ABAG Data Adjusted	64,849	69,753	85,645	0.8%	N/A	0.6%
Claritas Data	61,843	61,525	N/A	-0.1%	-0.2%	N/A
Persons Per Household/ Average Household Size						
ABAG Data Adjusted	2.6	2.7	2.7	0.4%	N/A	0.0%
Claritas Data	N/A	2.9	N/A	N/A	2.2%	N/A

Sources: Exhibits 2-7.

Summary Housing Trends

Low density housing units (single-family and 2- to 4-unit buildings) grew at an average annual growth rate of 0.4 percent from 2000 to 2005. The stock of high density housing increased at an average annual rate of 0.3 percent during the same time period. There are no forecasts for housing unit growth.

Apartment occupancy in PZR GS ranged from 95.0 to 98.4 percent from 1997 to 2005. During this same time period, the total stock of tracked apartments remained the same at 4,662 units. Most recently, in 2005, the occupancy rate was 95.1 percent.

Summary Employment Trends

Table 30 displays a summary of jobs trends in PZR GS. Since most of the jobs in this region are located in San Leandro, the figures will be dominated by San Leandro trends. The largest job type category was manufacturing, wholesale, and transportation jobs. These types of jobs did not grow much between 1996 and 2005, but are expected to increase by 28.0 percent by 2040. Health, education and recreation jobs make up the next largest share of total jobs. The total number of these types of jobs increased modestly by 7.7 between 1996 and 2005, but they are projected to increase by 90.3 percent by 2040. Much of that growth comes from new jobs projected in San Leandro where the San Leandro Hospital is planning an expansion. The one sector with significant growth in the 1996 to 2005 period was financial and professional services, which grew 28.0 percent. This sector is expected to grow by 61.6 percent in the next 35 years. In general, all categories of jobs are projected to have healthy increases except for the agriculture and natural resources sector.

Table 30
Jobs Summary Table for PZR GS

Type of Job	2000 Jobs	Share of Total	Total % Change 1996 – 2005	Total % Change 2005 – 2040
Agriculture and Natural Resources	176	0.2%	-32.7%	6.9%
Manufacture, Wholesale, Transportation	21,791	29.7%	1.0%	28.0%
Retail	10,458	14.3%	1.5%	73.1%
Financial/Professional Services	11,157	15.2%	27.9%	61.6%
Health, Education, and Recreation	20,583	28.1%	7.7%	90.3%
Other Jobs	9,182	12.5%	2.1%	48.7%
Total	73,347	100%		

Source: Exhibit 27.

Summary Commercial and Industrial Trends

Although data for inventory of office and industrial space is not available by PZR, it is useful to look at the trends in the City of San Leandro. In addition, some commercial space is tracked in the unincorporated area of San Lorenzo. San Leandro is a major center for industrial space with 22.4 million square feet of inventory in 2005. This stock of inventory is unchanged from 1997, while occupancy has remained above 91.0 percent. The result was that occupied space grew 3.8 percent from 1998 to 2005. San Lorenzo had a much smaller base of 1.2 million square feet in 2005. Stock grew 8.4 percent from 1998 while occupancy has fallen from a high of 100 percent in the late 1990s to 93.9 percent in 2005. As a result, occupied space in San Lorenzo increased by 2.4 percent during the time period.

San Lorenzo's office market is not tracked, but San Leandro had an inventory of 639,300 square feet in 2005, up 1.3 percent from 1998. Occupancy declined in that same period from 95.8 percent in 1998 to 88.7 percent in 2005. The result was that occupied office space in San Leandro decreased 6.6 percent during the 1998 to 2005 time period.

Taxable retail sales in PZR GS grew 21.1 percent from $1.4 billion (adjusted for inflation) in 1996 to $1.6 billion in 2005. The value of retail building permits grew even faster during the same period at 42.0 percent, indicating a strong increase in the PZR's retail space.

PRESSURE ZONE REGION H

Composition of PZR

Map 11 in Appendix A shows the location of PZR H in dark red. About 41 percent of the City of Walnut Creek's population is served by this PZR. Pleasant Hill has 22 percent of its population in PZR H and Lafayette has less than 1 percent in this PZR. The one unincorporated area served by this PZR, Alamo, has 5 percent of its population in this region.

Table 31 shows the composition of PZR H. Walnut Creek makes up the largest share of total regional population with 76 percent of persons in 2000. Pleasant Hill contributes 21 percent. Walnut Creek provides virtually all the jobs in this region.

Table 31
Share of 2000 ABAG Adjusted Total Population/Employment in PZR H by City/Unincorporated Area

City/Unincorporated Area	Share of Population	Share of Employment
Walnut Creek	76%	99%
Pleasant Hill	21%	<1%
Unincorporated Contra Costa County	3%	<1%
Lafayette	<1%	<1%
Alamo	N/A	<1%

Note: ABAG city population data use do not include persons living in the spheres of influence. The ABAG city employment data, however, in many cases includes the spheres of influence. Therefore Alamo is included in the share of population in unincorporated Contra Costa County, but their employment is listed separately.
Sources: Exhibits 2 and 28.

Summary Demographic Trends

Table 32 displays summary demographic data for PZR H. From 1996 to 2005, total population in PZR H grew at an average annual rate of between 0.4 and 0.6 percent depending on the data source. ABAG adjusted data suggests that the growth rate will decrease slightly to 0.5 percent in the 2005 to 2040 time period. Claritas data only forecasts to 2012, with the annual growth rate decreasing to 0.3 percent. Average household size, at 2.2 in 2005, is projected remain unchanged in the 2005 to 2040 time period.

Table 32
Demographic Summary Table for PZR H

Demographic Statistic	Population/Household Figures			Average Annual Growth Rate		
	Estimated 1996	Estimated 2005	Projected 2040	1996 – 2005	2005 – 2012	2005 – 2040
Persons						
ABAG Data Adjusted	33,510	35,510	42,384	0.6%	N/A	0.5%
Claritas Data	39,415	41,020	N/A	0.4%	0.3%	N/A
Households						
ABAG Data Adjusted	15,204	16,154	19,507	0.7%	N/A	0.5%
Claritas Data	17,467	18,169	N/A	0.4%	0.4%	N/A
Persons Per Household/ Average Household Size						
ABAG Data Adjusted	2.2	2.2	2.2	0.0%	N/A	0.0%
Claritas Data	N/A	2.2	N/A	N/A	0.0%	N/A

Sources: Exhibits 2-7.

Summary Housing Trends

Both low density housing units (single-family and 2- to 4-unit buildings) and high density housing grew at an average annual growth rate of 0.5 percent from 2000 to 2005. CBRE Consulting expects there to be an emerging condominium market in Walnut Creek, but there are no forecasts for housing unit growth.

Apartment occupancy in PZR H ranged from 94.1 to 98.3 percent from 1997 to 2005. During this same time period the total stock of apartments increased by 3.6 percent. The higher occupancy rates occurred during the late 1990s. Most recently, in 2005, the occupancy rate was 95.6 percent with 3,376 units tracked by RealFacts. The result was that from 1997 to 2005 occupied units grew 2.0 percent.

Summary Employment Trends

Table 33 displays a summary of jobs trends in PZR H. Virtually all the jobs in this region are located in Walnut Creek. The largest job type category in 2000 was financial and professional services. These types of jobs grew by a total of 13.2 percent from 1996 to 2005 and are expected to grow by 37.3 percent by 2040. Health, education and recreation jobs make up the next largest sector in this region with a 20.3 percent total increase from 1996 to 2005 and a 29.9 percent projected increase from 2005 to 2040. The retail and other jobs (construction, informational and public administration) sectors are also projected to grow significantly by 2040. Manufacturing only makes up 9.2 percent of total jobs in 2000 and is projected to grow slowly in the future.

Table 33
Jobs Summary Table for PZR H

Type of Job	2000 Jobs	Share of Total	Total % Change 1996 – 2005	Total % Change 2005 – 2040
Agriculture and Natural Resources	76	0.2%	98.9%	-39.7%
Manufacture, Wholesale, Transportation	4,143	9.2%	-5.5%	4.3%
Retail	5,859	13.0%	5.3%	22.8%
Financial/Professional Services	15,885	35.3%	13.2%	37.3%
Health, Education, and Recreation	14,469	32.1%	20.3%	29.9%
Other Jobs	4,582	10.2%	14.4%	20.9%
Total	45,013	100%		

Source: Exhibit 28.

Summary Commercial and Industrial Trends

Although data for inventory of office and industrial space is not available by PZR, it is useful to look at the trends in the City of Walnut Creek, which provides all jobs to this region. The industrial market is too small to be tracked, but two separate office markets are tracked in Walnut Creek. The Downtown market had 4.9 million square feet in 2005. That represents an increase of 2.3 percent from 1997. Occupancy fell from 94.7 percent in 1997 to 92.0 percent in 2005, resulting in a decrease of 0.7 percent in occupied stock. The occupied stock in Walnut Creek's Ygnacio Valley Road submarket also declined, but this submarket is not located in PZR H and in fact is not served by EBMUD.

Taxable retail sales in PZR H grew from $926.1 million (adjusted for inflation) in 1996 to $1.2 billion in 2005, an increase of 21.4 percent. The value of retail building permits grew 15.4 percent occurred over the same period.

ASSUMPTIONS AND GENERAL LIMITING CONDITIONS

CBRE Consulting, Inc./Sedway Group has made extensive efforts to confirm the accuracy and timeliness of the information contained in this study. Such information was compiled from a variety of sources, including interviews with government officials, review of City and County documents, and other third parties deemed to be reliable. Although CBRE Consulting, Inc./Sedway Group believes all information in this study is correct, it does not warrant the accuracy of such information and assumes no responsibility for inaccuracies in the information by third parties. We have no responsibility to update this report for events and circumstances occurring after the date of this report. Further, no guarantee is made as to the possible effect on development of present or future federal, state or local legislation, including any regarding environmental or ecological matters.

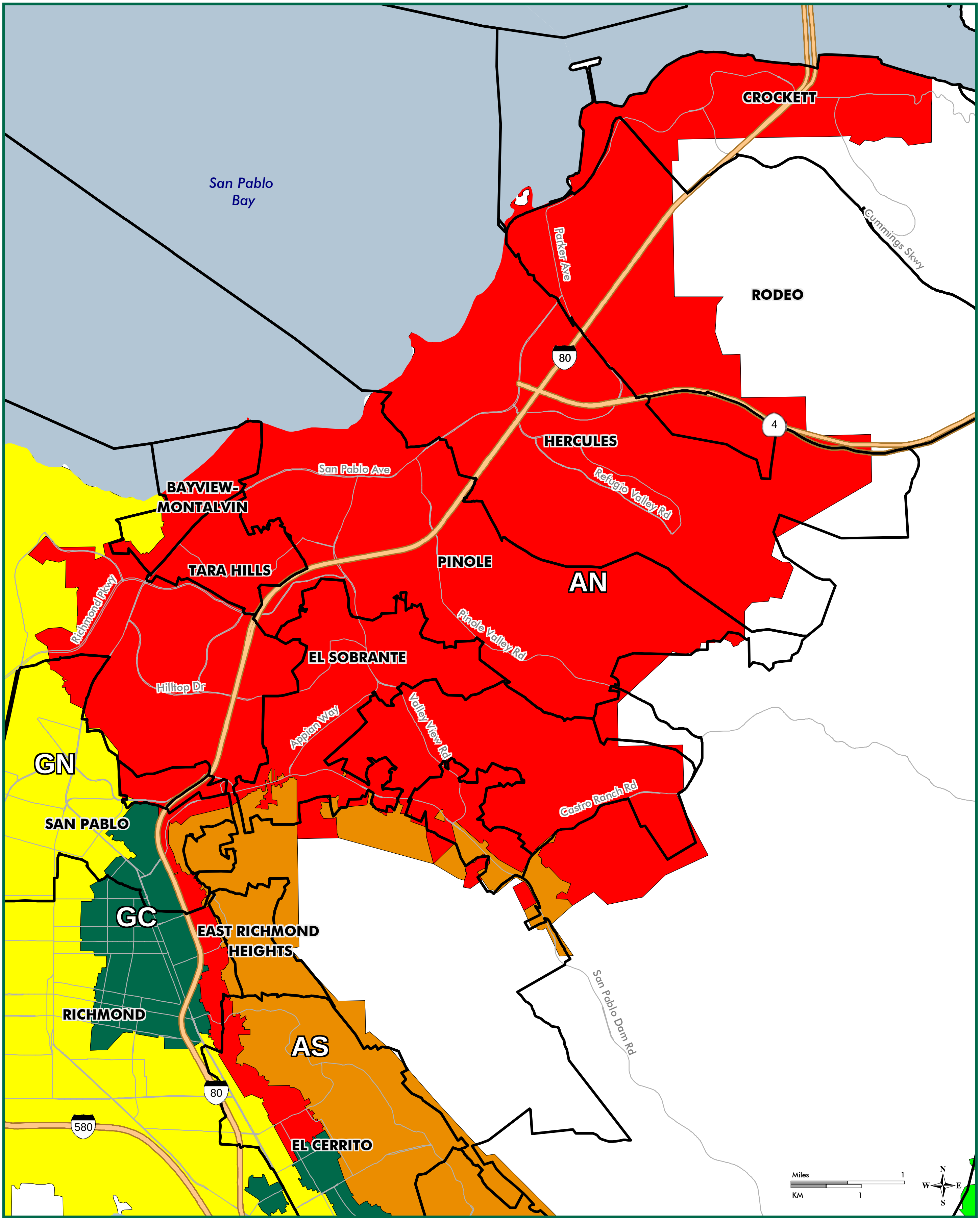
The accompanying projections and analyses are based on estimates and assumptions developed in connection with the study. In turn, these assumptions, and their relation to the projections, were developed using currently available economic data and other relevant information. It is the nature of forecasting, however, that some assumptions may not materialize, and unanticipated events and circumstances may occur. Therefore, actual results achieved during the projection period will likely vary from the projections, and some of the variations may be material to the conclusions of the analysis.

Contractual obligations do not include access to or ownership transfer of any electronic data processing files, programs or models completed directly for or as by-products of this research effort, unless explicitly so agreed as part of the contract.

This report may not be used for any purpose other than that for which it is prepared. Neither all nor any part of the contents of this study shall be disseminated to the public through publication advertising media, public relations, news media, sales media, or any other public means of communication without prior written consent and approval of CBRE Consulting, Inc./Sedway Group.

APPENDIX A

Map 1: Pressure Zone Region - AN



CBRE
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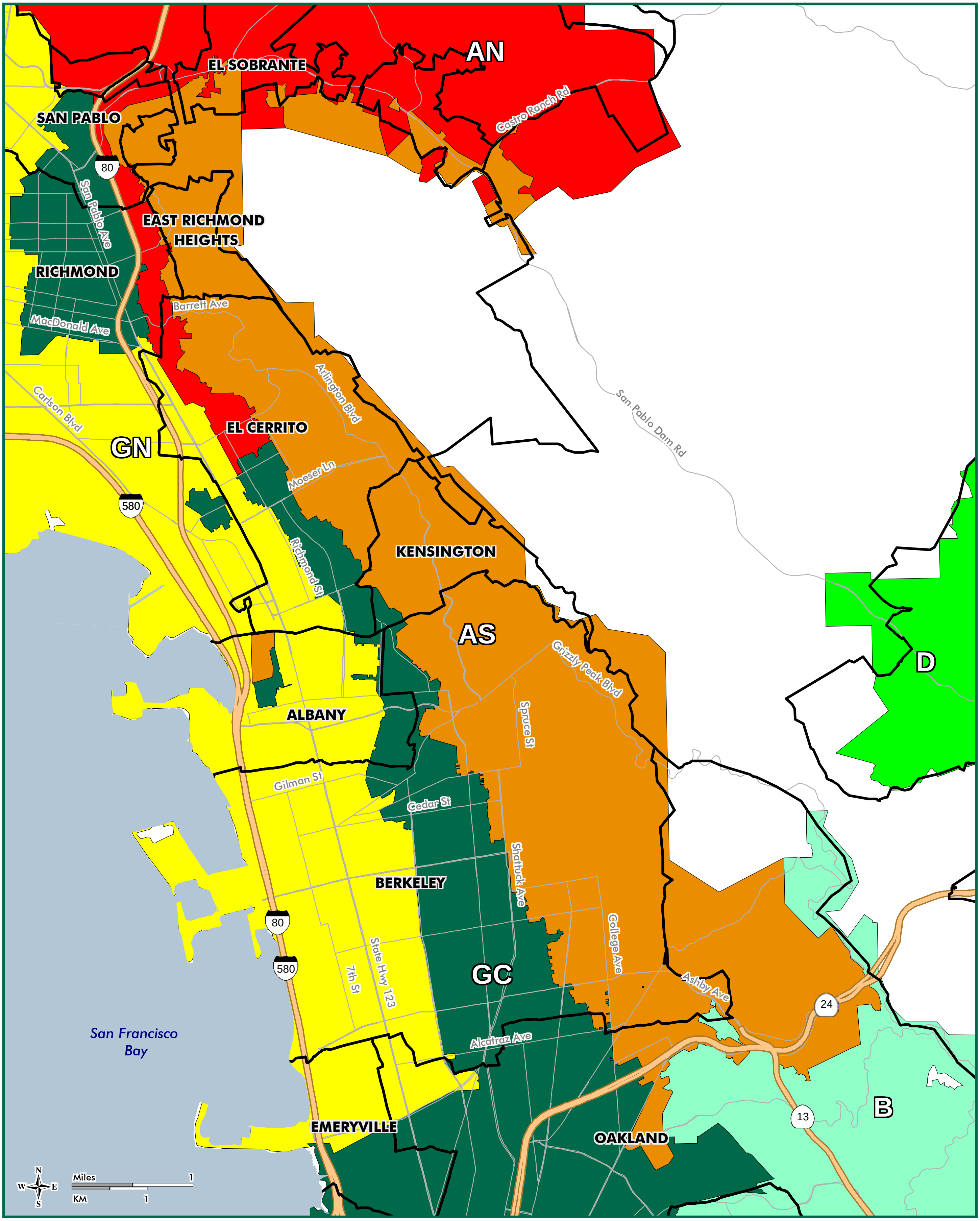
Map 2: Pressure Zone Region - AS



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 Sources: CBRE Mapping Services (877) 580-4674; Claritas, Inc./GDT, Inc. MapFiles\Work2007\140456.wor 7/26/2007

CBRE
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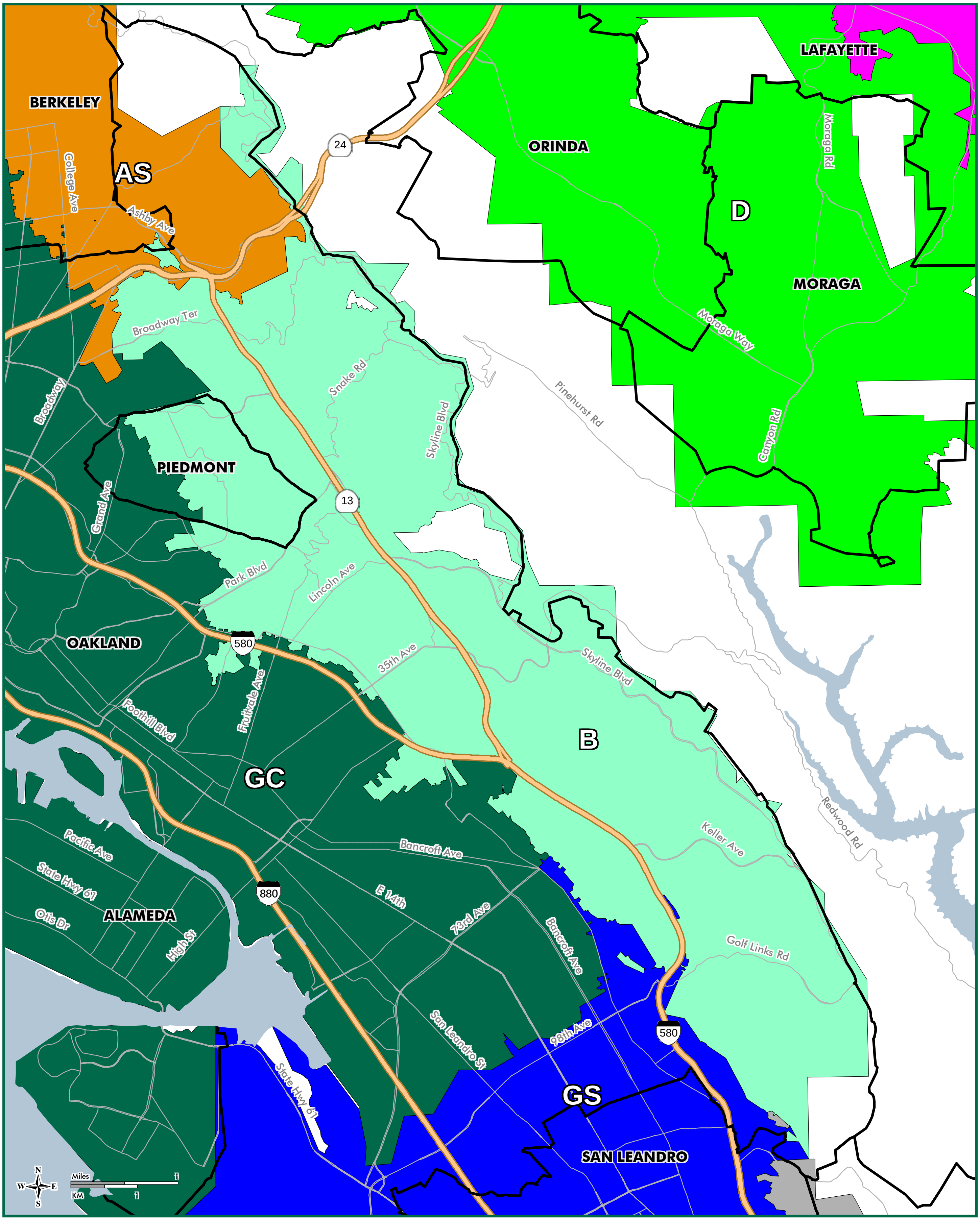
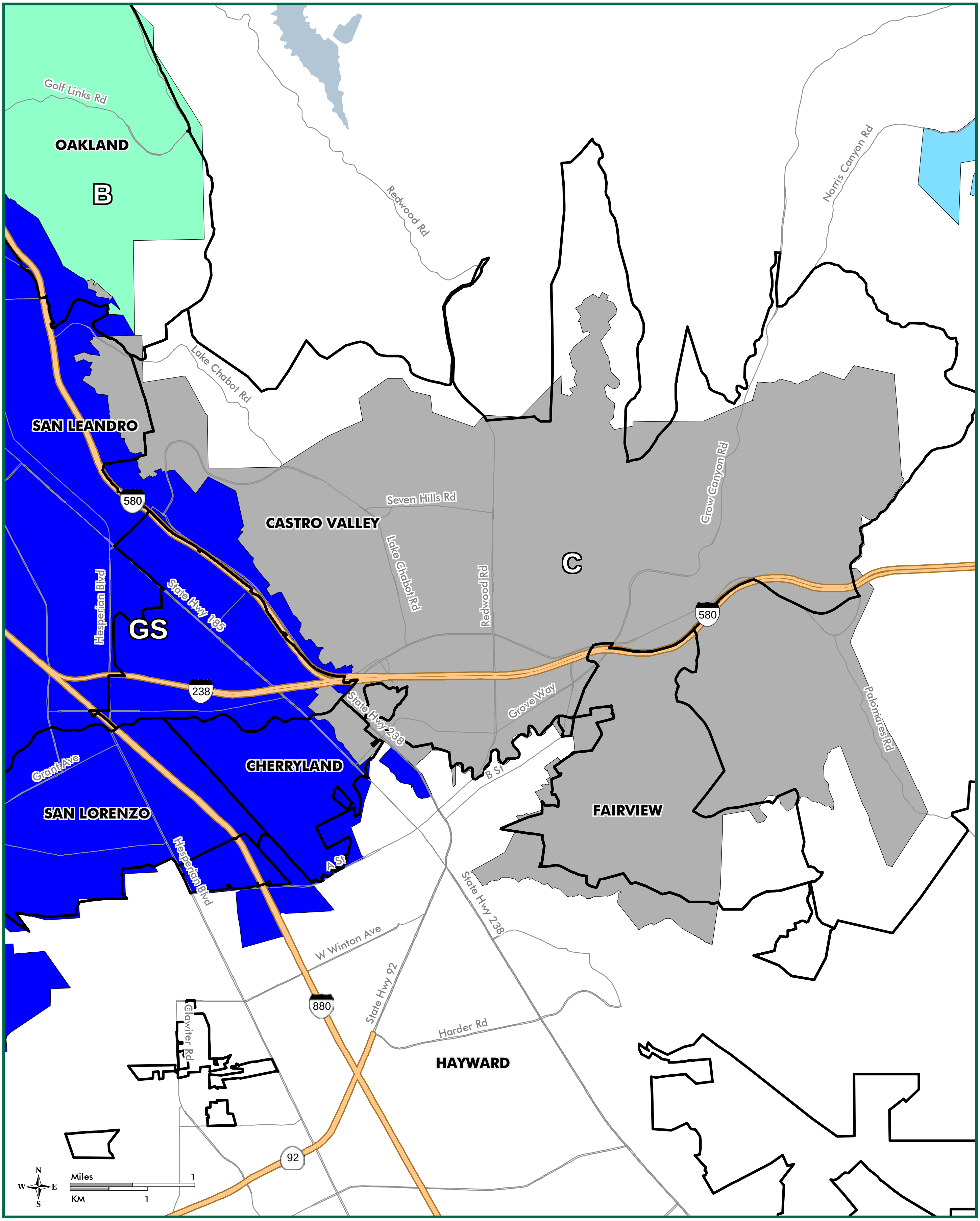
Map 3: Pressure Zone Region - B



CB RICHARD ELLIS

Map 4: Pressure Zone Region - C



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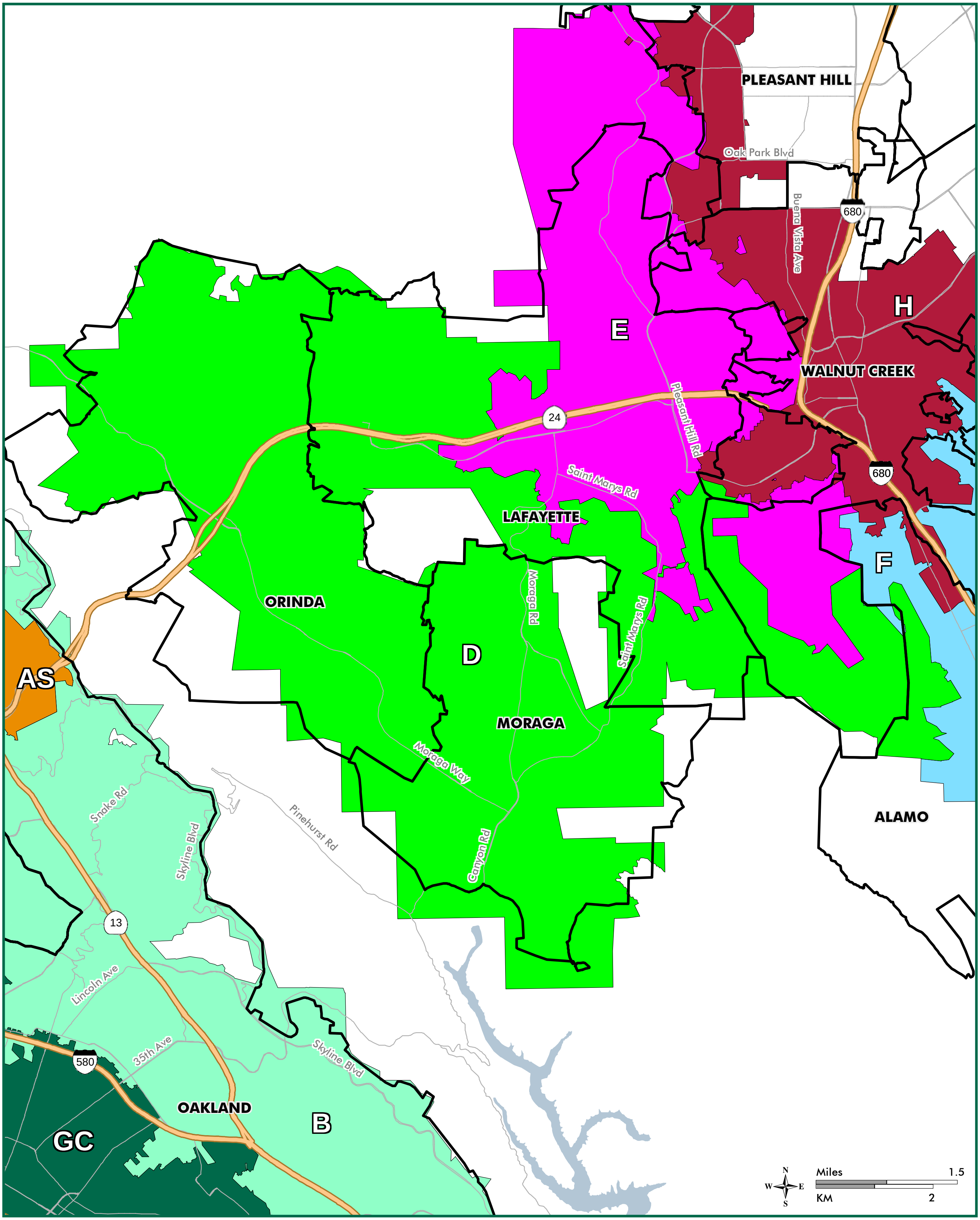
Map 5: Pressure Zone Region - D



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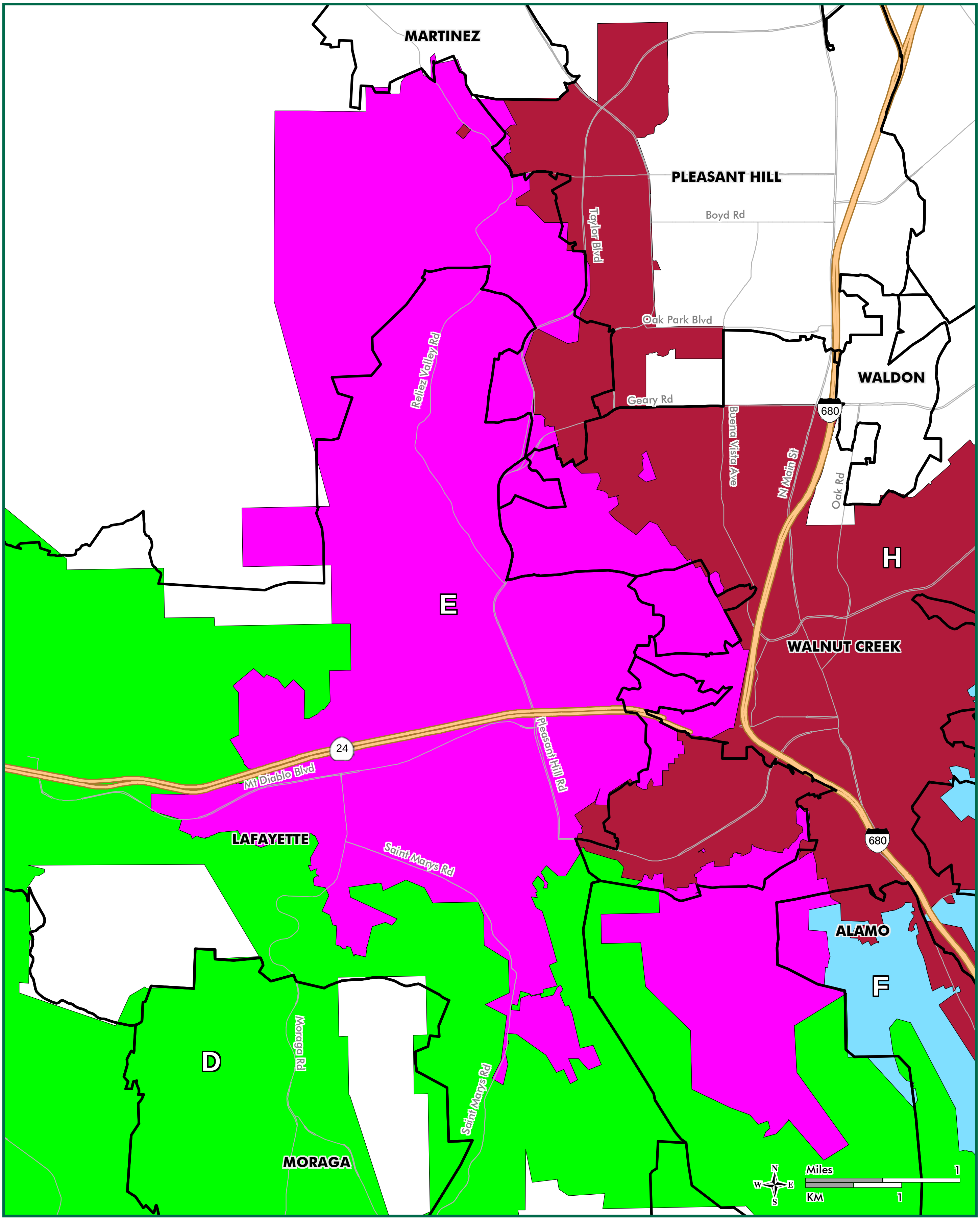
Map 6: Pressure Zone Region - E



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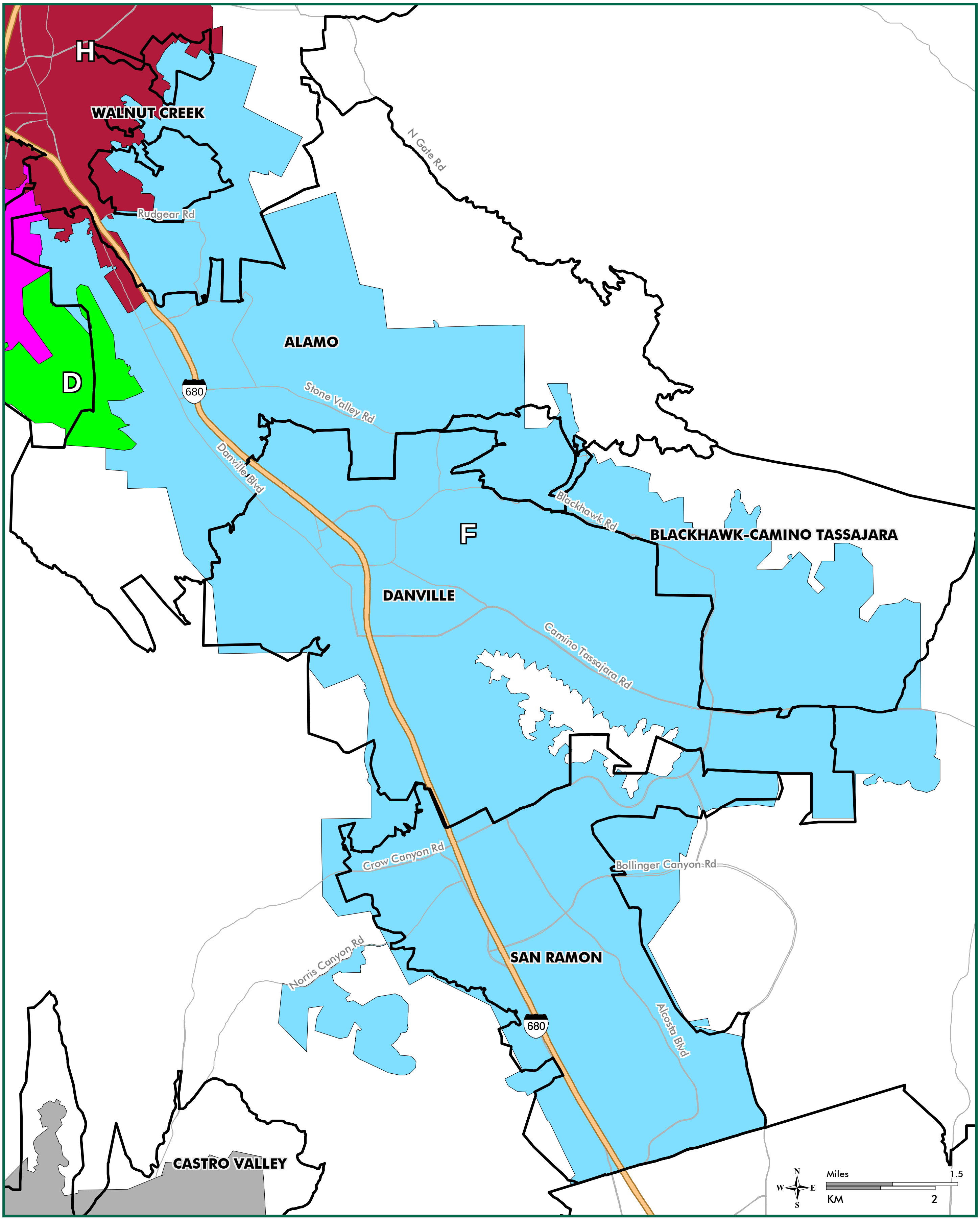
Map 7: Pressure Zone Region - F



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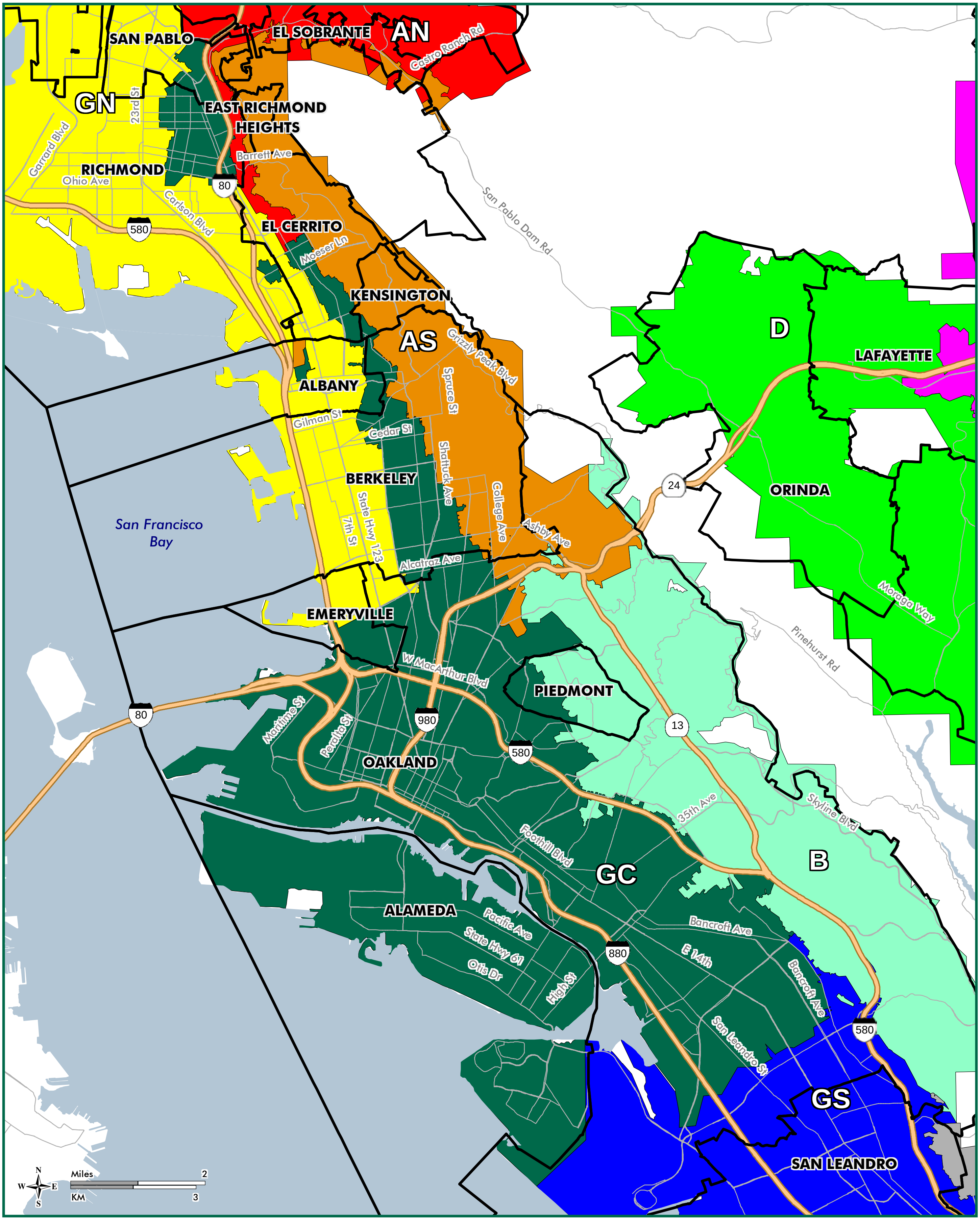
Map 8: Pressure Zone Region - GC



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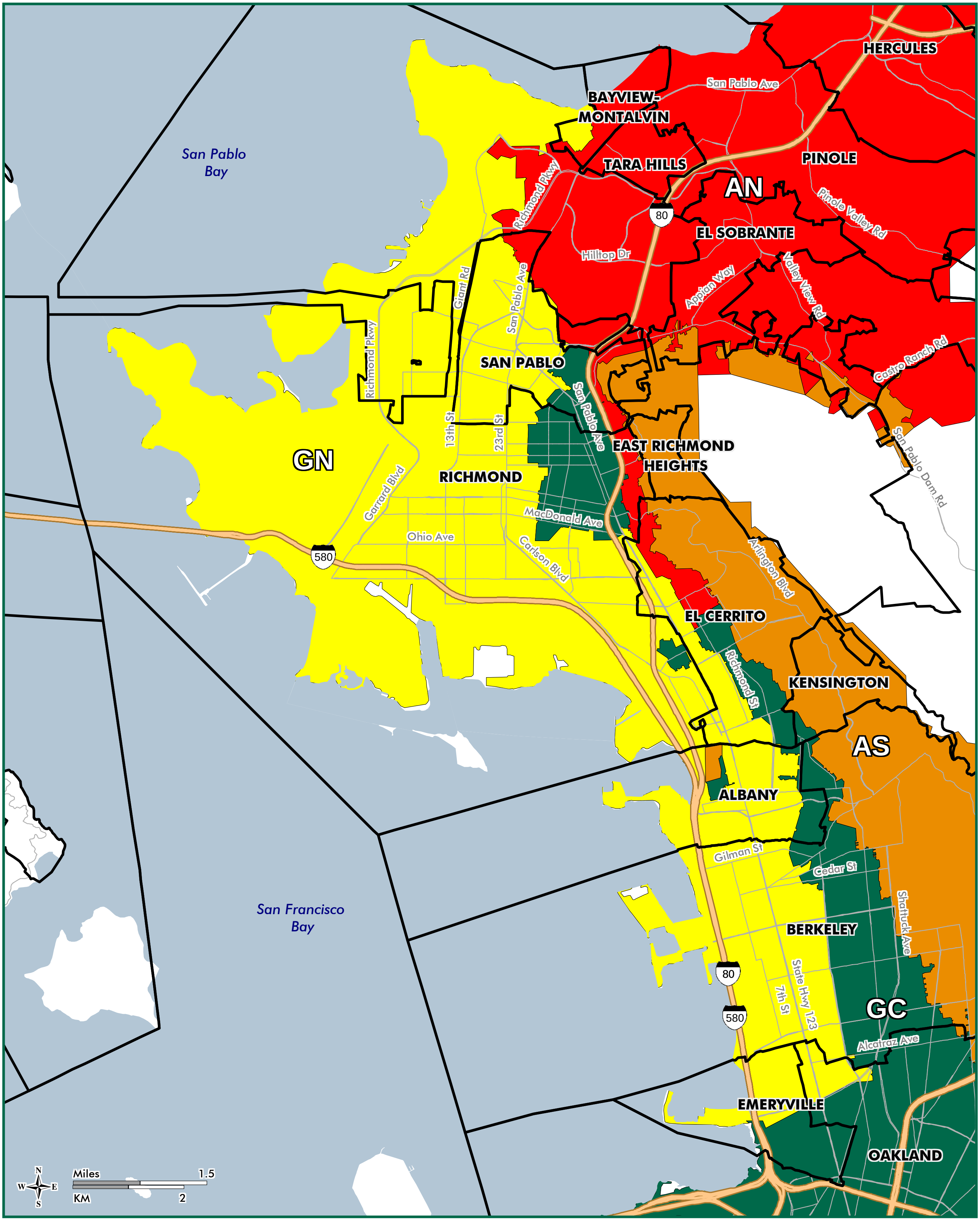
Map 9: Pressure Zone Region - GN



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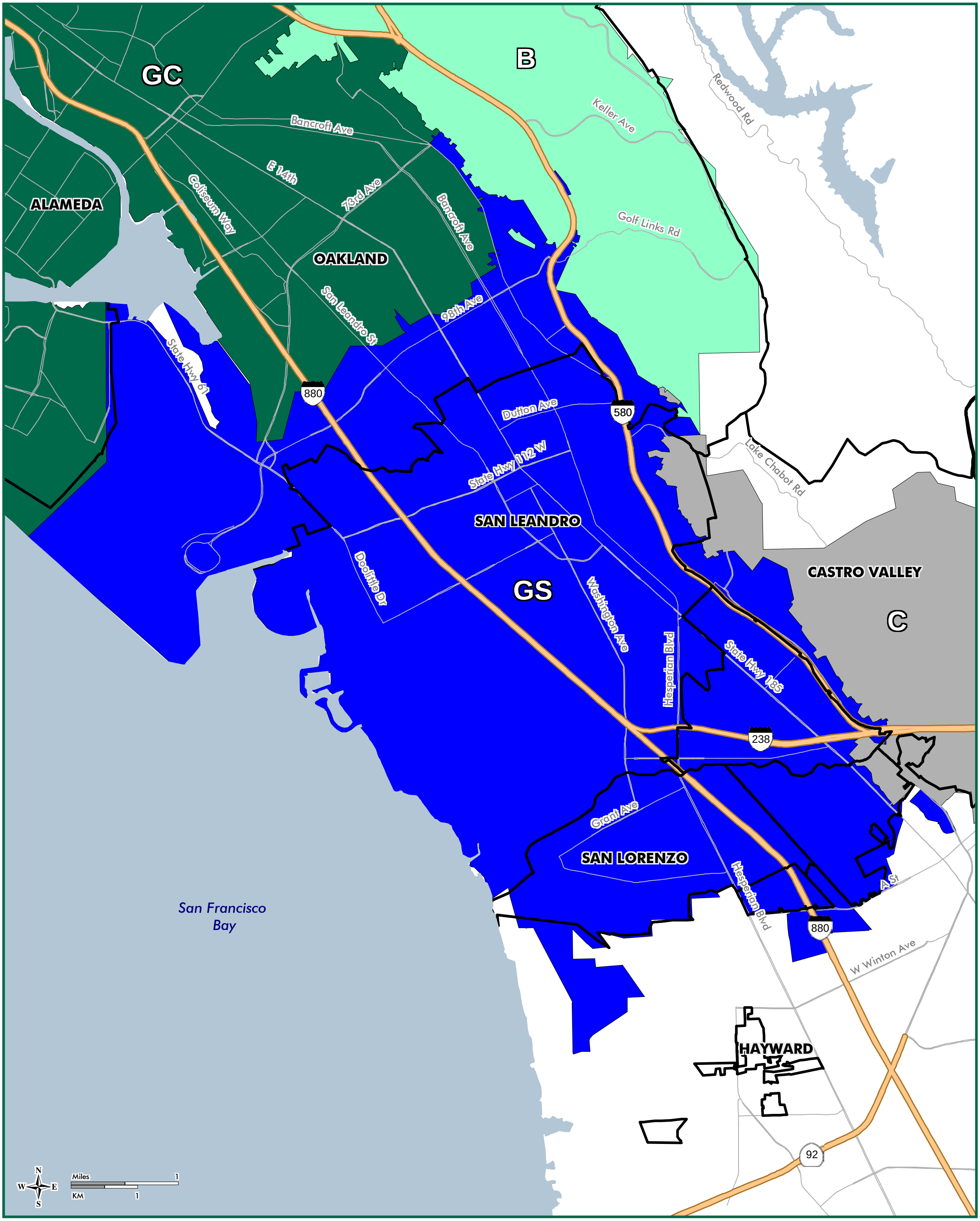
Map 10: Pressure Zone Region - GS



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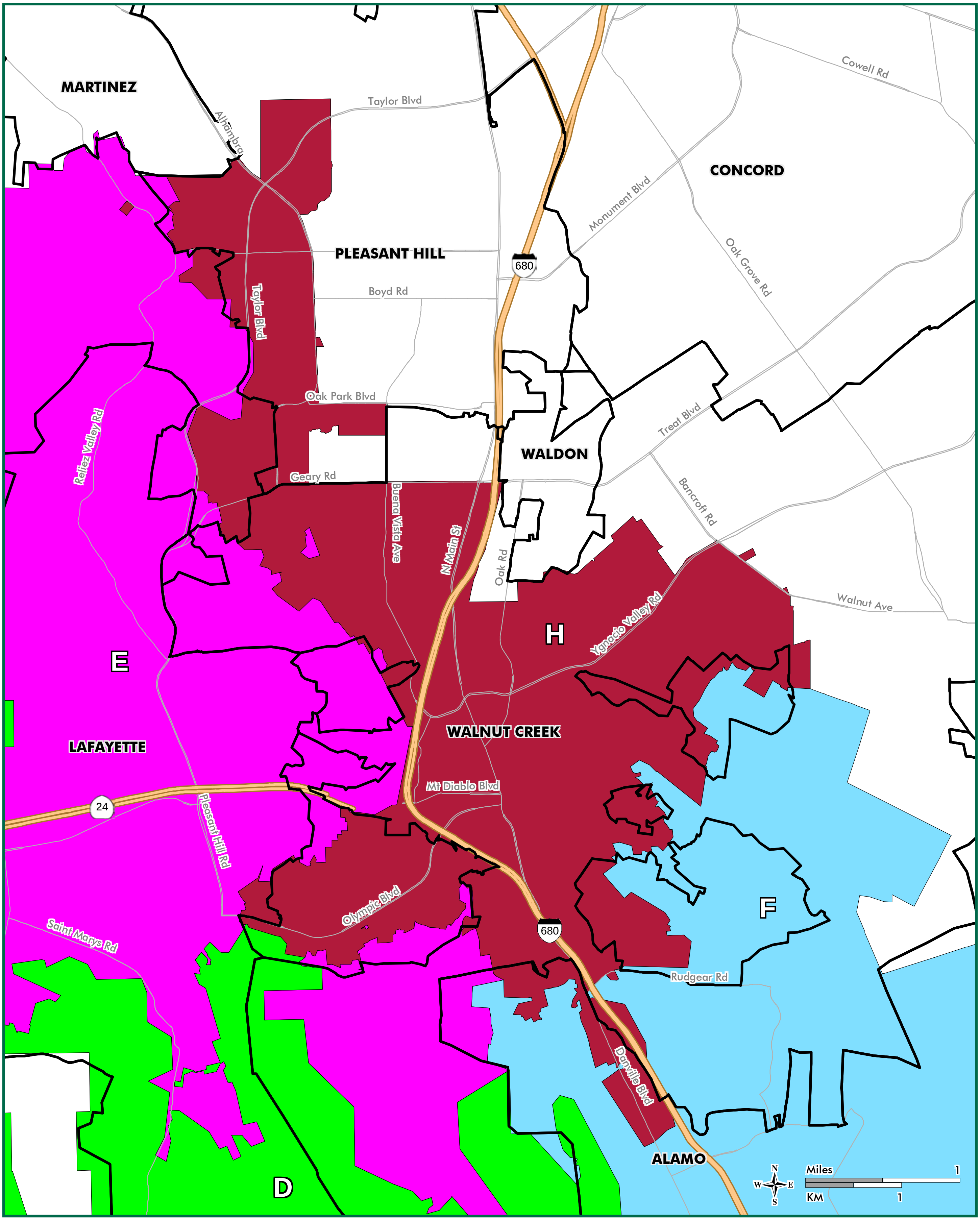
Map 11: Pressure Zone Region - H



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APPENDIX B

Appendix B: Percent of City in Each Pressure Zone Region (PZR)

CITY	PZR	CITY OR UNINCORPORATED AREA	TOTAL CITY/AREA POPULATION 2007	2007 POPULATION IN PZR	PERCENT OF 2007 POPULATION IN PZR	ADJUSTED FOR EMPLOYMENT DATA (1)	DIFFERENCE
Hercules	AN	Incorporated	25,634	25,628	100.0%	100.0%	0.0%
Richmond	AN	Incorporated	103,667	23,430	22.6%	22.6%	0.0%
Pinole	AN	Incorporated	19,072	18,961	99.4%	99.4%	0.0%
San Pablo	AN	Incorporated	31,451	2,944	9.4%	9.4%	0.0%
El Sobrante	AN	CDP CCC	12,482	11,416	91.5%	91.5%	0.0%
Rodeo	AN	CDP CCC	9,265	8,617	93.0%	93.0%	0.0%
Tara Hills	AN	CDP CCC	5,546	5,546	100.0%	100.0%	0.0%
Bayview-Montalvin	AN	CDP CCC	5,491	3,597	65.5%	65.5%	0.0%
Rollingwood	AN	CDP CCC	2,904	2,904	100.0%	100.0%	0.0%
Crockett	AN	CDP CCC	3,301	2,848	86.3%	86.3%	0.0%
Berkeley	AS	Incorporated	101,920	46,407	45.5%	13.7%	-31.9%
El Cerrito	AS	Incorporated	22,693	10,295	45.4%	2.3%	-43.1%
Oakland	AS	Incorporated	401,060	5,727	1.4%	1.4%	0.0%
Richmond	AS	Incorporated	103,667	416	0.4%	0.4%	0.0%
San Pablo	AS	Incorporated	31,451	368	1.2%	1.2%	0.0%
Kensington	AS	CDP CCC	4,898	4,503	91.9%	91.9%	0.0%
East Richmond Heights	AS	CDP CCC	3,467	3,467	100.0%	100.0%	0.0%
El Sobrante	AS	CDP CCC	12,482	1,063	8.5%	8.5%	0.0%
Oakland	B	Incorporated	401,060	67,883	16.9%	5.1%	-11.9%
Piedmont	B	Incorporated	10,612	6,442	60.7%	20.0%	-40.7%
Berkeley	B	Incorporated	101,920	129	0.1%	0.1%	0.0%
Hayward	C	Incorporated	141,828	5,683	4.0%	4.0%	0.0%
San Leandro	C	Incorporated	78,826	1,057	1.3%	1.3%	0.0%
Castro Valley	C	CDP AC	55,669	50,815	91.3%	91.3%	0.0%
Fairview	C	CDP AC	9,435	8,609	91.3%	91.3%	0.0%
Cherryland	C	CDP AC	14,508	853	5.9%	5.9%	0.0%
Orinda	D	Incorporated	18,411	18,411	100.0%	100.0%	0.0%
Moraga	D	Incorporated	16,617	16,617	100.0%	100.0%	0.0%
Lafayette	D	Incorporated	24,870	10,271	41.3%	9.8%	-31.5%
Walnut Creek	D	Incorporated	64,248	3,020	4.7%	0.0%	-4.7%
Alamo	D	CDP CCC	16,404	119	0.7%	0.7%	0.0%
Lafayette	E	Incorporated	24,870	14,557	58.5%	90.0%	31.5%
Walnut Creek	E	Incorporated	64,248	8,481	13.2%	4.0%	-9.2%
Pleasant Hill	E	Incorporated	32,924	51	0.2%	0.2%	0.0%
Alamo	E	CDP CCC	16,404	297	1.8%	1.8%	0.0%
San Ramon	F	Incorporated	50,501	50,501	100.0%	100.0%	0.0%
Danville	F	Incorporated	43,936	43,936	100.0%	100.0%	0.0%
Walnut Creek	F	Incorporated	64,248	5,250	8.2%	1.0%	-7.2%
Alamo	F	CDP CCC	16,404	11,004	67.1%	67.1%	0.0%
Blackhawk-Camino Tassajara	F	CDP CCC	10,729	8,368	78.0%	78.0%	0.0%
Diablo	F	CDP CCC	874	874	100.0%	100.0%	0.0%
Oakland	GC	Incorporated	401,060	290,075	72.3%	84.2%	11.9%
Alameda	GC	Incorporated	71,326	70,950	99.5%	99.5%	0.0%
Berkeley	GC	Incorporated	101,920	33,322	32.7%	32.7%	0.0%
Richmond	GC	Incorporated	103,667	13,713	13.2%	13.2%	0.0%
El Cerrito	GC	Incorporated	22,693	4,483	19.8%	19.8%	0.0%
Piedmont	GC	Incorporated	10,612	4,171	39.3%	80.0%	40.7%
Emeryville	GC	Incorporated	9,317	3,715	39.9%	39.9%	0.0%

Appendix B: Percent of City in Each Pressure Zone Region (PZR)

CITY	PZR	CITY OR UNINCORPORATED AREA	TOTAL CITY/AREA POPULATION 2007	2007 POPULATION IN PZR	PERCENT OF 2007 POPULATION IN PZR	ADJUSTED FOR EMPLOYMENT DATA (1)	DIFFERENCE
San Pablo	GC	Incorporated	31,451	2,049	6.5%	6.5%	0.0%
Albany	GC	Incorporated	16,103	1,798	11.2%	1.0%	-10.2%
Kensington	GC	CDP CCC	4,898	395	8.1%	8.1%	0.0%
Richmond	GN	Incorporated	103,667	65,079	62.8%	62.8%	0.0%
San Pablo	GN	Incorporated	31,451	26,089	83.0%	83.0%	0.0%
Berkeley	GN	Incorporated	101,920	22,061	21.7%	53.5%	31.9%
Albany	GN	Incorporated	16,103	14,305	88.8%	99.0%	10.2%
El Cerrito	GN	Incorporated	22,693	7,915	34.9%	78.0%	43.1%
Emeryville	GN	Incorporated	9,317	5,602	60.1%	60.1%	0.0%
Oakland	GN	Incorporated	401,060	3,814	1.0%	1.0%	0.0%
Bayview-Montalvin	GN	CDP CCC	5,491	1,895	34.5%	34.5%	0.0%
San Leandro	GS	Incorporated	78,826	77,769	98.7%	98.7%	0.0%
Oakland	GS	Incorporated	401,060	33,350	8.3%	8.3%	0.0%
Hayward	GS	Incorporated	141,828	5,616	4.0%	4.0%	0.0%
San Lorenzo	GS	CDP AC	21,131	21,131	100.0%	100.0%	0.0%
Ashland	GS	CDP AC	20,180	20,180	100.0%	100.0%	0.0%
Cherryland	GS	CDP AC	14,508	13,655	94.1%	94.1%	0.0%
Castro Valley	GS	CDP AC	55,669	3,867	7.0%	7.0%	0.0%
Walnut Creek	H	Incorporated	64,248	26,235	40.8%	72.0%	31.2%
Pleasant Hill	H	Incorporated	32,924	7,208	21.9%	1.0%	-20.9%
Lafayette	H	Incorporated	24,870	34	0.1%	0.1%	0.0%
Alamo	H	CDP CCC	16,404	783	4.8%	4.8%	0.0%

Source: Claritas Inc.; and CBRE Consulting.

CDP CCC = census designated place in Contra Costa County

CDP AC = census designated place in Alameda County

(1) The following adjustments were made:

Because the El Cerrito hills does not have much employment, 95 percent of the share in El Ceritto in PZR AS was moved to the share of El Cerrito in region GN (flatlands). Berkeley's hills do have some employment related to the University, but still less than other parts of Berkeley and so 70 percent of the share of Berkeley in PZR AS was moved to the share of Berkeley in region GN. In addition, 95 percent of the share of Oakland in region B was moved to the share of Oakland in region GC. Other employment adjustments were 31.5 percent of Lafayette moved from region D to region E. Although only 66.1 percent of Walnut Creek's population is in the East Bay Municipal Utility District all of the employment is considered to be in the district, largely in PZR H. Most of Piedmont's employment (80 percent) is considered to be in PZR GC. For Albany, almost all of the employment (99 percent) is considered to be in region GN. These adjustments were made based upon professional knowledge of the geographic distribution of the employment base in the respective cities.

APPENDIX C

Appendix C: Calculation of Unincorporated Population
Pressure Zone Regions by Share of City in Region
1996 and 2005

Total Uninc. Population Alameda County
122,283

Total Uninc. Population Contra Costa County
115,839

Pressure Zone Region City (Unshaded)/ Unincorporated Area (Shaded)	% of City/Area Population	Unincorporated Population	Uninc. Population Adjusted for % of Area in Region (1)	Share of Total Uninc. Pop. of Alameda	Share of Total Uninc. Pop. of Contra Costa County(2)
AN					
Hercules	100.0%				
Richmond	22.6%				
Pinole	99.4%				
San Pablo	9.4%				
El Sobrante	91.5%	12,482	11,416		
Rodeo	93.0%	9,265	8,617		
Tara Hills	100.0%	5,546	5,546		
Bayview-Montalvin	65.5%	5,491	3,597		
Rollingwood	100.0%	2,904	2,904		
Crockett	86.3%	3,301	2,848		
Region Total Unincorporated		38,989	34,929		30.2%
For Jobs Exhibits Excludes Rodeo/Crockett		26,423	23,463		20.3%
AS					
Berkeley	45.5%				
El Cerrito	45.4%				
Oakland	1.4%				
San Pablo	1.2%				
Richmond	0.4%				
East Richmond Heights	100.0%	3,467	3,467		
Kensington	91.9%	4,898	4,503		
El Sobrante	8.5%	12,482	1,063		
Region Total Unincorporated		20,847	9,033		7.8%
B					
Oakland	16.9%				
Piedmont	60.7%				
Berkeley	0.1%				
Region Total Unincorporated		-	-		
C					
Hayward	4.0%				
San Leandro	1.3%				
Castro Valley	91.3%	55,669	50,815		
Fairview	91.2%	9,435	8,609		
Cherryland	5.9%	14,508	853		
Region Total Unincorporated		79,612	60,277	49.3%	

Appendix C: Calculation of Unincorporated Population
Pressure Zone Regions by Share of City in Region
1996 and 2005

Total Uninc. Population Alameda County
122,283

Total Uninc. Population Contra Costa County
115,839

Pressure Zone Region City (Unshaded)/ Unincorporated Area (Shaded)	% of City/Area Population	Unincorporated Population	Uninc. Population Adjusted for % of Area in Region (1)	Share of Total Uninc. Pop. of Alameda	Share of Total Uninc. Pop. of Contra Costa County(2)
D					
Orinda	100.0%				
Moraga	100.0%				
Lafayette	41.3%				
Walnut Creek	4.7%				
Alamo	0.7%	16,404	119		
Region Total Unincorporated		16,404	119		0.1%
E					
Lafayette	58.5%				
Walnut Creek	13.2%				
Pleasant Hill	0.2%				
Alamo	1.8%	16,404	297		
Region Total Unincorporated		16,404	297		0.3%
F					
San Ramon	100.0%				
Danville	100.0%				
Walnut Creek	8.2%				
Alamo	67.1%	16,404	11,004		
Blackhawk-Camino Tassajara	78.0%	10,729	8,368		
Diablo	100.0%	874	874		
Region Total Unincorporated		28,007	20,246		17.5%
For Jobs Exhibits Excludes Alamo-Blackhawk		874	874		0.8%
GC					
Oakland	72.3%				
Alameda	99.5%				
Berkeley	32.7%				
Richmond	13.2%				
El Cerrito	19.8%				
Piedmont	39.3%				
Emeryville	39.9%				
San Pablo	6.5%				
Albany	11.2%				
Kensington	8.1%	4,898	395		
Region Total Unincorporated		4,898	395		0.3%

Appendix C: Calculation of Unincorporated Population
Pressure Zone Regions by Share of City in Region
1996 and 2005

Total Uninc. Population Alameda County
122,283

Total Uninc. Population Contra Costa County
115,839

Pressure Zone Region City (Unshaded)/ Unincorporated Area (Shaded)	% of City/Area Population	Unincorporated Population	Uninc. Population Adjusted for % of Area in Region (1)	Share of Total Uninc. Pop. of Alameda	Share of Total Uninc. Pop. of Contra Costa County(2)
GN					
Richmond	62.8%				
San Pablo	83.0%				
Berkeley	21.6%				
Albany	88.8%				
El Cerrito	34.9%				
Emeryville	60.1%				
Oakland	1.0%				
Bayview-Montalvin	34.5%	5,491	1,895		
Region Total Unincorporated		5,491	1,895		1.6%
GS					
San Leandro	98.7%				
Oakland	8.3%				
Hayward	4.0%				
San Lorenzo	100.0%	21,131	21,131		
Ashland	100.0%	20,180	20,180		
Cherryland	94.1%	14,508	13,655		
Castro Valley	6.9%	55,669	3,867		
Region Total Unincorporated		111,488	58,833	48.1%	
H					
Walnut Creek	40.8%				
Pleasant Hill	21.9%				
Lafayette	0.1%				
Alamo	4.8%	16,404	783		
Region Total Unincorporated		16,404	783		0.7%

Sources: Claritas; and CBRE Consulting.

(1) This figure is the unincorporated population multiplied by the percentage share of the population in the PZR.
(2) This figure is the sum of the unincorporated populations for each city adjusted by the percentage shares of the population (in each PZR) divided by the total unincorporated population of the county.

APPENDIX D

Appendix D: Share Adjustments For School Enrollment and Employment
Pressure Zone Regions by Share of City in Region

Pressure Zone Region City (Unshaded)/ Unincorporated Area (Shaded)	% of City Population in Region	Unincorporated Population	Uninc. Population Adjusted for % of Area in Region	Combined Adjusted Share
AN				
Rodeo	93.0%	9,265	8,617	
Crockett	86.3%	3,301	2,848	
Rodeo/Crockett Total		12,566	11,465	91.2%
F				
San Ramon	100.0%	50,501	50,501	
Danville	100.0%	43,936	43,936	
Alamo	67.1%	16,404	11,004	
San Ramon/Danville/Alamo		110,841	105,441	95.1%
D				
Orinda	100.0%	18,411	18,411	
Moraga	100.0%	16,617	16,617	
Lafayette	41.3%	24,870	10,271	
Orinda/Moraga/Lafayette		59,898	45,299	75.6%
AN				
Hercules	100.0%	25,634	25,629	
Richmond	22.6%	103,667	23,429	
Pinole	99.4%	19,072	18,961	
San Pablo	9.4%	31,541	2,952	
El Sobrante	91.5%	12,482	11,416	
West Contra Costa County District		192,396	82,387	42.8%

Appendix D: Share Adjustments For School Enrollment and Employment
Pressure Zone Regions by Share of City in Region

Pressure Zone Region City (Unshaded)/ Unincorporated Area (Shaded)	% of City Population in Region	Unincorporated Population	Uninc. Population Adjusted for % of Area in Region	Combined Adjusted Share
AS				
El Cerrito	33.8%	22,693	7,676	
San Pablo	1.2%	31,541	369	
Richmond	0.4%	103,667	416	
Kensington	91.9%	4,898	4,503	
El Sobrante	8.5%	12,482	1,063	
West Contra Costa County District		175,281	14,027	8.0%
GC				
Richmond	13.2%	103,667	13,713	
El Cerrito	19.8%	22,693	4,483	
San Pablo	6.5%	31,541	2,055	
Kensington	8.1%	4,898	395	
West Contra Costa County District		162,799	20,646	12.7%
GN				
Richmond	62.8%	103,667	65,079	
San Pablo	83.0%	31,541	26,164	
El Cerrito	34.9%	22,693	7,915	
West Contra Costa County District		157,901	99,158	62.8%

APPENDIX E

Exhibit 1
California Department Of Finance
Total Population Estimates and Projections
Select Counties and California

JURISDICTION	2000	2010	2020	2030	2040	2050	Annual Avg Growth Rate 2000 - 2010	Annual Avg Growth Rate 2010 - 2020
ALAMEDA	1,453,078	1,550,133	1,663,481	1,791,721	1,923,505	2,047,658	0.6%	0.7%
CONTRA COSTA	956,497	1,075,931	1,237,544	1,422,840	1,609,257	1,812,242	1.2%	1.4%
CALIFORNIA	34,105,437	39,135,676	44,135,923	49,240,891	54,226,115	59,507,876	1.4%	1.2%

Source: State of California, Department of Finance, *Population Projections for California and Its Counties 2000-2050,* Sacramento , California, July 2007.

Exhibit 2
Total Population
Pressure Zone Regions
Based on Association of Bay Area Governments' Estimates and Projections for Constituent Cities (1)
1995 - 2040

Pressure Zone Region	1995 (2)	1996 (3)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (4)	% Change '05-'40	CAGR (5) '96-'05	CAGR (5) '05-'40
AN	104,739	105,659	109,467	117,497	120,465	125,409	130,166	135,047	139,245	142,402	147,855	25.8%	1.2%	0.7%
AS	76,307	76,130	75,445	77,102	79,010	80,996	83,031	85,196	87,512	89,392	91,585	18.8%	0.1%	0.5%
B	71,351	71,922	74,263	76,173	78,720	82,170	85,444	89,874	94,339	98,600	102,675	34.8%	0.6%	0.9%
C	66,779	68,084	73,569	76,779	79,682	81,077	83,297	85,768	88,600	90,937	93,732	22.1%	1.3%	0.6%
D	45,969	46,160	46,937	47,548	48,157	48,703	49,960	50,784	51,594	52,573	53,432	12.4%	0.3%	0.3%
E	22,443	22,552	22,994	23,559	23,807	24,106	24,766	25,390	25,866	26,422	26,951	14.4%	0.5%	0.4%
F (6)	106,864	109,024	118,255	123,094	125,960	132,826	139,467	145,581	151,218	156,409	162,783	32.2%	1.4%	0.8%
GC	415,792	417,199	423,317	435,171	450,364	469,733	488,029	511,837	536,783	559,851	582,662	33.9%	0.5%	0.8%
GN	134,954	136,466	142,928	147,674	151,341	156,605	162,568	170,080	175,129	180,259	186,334	26.2%	0.9%	0.7%
GS	166,422	169,509	182,483	189,402	195,335	200,171	205,696	212,459	219,887	226,831	233,991	23.5%	1.2%	0.6%
H	33,265	33,510	34,510	35,510	36,147	36,799	37,849	38,992	40,218	41,316	42,384	19.4%	0.6%	0.5%

Sources: Association of Bay Area Governments, *Projections 2007 and Projections 2000;* Claritas, Inc.; and CBRE Consulting.

(1) City data from ABAG are adjusted by percent share of each city in each pressure zone region. Share data is provided by Claritas.
(2) Estimates for 1995 are from ABAG's *Projections 2000* .
(3) Figures for 1996 were estimated by using the average annual compound growth rate between 1995 and 2000.
(4) Projection for 2040 was estimated by applying the average annual compound growth rate for the period 2000 to 2035.
(5) Compound average annual growth rate.
(6) The population of San Ramon was adjusted to take out the growth in Dougherty Valley, which is not serviced by EBMUD. Growth in Dougherty Valley was determined by the difference between city building permits (which exclude Dougherty Valley since the county issued the permits) and the growth in housing stock. The building permits issued by the city of San Ramon account for 23 percent of development within San Ramon. Therefore, the remaining 77 percent of population growth from 2000 to 2005 was from Dougherty Valley. Given that by 2005 Dougherty Valley was half developed, CBRE Consulting assumed that the second half would be completed between 2005 and 2010 with a corresponding doubling of new households and persons. These new households and persons were taken out of the 2005 and 2010 numbers. As this growth represented 18.5 percent of total population in 2010, 18.5 percent of population from San Ramon was subtracted out of each forecast year starting in 2015.

Exhibit 3
Total Households
Pressure Zone Regions
Based on Association of Bay Area Governments' Estimates and Projections for Constituent Cities (1)
1995 - 2040

Pressure Zone	1995 (2)	1996 (3)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (4)	% Change '05-'40	CAGR (5) '96-'05	CAGR (5) '05-'40
AN	37,067	37,344	38,479	41,069	42,611	44,692	46,652	48,706	50,471	51,841	54,096	31.7%	1.1%	0.8%
AS	30,769	30,963	31,753	32,349	33,023	33,849	34,726	35,645	36,549	37,333	38,207	18.1%	0.5%	0.5%
B	26,747	26,961	27,837	28,482	29,339	30,918	32,366	34,060	35,752	37,425	39,042	37.1%	0.6%	0.9%
C	24,287	24,642	26,115	27,089	27,958	28,538	29,343	30,249	31,162	31,971	32,909	21.5%	1.1%	0.6%
D	17,205	17,267	17,517	17,744	18,075	18,531	18,986	19,487	19,990	20,489	20,953	18.1%	0.3%	0.5%
E	9,323	9,367	9,547	9,735	9,957	10,213	10,495	10,809	11,124	11,424	11,721	20.4%	0.4%	0.5%
F (6)	38,912	39,855	43,912	45,583	47,220	50,302	53,092	55,781	58,366	60,675	63,544	39.4%	1.5%	1.0%
GC	158,381	159,681	165,008	169,240	174,530	183,191	191,370	200,787	210,142	219,243	228,327	34.9%	0.6%	0.9%
GN	52,059	52,353	53,581	55,375	57,060	59,544	62,088	65,141	67,369	69,629	72,285	30.5%	0.6%	0.8%
GS	64,110	64,849	67,894	69,753	71,506	73,382	75,578	78,140	80,727	83,194	85,645	22.8%	0.8%	0.6%
H	15,066	15,204	15,771	16,154	16,598	17,061	17,605	18,215	18,891	19,507	19,507	20.8%	0.7%	0.5%

Sources: Association of Bay Area Governments, *Projections 2007* and *Projections 2000*; Claritas, Inc.; and CBRE Consulting.

(1) City data from ABAG are adjusted by percent share of each city in each pressure zone region. Share data are provided by Claritas.
(2) Estimates for 1995 are from ABAG's *Projections 2000*.
(3) Figures for 1996 were estimated by using the average annual compound growth rate between 1995 and 2000.
(4) Projection for 2040 was estimated by applying the average annual compound growth rate for the period 2000 to 2035.
(5) Compound average annual growth rate.
(6) The population of San Ramon was adjusted to take out the growth in Dougherty Valley, which is not serviced by EBMUD. Growth in Dougherty Valley was determined by the difference between city building permits (which exclude Dougherty Valley since the county issued the permits) and the growth in housing stock. The building permits issued by the city of San Ramon account for 23 percent of development within San Ramon. Therefore, the remaining 77 percent of population growth from 2000 to 2005 was from Dougherty Valley. Given that by 2005 Dougherty Valley was half developed, CBRE Consulting assumed that the second half would be completed between 2005 and 2010 with a corresponding doubling of new households and persons. These new households and persons were taken out of the 2005 and 2010 numbers. As this growth represented 18.5 percent of total population in 2010, 18.5 percent of population from San Ramon was subtracted out of each forecast year starting in 2015.

Exhibit 4
Persons Per Household (1)
Pressure Zone Regions
Based on Association of Bay Area Governments' Estimates and Projections for Constituent Cities (2)
1995 - 2040

Pressure Zone Region	1995 (3)	1996 (4)	2000	2005	2010	2015	2020	2025	2030	2035	2040	% Change '05-'40	CAGR (5) '96-'05	CAGR (5) '05-'40
AN	2.8	2.8	2.8	2.9	2.8	2.8	2.8	2.8	2.8	2.7	2.7	-4.5%	0.1%	-0.1%
AS	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	0.6%	-0.3%	0.0%
B	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.6	-1.7%	0.0%	0.0%
C	2.7	2.8	2.8	2.8	2.9	2.8	2.8	2.8	2.8	2.8	2.8	0.5%	0.3%	0.0%
D	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	-4.8%	0.0%	-0.1%
E	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	-5.0%	0.1%	-0.1%
F	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	-5.1%	-0.1%	-0.2%
GC	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.6	2.6	2.6	-0.8%	-0.2%	0.0%
GN	2.6	2.6	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	-3.3%	0.3%	-0.1%
GS	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	0.6%	0.4%	0.0%
H	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	-1.2%	0.0%	0.0%

Sources: Association of Bay Area Governments, *Projections 2007* and *Projections 2000* ; Claritas, Inc.; and CBRE Consulting.

(1) Persons per Household figure calculated by divided the population figures in Exhibit 2 by the households figures in Exhibit 3.
(2) City data from ABAG are adjusted by percent share of each city in each pressure zone region. Share data is provided by Claritas.
(3) Estimates for 1995 are from ABAG's *Projections 2000* .
(4) Figures for 1996 were estimated by using the average annual compound growth rate between 1995 and 2000.
(5) Compound average annual growth rate.

Exhibit 5
Total Population
Pressure Zone Regions
Claritas Data
1990 - 2012 (1)

Region	1990	1996	2000	2005	2007	2012	Total % Change '96-'05	Total % Change '05-'12	CAGR (2) '96-'05	CAGR (2) '05-'12
AN	91,415	96,729	100,443	106,257	108,676	115,010	9.8%	8.2%	1.0%	1.1%
AS	74,421	72,549	71,327	70,785	70,569	71,171	-2.4%	0.5%	-0.3%	0.1%
B	75,488	76,098	76,508	75,050	74,475	74,227	-1.4%	-1.1%	-0.2%	-0.2%
C	60,295	66,654	71,262	71,142	71,094	72,064	6.7%	1.3%	0.7%	0.2%
D	47,048	47,791	48,293	49,110	49,440	50,885	2.8%	3.6%	0.3%	0.5%
E	22,985	23,726	24,233	24,802	25,033	25,754	4.5%	3.8%	0.5%	0.5%
F	90,540	103,356	112,892	120,047	123,034	130,693	16.1%	8.9%	1.7%	1.2%
GC	398,059	411,857	421,320	423,711	424,671	433,985	2.9%	2.4%	0.3%	0.3%
GN	127,576	137,464	144,479	148,545	150,203	155,872	8.1%	4.9%	0.9%	0.7%
GS	154,730	169,567	180,240	179,378	179,035	181,179	5.8%	1.0%	0.6%	0.1%
H	37,742	39,415	40,572	41,020	41,200	41,915	4.1%	2.2%	0.4%	0.3%

Sources: Claritas, Inc; and CBRE Consulting.

(1) Figures for 1990, 2000, 2007 (estimate) and 2012 (projection) are from Claritas. Figures for 1996 and 2005 were interpolated by using the average annual compound growth rates between 1990 and 2000 (for 1996) and between 2000 to 2007 (for 2005)
(2) Compound average annual growth rate.

Exhibit 6
Total Households
Pressure Zone Regions
Claritas Data
1990 - 2012 (1)

							Total % Change		CAGR (2)	
Region	1990	1996	2000	2005	2007	2012	'96-'05	'05-'12	'96-'05	'05-'12
AN	32,914	34,575	35,729	37,575	38,340	40,473	8.7%	7.7%	0.9%	1.1%
AS	29,912	30,176	30,353	29,971	29,819	30,058	-0.7%	0.3%	-0.1%	0.0%
B	29,778	30,301	30,655	29,915	29,624	29,518	-1.3%	-1.3%	-0.1%	-0.2%
C	23,592	25,631	27,088	26,728	26,585	26,758	4.3%	0.1%	0.5%	0.0%
D	19,051	19,354	19,558	19,779	19,868	20,458	2.2%	3.4%	0.2%	0.5%
E	9,835	10,236	10,512	10,783	10,893	11,222	5.3%	4.1%	0.6%	0.6%
F	32,038	37,062	40,842	43,646	44,821	47,948	17.8%	9.9%	1.8%	1.4%
GC	157,502	161,858	164,829	163,696	163,245	165,524	1.1%	1.1%	0.1%	0.2%
GN	50,224	51,999	53,217	54,326	54,776	56,684	4.5%	4.3%	0.5%	0.6%
GS	60,061	61,843	63,061	61,525	60,921	60,731	-0.5%	-1.3%	-0.1%	-0.2%
H	16,745	17,467	17,966	18,169	18,251	18,632	4.0%	2.5%	0.4%	0.4%

Sources: Claritas, Inc; and CBRE Consulting.

(1) Figures for 1990, 2000, 2007 (estimate) and 2012 (projection) are from Claritas. Figures for 1996 and 2005 were interpolated by using the average annual compound growth rates between 1990 and 2000 (for 1996) and between 2000 to 2007 (for 2005)
(2) Compound average annual growth rate.

Exhibit 7
Average Household Size
Pressure Zone Regions
Claritas Data
2000-2012

Zone	1990 (1)	1996 (1)	2000	2005 (2)	2007	2012	% Change '96-'05	% Change '05-'12
AN	--	--	2.81	2.82	2.83	2.84	--	0.6%
AS	--	--	2.20	2.21	2.22	2.22	--	0.3%
B	--	--	2.46	2.47	2.48	2.48	--	0.2%
C	--	--	2.58	2.62	2.63	2.65	--	1.3%
D	--	--	2.38	2.39	2.39	2.38	--	-0.3%
E	--	--	2.27	2.27	2.27	2.26	--	-0.4%
F	--	--	2.73	2.72	2.72	2.70	--	-0.8%
GC	--	--	2.51	2.54	2.55	2.58	--	1.6%
GN	--	--	2.65	2.69	2.70	2.72	--	1.3%
GS	--	--	2.82	2.88	2.90	2.94	--	2.2%
H	--	--	2.22	2.22	2.22	2.22	--	0.0%

Sources: Claritas, Inc; and CBRE Consulting.

(1) Data available between 2000 and 2012 only.
(2) Figures for 2000, 2007 (estimate) and 2012 (projection) are given by Claritas. Figures for 2005 were estimated by using the average annual compound growth rates between 2000 and 2007.

Exhibit 8
Total Housing Units
Pressure Zone Regions
Claritas Data
2000-2012

Zone	1990 (1)	1996 (1)	2000	2005 (2)	2007	2012	% Change '96-'05	% Change '05-'12
AN	--	--	36,594	38,734	39,625	41,808	--	7.9%
AS	--	--	31,402	31,371	31,359	31,575	--	0.6%
B	--	--	31,439	30,969	30,783	30,656	--	-1.0%
C	--	--	27,656	27,499	27,436	27,604	--	0.4%
D	--	--	20,216	20,612	20,772	21,373	--	3.7%
E	--	--	10,890	11,276	11,434	11,768	--	4.4%
F	--	--	41,903	45,135	46,496	49,748	--	10.2%
GC	--	--	172,668	174,395	175,091	177,341	--	1.7%
GN	--	--	55,642	57,605	58,409	60,412	--	4.9%
GS	--	--	64,627	63,627	63,231	62,989	--	-1.0%
H	--	--	18,460	18,805	18,945	19,330	--	2.8%

Sources: Claritas, Inc; and CBRE Consulting.

(1) Data available between 2000 and 2012 only.
(2) Figures for 2000, 2007 (estimate) and 2012 (projection) are given by Claritas. Figures for 2005 were estimated by using the average annual compound growth rates between 2000 and 2007.

Exhibit 9
Single-Family Detached Housing Units
Pressure Zone Regions
Claritas Data
2000-2012

			2000		2005 (3)		2007		2012		% Change	% Change
Zone	1990 (1)	1996 (1)	Actual	% (2)	Estimated	% (2)	Estimated	% (2)	Forecast	% (2)	'96-'05	'05-'12
AN	--	--	25,341	69.2%	26,429	68.2%	26,877	67.8%	28,086	67.2%	--	6.3%
AS	--	--	18,282	58.2%	18,277	58.3%	18,275	58.3%	18,436	58.4%	--	0.9%
B	--	--	25,505	81.1%	25,081	81.0%	24,913	80.9%	24,749	80.7%	--	-1.3%
C	--	--	18,997	68.7%	18,837	68.5%	18,774	68.4%	18,858	68.3%	--	0.1%
D	--	--	13,154	65.1%	13,475	65.4%	13,606	65.5%	14,046	65.7%	--	4.2%
E	--	--	6,273	57.6%	6,455	57.3%	6,530	57.1%	6,760	57.4%	--	4.7%
F	--	--	30,519	72.8%	32,461	71.9%	33,272	71.6%	35,285	70.9%	--	8.7%
GC	--	--	65,198	37.8%	65,334	37.5%	65,388	37.3%	65,782	37.1%	--	0.7%
GN	--	--	25,338	45.5%	25,754	44.7%	25,922	44.4%	26,442	43.8%	--	2.7%
GS	--	--	39,449	61.0%	38,740	60.9%	38,460	60.8%	38,223	60.7%	--	-1.3%
H	--	--	9,238	50.0%	9,348	49.7%	9,392	49.6%	9,556	49.4%	--	2.2%

Sources: Claritas, Inc; and CBRE Consulting.

(1) Data available between 2000 and 2012 only.
(2) Figure represents single family detached product as a percent of total housing units in this pressure zone.
(3) Figures for 2000, 2007(estimate) and 2012 (projection) are given by Claritas. 2005 figures were estimated by using the average annual compound growth rates between 2000 and 2007.

Exhibit 10
Single-Family Attached Housing Units
Pressure Zone Regions
Claritas Data
2000-2012

			2000		2005 (3)		2007		2012		% Change	% Change
Zone	1990 (1)	1996 (1)	Actual	% (2)	Estimated	% (2)	Estimated	% (2)	Forecast	% (2)	'96-'05	'05-'12
AN	--	--	3,321	9.1%	3,790	9.8%	3,995	10.1%	4,480	10.7%	--	18.2%
AS	--	--	1,138	3.6%	1,144	3.6%	1,147	3.7%	1,157	3.7%	--	1.1%
B	--	--	742	2.4%	722	2.3%	714	2.3%	710	2.3%	--	-1.7%
C	--	--	1,901	6.9%	1,926	7.0%	1,936	7.1%	1,977	7.2%	--	2.7%
D	--	--	1,925	9.5%	1,930	9.4%	1,932	9.3%	1,977	9.2%	--	2.4%
E	--	--	1,194	11.0%	1,206	10.7%	1,211	10.6%	1,228	10.4%	--	1.8%
F	--	--	5,220	12.5%	5,665	12.6%	5,854	12.6%	6,313	12.7%	--	11.4%
GC	--	--	10,124	5.9%	10,259	5.9%	10,313	5.9%	10,424	5.9%	--	1.6%
GN	--	--	3,730	6.7%	3,830	6.6%	3,871	6.6%	3,997	6.6%	--	4.4%
GS	--	--	4,249	6.6%	4,230	6.6%	4,222	6.7%	4,222	6.7%	--	-0.2%
H	--	--	1,726	9.4%	1,750	9.3%	1,759	9.3%	1,783	9.2%	--	1.9%

Sources: Claritas, Inc; and CBRE Consulting.

(1) Data available between 2000 and 2012 only.
(2) Figure represents single family attached product as a percent of total housing units in this pressure zone.
(3) Figures for 2000, 2007 (estimate) and 2012 (projection) are given by Claritas. 2005 figures were estimated by using the average annual compound growth rates between 2000 and 2007.

Exhibit 11
Duplex Housing Units
Pressure Zone Regions
Claritas Data
2000-2012

			2000		2005 (3)		2007		2012		% Change	% Change
Zone	1990 (1)	1996 (1)	Actual	% (2)	Estimated	% (2)	Estimated	% (2)	Forecast	% (2)	'96-'05	'05-'12
AN	--	--	638	1.7%	661	1.7%	671	1.7%	696	1.7%	--	5.3%
AS	--	--	1,445	4.6%	1,443	4.6%	1,442	4.6%	1,454	4.6%	--	0.8%
B	--	--	915	2.9%	901	2.9%	896	2.9%	900	2.9%	--	-0.1%
C	--	--	458	1.7%	459	1.7%	460	1.7%	464	1.7%	--	1.0%
D	--	--	502	2.5%	488	2.4%	482	2.3%	494	2.3%	--	1.3%
E	--	--	165	1.5%	173	1.5%	176	1.5%	180	1.5%	--	4.3%
F	--	--	203	0.5%	219	0.5%	226	0.5%	244	0.5%	--	11.4%
GC	--	--	13,641	7.9%	13,858	7.9%	13,946	8.0%	14,177	8.0%	--	2.3%
GN	--	--	3,527	6.3%	3,614	6.3%	3,649	6.2%	3,747	6.2%	--	3.7%
GS	--	--	2,305	3.6%	2,313	3.6%	2,316	3.7%	2,330	3.7%	--	0.7%
H	--	--	364	2.0%	365	1.9%	365	1.9%	370	1.9%	--	1.5%

Sources: Claritas, Inc; and CBRE Consulting.

(1) Data available between 2000 and 2012 only.
(2) Figure represents duplex product as a percent of total housing units in this pressure zone.
(3) Figures for 2000, 2007 (estimate) and 2012 (projection) are given by Claritas. 2005 figures were estimated by using the average annual compound growth rates between 2000 and 2007.

Exhibit 12
Multifamily Buildings: 3 to 19 Units
Pressure Zone Regions
Claritas Data
2000-2012

			2000		2005 (3)		2007		2012		% Change	% Change
Zone	1990 (1)	1996 (1)	Actual	% (2)	Estimated	% (2)	Estimated	% (2)	Forecast	% (2)	'96-'05	'05-'12
AN	--	--	4,481	12.2%	4,834	12.5%	4,983	12.6%	5,306	12.7%	--	9.8%
AS	--	--	6,702	21.3%	6,693	21.3%	6,690	21.3%	6,714	21.3%	--	0.3%
B	--	--	3,210	10.2%	3,196	10.3%	3,190	10.4%	3,214	10.5%	--	0.6%
C	--	--	2,684	9.7%	2,696	9.8%	2,701	9.8%	2,721	9.9%	--	0.9%
D	--	--	3,838	19.0%	3,891	18.9%	3,912	18.8%	3,995	18.7%	--	2.7%
E	--	--	2,326	21.4%	2,465	21.9%	2,523	22.1%	2,563	21.8%	--	4.0%
F	--	--	3,756	9.0%	4,259	9.4%	4,479	9.6%	4,945	9.9%	--	16.1%
GC	--	--	49,011	28.4%	49,677	28.5%	49,946	28.5%	50,716	28.6%	--	2.1%
GN	--	--	13,842	24.9%	14,166	24.6%	14,297	24.5%	14,628	24.2%	--	3.3%
GS	--	--	9,041	14.0%	8,892	14.0%	8,833	14.0%	8,826	14.0%	--	-0.7%
H	--	--	2,514	13.6%	2,568	13.7%	2,590	13.7%	2,645	13.7%	--	3.0%

Sources: Claritas, Inc; and CBRE Consulting.

(1) Data available between 2000 and 2012 only.
(2) Figure represents multifamily product of 3 to 19 units as a percent of total housing units in this pressure zone.
(3) Figures for 2000, 2007 (estimate) and 2012 (projection) are given by Claritas. 2005 figures were estimated by using the average annual compound growth rates between 2000 and 2007.

Exhibit 13
Multifamily Buildings: 20 to 49 Units
Pressure Zone Regions
Claritas Data
2000-2012

			2000		2005 (3)		2007		2012		% Change	% Change
Zone	1990 (1)	1996 (1)	Actual	% (2)	Estimated	% (2)	Estimated	% (2)	Forecast	% (2)	'96-'05	'05-'12
AN	--	--	1,274	3.5%	1,354	3.5%	1,388	3.5%	1,440	3.4%	--	6.3%
AS	--	--	2,853	9.1%	2,833	9.0%	2,825	9.0%	2,829	9.0%	--	-0.1%
B	--	--	627	2.0%	632	2.0%	634	2.1%	643	2.1%	--	1.7%
C	--	--	1,391	5.0%	1,396	5.1%	1,398	5.1%	1,410	5.1%	--	1.0%
D	--	--	361	1.8%	375	1.8%	381	1.8%	400	1.9%	--	6.6%
E	--	--	456	4.2%	472	4.2%	479	4.2%	498	4.2%	--	5.5%
F	--	--	745	1.8%	876	1.9%	935	2.0%	1,050	2.1%	--	19.8%
GC	--	--	18,282	10.6%	18,376	10.5%	18,414	10.5%	18,646	10.5%	--	1.5%
GN	--	--	2,374	4.3%	2,494	4.3%	2,544	4.4%	2,659	4.4%	--	6.6%
GS	--	--	3,845	5.9%	3,802	6.0%	3,785	6.0%	3,781	6.0%	--	-0.6%
H	--	--	1,546	8.4%	1,587	8.4%	1,603	8.5%	1,638	8.5%	--	3.2%

Sources: Claritas, Inc; and CBRE Consulting.

(1) Data available between 2000 and 2012 only.
(2) Figure represents multifamily product of 20 to 49 units as a percent of total housing units in this pressure zone.
(3) Figures for 2000, 2007 (estimate) and 2012 (projection) are given by Claritas. 2005 figures were estimated by using the average annual compound growth rates between 2000 and 2007.

Exhibit 14
Multifamily Buildings: 50 Units+
Pressure Zone Regions
Claritas Data
2000-2012

			2000		2005 (3)		2007		2012		% Change	% Change
Zone	1990 (1)	1996 (1)	Actual	% (2)	Estimated	% (2)	Estimated	% (2)	Forecast	% (2)	'96-'05	'05-'12
AN	--	--	1,203	3.3%	1,306	3.4%	1,350	3.4%	1,425	3.4%	--	9.1%
AS	--	--	941	3.0%	939	3.0%	938	3.0%	943	3.0%	--	0.4%
B	--	--	382	1.2%	378	1.2%	376	1.2%	379	1.2%	--	0.4%
C	--	--	1,768	6.4%	1,751	6.4%	1,744	6.4%	1,751	6.3%	--	0.0%
D	--	--	410	2.0%	421	2.0%	426	2.1%	428	2.0%	--	1.6%
E	--	--	476	4.4%	501	4.4%	511	4.5%	535	4.5%	--	6.9%
F	--	--	1,364	3.3%	1,528	3.4%	1,599	3.4%	1,757	3.5%	--	15.0%
GC	--	--	15,664	9.1%	16,136	9.3%	16,329	9.3%	16,835	9.5%	--	4.3%
GN	--	--	5,857	10.5%	6,708	11.6%	7,082	12.1%	7,859	13.0%	--	17.2%
GS	--	--	4,453	6.9%	4,398	6.9%	4,376	6.9%	4,370	6.9%	--	-0.6%
H	--	--	3,046	16.5%	3,161	16.8%	3,208	16.9%	3,309	17.1%	--	4.7%

Sources: Claritas, Inc; and CBRE Consulting.

(1) Data available between 2000 and 2012 only.
(2) Figure represents multifamily product of 50 units or more as a percent of total housing units in this pressure zone.
(3) Figures for 2000, 2007 (estimate) and 2012 (projection) are given by Claritas. 2005 figures were estimated by using the average annual compound growth rates between 2000 and 2007.

Exhibit 15
Percent of Total Units Vacant
Pressure Zone Regions
Claritas Data
2000-2012

Zone	1990 (1)	1996 (1)	2000	2005 (2)	2007	2012	% Change '96-'05	Change '05-'12
AN	--	--	2.6%	3.0%	3.2%	3.2%	--	0.2%
AS	--	--	3.7%	4.5%	4.9%	4.8%	--	0.3%
B	--	--	2.8%	3.5%	3.8%	3.7%	--	0.2%
C	--	--	2.1%	2.8%	3.1%	3.1%	--	0.3%
D	--	--	3.1%	4.0%	4.4%	4.3%	--	0.3%
E	--	--	3.9%	4.5%	4.7%	4.6%	--	0.2%
F	--	--	2.4%	3.2%	3.6%	3.6%	--	0.4%
GC	--	--	4.4%	6.0%	6.8%	6.7%	--	0.7%
GN	--	--	4.2%	5.6%	6.2%	6.2%	--	0.6%
GS	--	--	2.4%	3.2%	3.7%	3.6%	--	0.4%
H	--	--	2.5%	3.3%	3.7%	3.6%	--	0.3%

Sources: Claritas, Inc; and CBRE Consulting.

(1) Data available between 2000 and 2012 only.
(3) Figures for 2000, 2007 (estimate) and 2012 (projection) are given by Claritas. 2005 figures were estimated by using the average annual compound growth rates between 2000 and 2007.

Exhibit 16
Average Annual Growth Rates and Total Percent Growth by Housing Density
Pressure Zone Region
2000-2005

	Low Density					High Density				
	CAGR (1)					CAGR (1)				
Pressure Zone Region	SF-Detached	SF-Attached	2-4 Units	Total Low Density	Total % Change	5+ Units	Mobile	Total High Density	Total % Change	CAGR (1) Total Units
AN	1.5%	-0.1%	0.7%	1.3%	6.7%	2.6%	0.3%	2.2%	11.5%	1.4%
AS	0.3%	0.1%	0.1%	0.2%	1.2%	0.6%	0.1%	0.6%	3.1%	0.3%
B	0.2%	0.0%	0.1%	0.2%	0.8%	1.0%	0.0%	1.0%	5.0%	0.4%
C	0.4%	0.1%	0.4%	0.4%	2.0%	0.4%	0.0%	0.3%	1.6%	0.4%
D	0.1%	0.0%	0.2%	0.1%	0.5%	0.5%	0.0%	0.5%	2.5%	0.1%
E	0.2%	0.1%	1.1%	0.3%	1.3%	0.7%	0.0%	0.7%	3.8%	0.4%
F (2)	0.8%	0.3%	0.7%	0.7%	3.8%	0.8%	0.1%	0.8%	3.9%	0.7%
GC	0.3%	0.1%	0.2%	0.2%	1.1%	0.9%	0.0%	0.9%	4.4%	0.4%
GN	0.4%	0.7%	0.3%	0.4%	1.9%	1.3%	0.2%	1.2%	6.2%	0.6%
GS	0.4%	0.6%	0.2%	0.4%	1.9%	0.4%	0.0%	0.3%	1.7%	0.4%
H	0.3%	0.4%	1.3%	0.5%	2.6%	0.5%	-0.7%	0.5%	2.3%	0.5%

Sources: Economic Sciences Corporation; and CBRE Consulting.

(1) Compound average annual growth rate.
(2) The population of San Ramon was adjusted to take out the growth in Dougherty Valley, which is not serviced by EBMUD. Growth in Dougherty Valley was determined by the difference between city building permits (which exclude Dougherty Valley since the county issued the permits) and the growth in housing stock. The building permits issued by the city of San Ramon account for 23 percent of development within San Ramon. Therefore, the remaining 77 percent of population growth from 2000 to 2005 was from Dougherty Valley. Given that by 2005 Dougherty Valley was half developed, CBRE Consulting assumed that the second half would be completed between 2005 and 2010 with a corresponding doubling of new households and persons. These new households and persons were taken out of the 2005 and 2010 numbers. As this growth represented 18.5 percent of total population in 2010, 18.5 percent of population from San Ramon was subtracted out of each forecast year starting in 2015.

Exhibit 17
Institutional Apartment Stock and Vacancy Trends (1)
By Pressure Zone Region
1997 - 2005

Pressure Zone Region (2)	1997	1998	1999	2000	2001	2002	2003	2004	2005	% Change 1997 - 2005
AN										
Total Units	2,626	2,626	2,626	2,626	2,626	3,060	3,060	3,260	3,260	24.1%
Occupied Units	2,552	2,602	2,589	2,615	2,555	2,848	2,836	2,914	2,969	16.3%
Occupancy	97.2%	99.1%	98.6%	99.6%	97.3%	93.1%	92.7%	89.4%	91.1%	-6.3%
C										
Total Units	1,230	1,230	1,230	1,230	1,230	1,230	1,230	1,230	1,230	0.0%
Occupied Units	1,193	1,202	1,206	1,207	1,190	1,163	1,146	1,141	1,163	-2.5%
Occupancy	97.0%	97.7%	98.0%	98.1%	96.7%	94.6%	93.2%	92.8%	94.6%	-2.5%
F										
Total Units	3,028	3,028	3,028	3,028	3,093	3,093	3,093	3,093	4,093	35.2%
Occupied Units	2,770	2,909	2,825	2,906	2,947	2,969	2,947	2,941	3,700	33.6%
Occupancy	91.5%	96.1%	93.3%	96.0%	95.3%	96.0%	95.3%	95.1%	90.4%	-1.2%
GC										
Total Units	6,204	6,424	6,424	6,706	7,016	7,016	7,016	7,547	7,547	21.6%
Occupied Units	6,017	6,244	6,327	6,632	6,686	6,538	6,637	6,958	7,094	17.9%
Occupancy	97.0%	97.2%	98.5%	98.9%	95.3%	93.2%	94.6%	92.2%	94.0%	-3.1%
GS										
Total Units	4,662	4,662	4,662	4,662	4,662	4,662	4,662	4,662	4,662	0.0%
Occupied Units	4,489	4,536	4,559	4,587	4,517	4,475	4,447	4,428	4,433	-1.2%
Occupancy	96.3%	97.3%	97.8%	98.4%	96.9%	96.0%	95.4%	95.0%	95.1%	-1.2%
GN										
Total Units	2,325	2,325	2,325	2,325	2,325	2,325	2,396	2,727	2,885	24.1%
Occupied Units	2,266	2,299	2,294	2,301	2,220	2,201	2,257	2,476	2,688	18.6%
Occupancy	97.5%	98.9%	98.7%	99.0%	95.5%	94.7%	94.2%	90.8%	93.2%	-4.4%
H										
Total Units	3,260	3,260	3,260	3,260	3,260	3,376	3,376	3,376	3,376	3.6%
Occupied Units	3,165	3,158	3,204	3,191	3,126	3,207	3,193	3,176	3,227	2.0%
Occupancy	97.1%	96.9%	98.3%	97.9%	95.9%	95.0%	94.6%	94.1%	95.6%	-1.5%

Sources: RealFacts, Inc. and CBRE Consulting.

(1) Apartment buildings with over 50 units.
(2) Pressure Zone Regions AS, B, D and E were excluded because there were very few apartment buildings covered by RealFacts in those regions

Exhibit 18
Jobs By Industry Trend
Pressure Zone AN
1996 - 2040

Industry	1996 (1)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (3)	% Change '96-'05	% Change '05-'40
Agriculture and Natural Resources	39	87	66	75	71	68	64	64	62	59	66.4%	49.6%
Manufacture, Wholesale and Transportation	5,129	5,289	5,103	5,304	5,810	6,331	6,842	7,374	7,928	8,400	-0.5%	63.8%
Retail	2,712	2,902	2,980	3,145	3,422	3,719	4,036	4,362	4,713	5,052	9.9%	86.3%
Financial/Professional Services	2,749	3,198	3,267	3,603	4,119	4,623	5,130	5,682	6,282	6,919	18.8%	151.7%
Health, Education, and Recreation	6,568	7,436	8,216	8,910	9,837	10,808	11,769	12,790	13,881	15,176	25.1%	131.1%
Other Jobs (2)	2,507	2,837	2,989	3,231	3,564	3,907	4,286	4,683	5,096	5,541	19.2%	121.0%
Total Jobs	19,704	21,749	22,621	24,268	26,822	29,456	32,127	34,954	37,963	41,146		
% Change from Previous Period		10.4%	4.0%	7.3%	10.5%	9.8%	9.1%	8.8%	8.6%	8.4%		

Sources: Association of Bay Area Governments, *Projections 2007* ; California Employment Development Dept: Labor Market Information Division, *Industry Employment and Labor Force - By Annual Average, March 2006* ; and CBRE Consulting.

(1) Jobs for 1996 were estimated by taking the annual average growth rate by industry at the county level from 1996 to 2000 and applying it to each city. Alameda County compound annual average growth rates by sector were -7.65% for Agriculture and Natural Resources, 3.58% for Manufacturing, Wholesale, and Transportation, 1.92% for Retail, 6.34% for Financial/Professional Services, 1.80% for Health, Education, and Recreation, and 0.86% for Other jobs. Contra Costa County compound annual average growth rates by sector were 21.79% for Agriculture and Natural Resources, 0.77% for Manufacturing, Wholesale, and Transportation, 1.71% for Retail, 3.86% for Financial/Professional Services, 3.15% for Health, Education, and Recreation, and 3.13% for Other jobs.
(2) Other Jobs is comprised of NAICS sectors 23, 51, and 92: Construction, Information, and Public Administration.
(3) Projection was estimated by applying the average annual compound growth rate for the period 2000 to 2035.

Exhibit 19
Jobs By Industry Trend
Pressure Zone AS
1996 - 2040

Industry	1996 (1)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (3)	% Change '96-'05	% Change '05-'40
Agriculture and Natural Resources	17	18	17	17	17	16	15	15	15	15	0.1%	-15.9%
Manufacture, Wholesale and Transportation	1,591	1,822	1,617	1,663	1,689	1,705	1,732	1,758	1,788	1,783	1.6%	10.3%
Retail	1,110	1,197	1,128	1,187	1,230	1,259	1,298	1,336	1,367	1,394	1.7%	23.5%
Financial/Professional Services	2,072	2,641	2,617	2,719	2,823	2,914	3,010	3,114	3,191	3,278	26.3%	25.3%
Health, Education, and Recreation	6,084	6,543	6,528	6,918	7,244	7,475	7,740	8,036	8,316	8,606	7.3%	31.8%
Other Jobs (2)	6,227	6,451	6,426	6,808	7,124	7,343	7,595	7,878	8,146	8,422	3.2%	31.1%
Total Jobs	17,100	18,672	18,333	19,312	20,127	20,712	21,391	22,137	22,823	23,497		
% Change from Previous Period		9.2%	-1.8%	5.3%	4.2%	2.9%	3.3%	3.5%	3.1%	3.0%		

Sources: Association of Bay Area Governments, *Projections 2007* ; California Employment Development Dept: Labor Market Information Division, *Industry Employment and Labor Force - By Annual Average, March 2006* ; and CBRE Consulting.

(1) Jobs for 1996 were estimated by taking the annual average growth rate by industry at the county level from 1996 to 2000 and applying it to each city. Alameda County compound annual average growth rates by sector were -7.65% for Agriculture and Natural Resources, 3.58% for Manufacturing, Wholesale, and Transportation, 1.92% for Retail, 6.34% for Financial/Professional Services, 1.80% for Health, Education, and Recreation, and 0.86% for Other jobs. Contra Costa County compound annual average growth rates by sector were 21.79% for Agriculture and Natural Resources, 0.77% for Manufacturing, Wholesale, and Transportation, 1.71% for Retail, 3.86% for Financial/Professional Services, 3.15% for Health, Education, and Recreation, and 3.13% for Other jobs.
(2) Other Jobs is comprised of NAICS sectors 23, 51, and 92: Construction, Information, and Public Administration.
(3) Projection was estimated by applying the average annual compound growth rate for the period 2000 to 2035.

Exhibit 20
Jobs By Industry Trend
Pressure Zone B
1996 - 2040

Industry	1996 (1)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (3)	% Change '96-'05	% Change '05-'40
Agriculture and Natural Resources	21	15	14	15	16	15	15	15	15	15	-47.3%	3.1%
Manufacture, Wholesale and Transportation	2,140	2,463	2,273	2,400	2,477	2,519	2,597	2,674	2,733	2,774	5.9%	22.0%
Retail	702	758	756	823	874	922	986	1,046	1,091	1,149	7.1%	52.0%
Financial/Professional Services	1,568	2,006	2,097	2,248	2,388	2,530	2,704	2,878	3,001	3,179	25.2%	51.6%
Health, Education, and Recreation	3,384	3,634	3,830	4,187	4,494	4,784	5,148	5,520	5,833	6,241	11.7%	63.0%
Other Jobs (2)	1,738	1,799	1,854	1,961	2,047	2,133	2,236	2,332	2,407	2,509	6.2%	35.4%
Total Jobs	9,553	10,675	10,825	11,634	12,296	12,904	13,686	14,465	15,081	15,868		
% Change from Previous Period		11.7%	1.4%	7.5%	5.7%	4.9%	6.1%	5.7%	4.3%	5.2%		

Sources: Association of Bay Area Governments, *Projections 2007* ; California Employment Development Dept: Labor Market Information Division, *Industry Employment and Labor Force - By Annual Average, March 2006* ; and CBRE Consulting.

(1) Jobs for 1996 were estimated by taking the annual average growth rate by industry at the county level from 1996 to 2000 and applying it to each city. Alameda County compound annual average growth rates by sector were -7.65% for Agriculture and Natural Resources, 3.58% for Manufacturing, Wholesale, and Transportation, 1.92% for Retail, 6.34% for Financial/Professional Services, 1.80% for Health, Education, and Recreation, and 0.86% for Other jobs. Contra Costa County compound annual average growth rates by sector were 21.79% for Agriculture and Natural Resources, 0.77% for Manufacturing, Wholesale, and Transportation, 1.71% for Retail, 3.86% for Financial/Professional Services, 3.15% for Health, Education, and Recreation, and 3.13% for Other jobs.
(2) Other Jobs is comprised of NAICS sectors 23, 51, and 92: Construction, Information, and Public Administration.
(3) Projection was estimated by applying the average annual compound growth rate for the period 2000 to 2035.

Exhibit 21
Jobs By Industry Trend
Pressure Zone C
1996 - 2040

Industry	1996 (1)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (3)	% Change '96-'05	% Change '05-'40
Agriculture and Natural Resources	84	61	60	60	60	60	60	60	60	60	-29.3%	1.4%
Manufacture, Wholesale and Transportation	1,798	2,069	1,768	1,784	1,859	1,920	1,992	2,064	2,148	2,160	-1.7%	22.2%
Retail	1,635	1,765	1,578	1,625	1,730	1,840	1,963	2,078	2,199	2,269	-3.5%	43.8%
Financial/Professional Services	2,258	2,888	2,710	2,748	2,919	3,112	3,325	3,527	3,725	3,863	20.0%	42.6%
Health, Education, and Recreation	7,031	7,551	7,136	7,389	7,944	8,506	9,152	9,776	10,473	10,974	1.5%	53.8%
Other Jobs (2)	2,427	2,512	2,305	2,309	2,416	2,529	2,659	2,772	2,904	2,964	-5.0%	28.6%
Total Jobs	15,233	16,847	15,555	15,914	16,929	17,968	19,152	20,278	21,509	22,291		
% Change from Previous Period		10.6%	-7.7%	2.3%	6.4%	6.1%	6.6%	5.9%	6.1%	3.6%		

Sources: Association of Bay Area Governments, *Projections 2007* ; California Employment Development Dept: Labor Market Information Division, *Industry Employment and Labor Force - By Annual Average, March 2006* ; and CBRE Consulting.

(1) Jobs for 1996 were estimated by taking the annual average growth rate by industry at the county level from 1996 to 2000 and applying it to each city. Alameda County compound annual average growth rates by sector were -7.65% for Agriculture and Natural Resources, 3.58% for Manufacturing, Wholesale, and Transportation, 1.92% for Retail, 6.34% for Financial/Professional Services, 1.80% for Health, Education, and Recreation, and 0.86% for Other jobs. Contra Costa County compound annual average growth rates by sector were 21.79% for Agriculture and Natural Resources, 0.77% for Manufacturing, Wholesale, and Transportation, 1.71% for Retail, 3.86% for Financial/Professional Services, 3.15% for Health, Education, and Recreation, and 3.13% for Other jobs.
(2) Other Jobs is comprised of NAICS sectors 23, 51, and 92: Construction, Information, and Public Administration.
(3) Projection was estimated by applying the average annual compound growth rate for the period 2000 to 2035.

Exhibit 22
Jobs By Industry Trend
Pressure Zone D
1996 - 2040

Industry	1996 (1)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (3)	% Change '96-'05	% Change '05-'40
Agriculture and Natural Resources	28	62	61	61	61	61	61	61	61	61	116.5%	-0.4%
Manufacture, Wholesale and Transportation	830	856	792	789	777	776	775	774	783	774	-4.6%	-2.4%
Retail	1,055	1,129	1,111	1,120	1,140	1,170	1,202	1,232	1,265	1,253	5.3%	12.8%
Financial/Professional Services	2,702	3,144	3,051	3,125	3,252	3,368	3,488	3,605	3,734	3,695	12.9%	21.1%
Health, Education, and Recreation	4,823	5,461	5,788	5,967	6,119	6,273	6,451	6,645	6,841	6,865	20.0%	18.6%
Other Jobs (2)	1,438	1,627	1,636	1,646	1,654	1,683	1,714	1,745	1,777	1,800	13.7%	10.1%
Total Jobs	10,877	12,280	12,439	12,708	13,004	13,332	13,691	14,063	14,462	14,448		
% Change from Previous Period		12.9%	1.3%	2.2%	2.3%	2.5%	2.7%	2.7%	2.8%	-0.1%		

Sources: Association of Bay Area Governments, *Projections 2007* ; California Employment Development Dept: Labor Market Information Division, *Industry Employment and Labor Force - By Annual Average, March 2006* ; and CBRE Consulting.

(1) Jobs for 1996 were estimated by taking the annual average growth rate by industry at the county level from 1996 to 2000 and applying it to each city. Alameda County compound annual average growth rates by sector were -7.65% for Agriculture and Natural Resources, 3.58% for Manufacturing, Wholesale, and Transportation, 1.92% for Retail, 6.34% for Financial/Professional Services, 1.80% for Health, Education, and Recreation, and 0.86% for Other jobs. Contra Costa County compound annual average growth rates by sector were 21.79% for Agriculture and Natural Resources, 0.77% for Manufacturing, Wholesale, and Transportation, 1.71% for Retail, 3.86% for Financial/Professional Services, 3.15% for Health, Education, and Recreation, and 3.13% for Other jobs.
(2) Other Jobs is comprised of NAICS sectors 23, 51, and 92: Construction, Information, and Public Administration.
(3) Projection was estimated by applying the average annual compound growth rate for the period 2000 to 2035.

Exhibit 23
Jobs By Industry Trend
Pressure Zone E
1996 - 2040

Industry	1996 (1)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (3)	% Change '96-'05	% Change '05-'40
Agriculture and Natural Resources	11	23	14	13	13	12	12	12	12	11	31.1%	-19.2%
Manufacture, Wholesale and Transportation	892	920	864	837	818	810	807	802	795	778	-3.1%	-10.0%
Retail	1,316	1,408	1,421	1,417	1,425	1,435	1,469	1,485	1,516	1,532	8.0%	7.8%
Financial/Professional Services	3,201	3,725	3,763	3,834	3,941	4,038	4,181	4,304	4,432	4,543	17.6%	20.7%
Health, Education, and Recreation	4,015	4,546	5,021	5,139	5,184	5,241	5,363	5,445	5,532	5,689	25.1%	13.3%
Other Jobs (2)	1,477	1,670	1,755	1,761	1,746	1,744	1,765	1,786	1,812	1,834	18.8%	4.5%
Total Jobs	10,911	12,293	12,838	13,002	13,128	13,280	13,597	13,834	14,099	14,387		
% Change from Previous Period		12.7%	4.4%	1.3%	1.0%	1.2%	2.4%	1.7%	1.9%	2.0%		

Sources: Association of Bay Area Governments, *Projections 2007* ; California Employment Development Dept: Labor Market Information Division, *Industry Employment and Labor Force - By Annual Average, March 2006* ; and CBRE Consulting.

(1) Jobs for 1996 were estimated by taking the annual average growth rate by industry at the county level from 1996 to 2000 and applying it to each city. Alameda County compound annual average growth rates by sector were -7.65% for Agriculture and Natural Resources, 3.58% for Manufacturing, Wholesale, and Transportation, 1.92% for Retail, 6.34% for Financial/Professional Services, 1.80% for Health, Education, and Recreation, and 0.86% for Other jobs. Contra Costa County compound annual average growth rates by sector were 21.79% for Agriculture and Natural Resources, 0.77% for Manufacturing, Wholesale, and Transportation, 1.71% for Retail, 3.86% for Financial/Professional Services, 3.15% for Health, Education, and Recreation, and 3.13% for Other jobs.
(2) Other Jobs is comprised of NAICS sectors 23, 51, and 92: Construction, Information, and Public Administration.
(3) Projection was estimated by applying the average annual compound growth rate for the period 2000 to 2035.

Exhibit 24
Jobs By Industry Trend
Pressure Zone F
1996 - 2040

Industry	1996 (1)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (3)	% Change '96-'05	% Change '05-'40
Agriculture and Natural Resources	255	562	562	564	557	527	537	517	497	488	119.9%	-13.1%
Manufacture, Wholesale and Transportation	7,212	7,438	6,844	7,057	7,357	7,697	8,036	8,294	8,561	8,735	-5.1%	27.6%
Retail	5,955	6,373	6,352	6,776	7,172	7,636	8,111	8,526	8,968	9,416	6.7%	48.2%
Financial/Professional Services	15,215	17,703	17,394	18,997	20,746	22,505	24,256	25,903	27,597	29,404	14.3%	69.0%
Health, Education, and Recreation	11,440	12,953	13,941	15,262	16,202	17,244	18,250	19,212	20,191	21,513	21.9%	54.3%
Other Jobs (2)	12,695	14,362	14,646	15,839	16,913	18,093	19,274	20,336	21,403	22,658	15.4%	54.7%
Total Jobs	52,773	59,391	59,739	64,495	68,947	73,701	78,463	82,787	87,217	92,214		
% Change from Previous Period		12.5%	0.6%	8.0%	6.9%	6.9%	6.5%	5.5%	5.4%	5.7%		

Sources: Association of Bay Area Governments, *Projections 2007* ; California Employment Development Dept: Labor Market Information Division, *Industry Employment and Labor Force - By Annual Average, March 2006* ; and CBRE Consulting.

(1) Jobs for 1996 were estimated by taking the annual average growth rate by industry at the county level from 1996 to 2000 and applying it to each city. Alameda County compound annual average growth rates by sector were -7.65% for Agriculture and Natural Resources, 3.58% for Manufacturing, Wholesale, and Transportation, 1.92% for Retail, 6.34% for Financial/Professional Services, 1.80% for Health, Education, and Recreation, and 0.86% for Other jobs. Contra Costa County compound annual average growth rates by sector were 21.79% for Agriculture and Natural Resources, 0.77% for Manufacturing, Wholesale, and Transportation, 1.71% for Retail, 3.86% for Financial/Professional Services, 3.15% for Health, Education, and Recreation, and 3.13% for Other jobs.
(2) Other Jobs is comprised of NAICS sectors 23, 51, and 92: Construction, Information, and Public Administration.
(3) Projection was estimated by applying the average annual compound growth rate for the period 2000 to 2035.

Exhibit 25
Jobs By Industry Trend
Pressure Zone GC
1996 - 2040

Industry	1996 (1)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (3)	% Change '96-'05	% Change '05-'40
Agriculture and Natural Resources	379	294	277	286	301	293	292	283	282	280	-26.9%	0.9%
Manufacture, Wholesale and Transportation	44,152	50,612	46,525	49,030	50,962	52,164	54,062	55,997	57,333	58,363	5.4%	25.4%
Retail	18,195	19,629	19,344	20,981	22,522	23,930	25,734	27,557	28,726	30,332	6.3%	56.8%
Financial/Professional Services	36,530	46,602	48,266	51,696	55,512	59,288	63,788	68,489	71,447	75,944	32.1%	57.3%
Health, Education, and Recreation	82,408	88,628	91,831	100,043	108,264	116,503	126,471	136,893	145,260	155,883	11.4%	69.7%
Other Jobs (2)	37,816	39,220	40,171	42,559	45,003	47,284	50,055	52,746	54,507	57,131	6.2%	42.2%
Total Jobs	219,480	244,985	246,414	264,594	282,565	299,462	320,401	341,965	357,554	377,933		
% Change from Previous Period		11.6%	0.6%	7.4%	6.8%	6.0%	7.0%	6.7%	4.6%	5.7%		

Sources: Association of Bay Area Governments, *Projections 2007* ; California Employment Development Dept: Labor Market Information Division, *Industry Employment and Labor Force - By Annual Average, March 2006* ; and CBRE Consulting.

(1) Jobs for 1996 were estimated by taking the annual average growth rate by industry at the county level from 1996 to 2000 and applying it to each city. Alameda County compound annual average growth rates by sector were -7.65% for Agriculture and Natural Resources, 3.58% for Manufacturing, Wholesale, and Transportation, 1.92% for Retail, 6.34% for Financial/Professional Services, 1.80% for Health, Education, and Recreation, and 0.86% for Other jobs. Contra Costa County compound annual average growth rates by sector were 21.79% for Agriculture and Natural Resources, 0.77% for Manufacturing, Wholesale, and Transportation, 1.71% for Retail, 3.86% for Financial/Professional Services, 3.15% for Health, Education, and Recreation, and 3.13% for Other jobs.
(2) Other Jobs is comprised of NAICS sectors 23, 51, and 92: Construction, Information, and Public Administration.
(3) Projection was estimated by applying the average annual compound growth rate for the period 2000 to 2035.

Exhibit 26
Jobs By Industry Trend
Pressure Zone GN
1996 - 2040

Industry	1996 (1)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (3)	% Change '96-'05	% Change '05-'40
Agriculture and Natural Resources	203	237	217	217	211	211	204	204	198	193	6.8%	-11.2%
Manufacture, Wholesale and Transportation	15,701	16,991	15,668	16,125	16,831	17,583	18,302	19,098	19,933	20,393	-0.2%	30.2%
Retail	11,710	12,605	12,271	13,095	14,184	15,189	16,365	17,640	18,529	19,577	4.8%	59.5%
Financial/Professional Services	15,274	18,951	30,842	32,538	34,590	36,620	38,627	40,851	42,963	48,293	101.9%	56.6%
Health, Education, and Recreation	34,873	38,086	38,934	41,649	44,206	46,491	48,840	51,429	54,080	56,858	11.6%	46.0%
Other Jobs (2)	12,344	13,241	13,350	13,977	14,665	15,380	16,101	16,857	17,676	18,421	8.1%	38.0%
Total Jobs	90,105	100,111	111,281	117,601	124,688	131,473	138,439	146,079	153,379	163,734		
% Change from Previous Period		11.1%	11.2%	5.7%	6.0%	5.4%	5.3%	5.5%	5.0%	6.8%		

Sources: Association of Bay Area Governments, *Projections 2007* ; California Employment Development Dept: Labor Market Information Division, *Industry Employment and Labor Force - By Annual Average, March 2006* ; and CBRE Consulting.

(1) Jobs for 1996 were estimated by taking the annual average growth rate by industry at the county level from 1996 to 2000 and applying it to each city. Alameda County compound annual average growth rates by sector were -7.65% for Agriculture and Natural Resources, 3.58% for Manufacturing, Wholesale, and Transportation, 1.92% for Retail, 6.34% for Financial/Professional Services, 1.80% for Health, Education, and Recreation, and 0.86% for Other jobs. Contra Costa County compound annual average growth rates by sector were 21.79% for Agriculture and Natural Resources, 0.77% for Manufacturing, Wholesale, and Transportation, 1.71% for Retail, 3.86% for Financial/Professional Services, 3.15% for Health, Education, and Recreation, and 3.13% for Other jobs.
(2) Other Jobs is comprised of NAICS sectors 23, 51, and 92: Construction, Information, and Public Administration.
(3) Projection was estimated by applying the average annual compound growth rate for the period 2000 to 2035.

Exhibit 27
Jobs By Industry Trend
Pressure Zone GS
1996 - 2040

Industry	1996 (1)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (3)	% Change '96-'05	% Change '05-'40
Agriculture and Natural Resources	242	176	163	164	176	175	175	174	174	174	-32.7%	6.9%
Manufacture, Wholesale and Transportation	18,929	21,791	19,121	19,703	20,482	21,336	22,290	23,177	24,123	24,476	1.0%	28.0%
Retail	9,691	10,458	9,839	10,423	11,374	12,510	13,735	14,907	16,021	17,028	1.5%	73.1%
Financial/Professional Services	8,724	11,157	11,155	11,724	12,587	13,688	14,852	15,982	16,973	18,022	27.9%	61.6%
Health, Education, and Recreation	19,164	20,583	20,643	22,117	24,534	27,253	30,210	33,189	36,237	39,286	7.7%	90.3%
Other Jobs (2)	8,871	9,182	9,053	9,409	10,001	10,730	11,474	12,154	12,831	13,459	2.1%	48.7%
Total Jobs	65,621	73,347	69,974	73,540	79,155	85,693	92,736	99,583	106,359	112,444		
% Change from Previous Period		11.8%	-4.6%	5.1%	7.6%	8.3%	8.2%	7.4%	6.8%	5.7%		

Sources: Association of Bay Area Governments, *Projections 2007* ; California Employment Development Dept: Labor Market Information Division, *Industry Employment and Labor Force - By Annual Average, March 2006* ; and CBRE Consulting.

(1) Jobs for 1996 were estimated by taking the annual average growth rate by industry at the county level from 1996 to 2000 and applying it to each city. Alameda County compound annual average growth rates by sector were -7.65% for Agriculture and Natural Resources, 3.58% for Manufacturing, Wholesale, and Transportation, 1.92% for Retail, 6.34% for Financial/Professional Services, 1.80% for Health, Education, and Recreation, and 0.86% for Other jobs. Contra Costa County compound annual average growth rates by sector were 21.79% for Agriculture and Natural Resources, 0.77% for Manufacturing, Wholesale, and Transportation, 1.71% for Retail, 3.86% for Financial/Professional Services, 3.15% for Health, Education, and Recreation, and 3.13% for Other jobs.
(2) Other Jobs is comprised of NAICS sectors 23, 51, and 92: Construction, Information, and Public Administration.
(3) Projection was estimated by applying the average annual compound growth rate for the period 2000 to 2035.

Exhibit 28
Jobs By Industry Trend
Pressure Zone H
1996 - 2040

Industry	1996 (1)	2000	2005	2010	2015	2020	2025	2030	2035	2040 (3)	% Change '96-'05	% Change '05-'40
Agriculture and Natural Resources	35	76	69	61	53	46	46	46	46	41	98.9%	-39.7%
Manufacture, Wholesale and Transportation	4,017	4,143	3,795	3,795	3,780	3,795	3,889	3,962	3,991	3,959	-5.5%	4.3%
Retail	5,475	5,859	5,765	5,866	5,990	6,159	6,450	6,726	6,931	7,078	5.3%	22.8%
Financial/Professional Services	13,652	15,885	15,458	16,079	16,849	17,590	18,677	19,714	20,528	21,227	13.2%	37.3%
Health, Education, and Recreation	12,779	14,469	15,370	16,029	16,482	16,999	17,870	18,684	19,238	19,971	20.3%	29.9%
Other Jobs (2)	4,050	4,582	4,633	4,742	4,801	4,904	5,114	5,318	5,463	5,602	14.4%	20.9%
Total Jobs	40,008	45,013	45,090	46,571	47,956	49,493	52,047	54,450	56,198	57,878		
% Change from Previous Period		12.5%	0.2%	3.3%	3.0%	3.2%	5.2%	4.6%	3.2%	3.0%		

Sources: Association of Bay Area Governments, *Projections 2007* ; California Employment Development Dept: Labor Market Information Division, *Industry Employment and Labor Force - By Annual Average, March 2006* ; and CBRE Consulting.

(1) Jobs for 1996 were estimated by taking the annual average growth rate by industry at the county level from 1996 to 2000 and applying it to each city. Alameda County compound annual average growth rates by sector were -7.65% for Agriculture and Natural Resources, 3.58% for Manufacturing, Wholesale, and Transportation, 1.92% for Retail, 6.34% for Financial/Professional Services, 1.80% for Health, Education, and Recreation, and 0.86% for Other jobs. Contra Costa County compound annual average growth rates by sector were 21.79% for Agriculture and Natural Resources, 0.77% for Manufacturing, Wholesale, and Transportation, 1.71% for Retail, 3.86% for Financial/Professional Services, 3.15% for Health, Education, and Recreation, and 3.13% for Other jobs.
(2) Other Jobs is comprised of NAICS sectors 23, 51, and 92: Construction, Information, and Public Administration.
(3) Projection was estimated by applying the average annual compound growth rate for the period 2000 to 2035.

Exhibit 29
Historical Inventory of Industrial Space (1)
1997 - 2005

	1997	1998	1999	2000	2001	2002	2003	2004	2005	Net % Change(2)
West of the Hills:										
Richmond										
Total Stock	12,045,606	12,045,606	12,178,015	12,501,690	12,582,614	12,880,617	12,577,410	12,759,927	12,860,993	6.3%
Occupied Stock	N/A	11,521,048	11,510,157	12,174,647	11,634,387	11,899,264	11,405,447	11,836,090	12,037,553	4.3%
Occupancy	N/A	95.6%	94.5%	97.4%	92.5%	92.4%	90.7%	92.8%	93.6%	-2.2%
Berkeley										
Total Stock	6,932,793	6,932,793	7,427,069	7,316,693	7,459,852	7,331,391	7,248,937	7,304,201	7,501,158	7.6%
Occupied Stock	N/A	6,888,153	7,269,079	7,114,991	7,120,058	7,068,238	7,011,481	7,176,414	7,458,033	7.6%
Occupancy	N/A	99.4%	97.9%	97.2%	95.4%	96.4%	96.7%	98.3%	99.4%	0.1%
Emeryville										
Total Stock	7,203,005	7,203,005	7,455,048	7,448,480	7,566,602	4,145,833	4,174,311	4,243,553	3,376,939	-113.3%
Occupied Stock	N/A	6,791,660	7,152,657	7,333,508	7,294,333	3,720,959	3,789,514	3,941,928	3,206,536	-111.8%
Occupancy	N/A	94.3%	95.9%	98.5%	96.4%	89.8%	90.8%	92.9%	95.0%	0.7%
Oakland										
Total Stock	35,301,392	35,301,392	35,342,424	36,612,080	38,246,614	32,246,620	32,682,005	33,072,432	33,351,998	-5.8%
Occupied Stock	N/A	31,936,837	33,531,830	35,201,035	35,541,997	30,382,226	30,640,391	30,901,233	31,981,740	0.1%
Occupancy	N/A	90.5%	94.9%	96.1%	92.9%	94.2%	93.8%	93.4%	95.9%	5.7%
Alameda										
Total Stock	2,169,148	2,169,148	2,334,871	2,270,422	2,270,522	3,485,253	3,541,253	4,130,361	4,383,566	50.5%
Occupied Stock	N/A	2,044,871	2,334,871	2,270,422	2,207,497	3,082,253	3,251,143	3,352,186	3,424,872	40.3%
Occupancy	N/A	94.3%	100.0%	100.0%	97.2%	88.4%	91.8%	81.2%	78.1%	-20.7%
San Leandro										
Total Stock	22,380,393	22,380,393	22,545,292	22,822,767	23,254,945	22,005,011	22,018,887	22,220,846	22,376,531	0.0%
Occupied Stock	N/A	20,430,896	21,931,198	22,045,023	22,347,332	20,555,927	20,687,499	20,711,801	21,235,600	3.8%
Occupancy	N/A	91.3%	97.3%	96.6%	96.1%	93.4%	94.0%	93.2%	94.9%	3.8%
San Lorenzo										
Total Stock	1,057,994	1,057,994	1,095,994	1,057,994	1,057,994	1,057,994	1,162,389	1,154,729	1,154,729	8.4%
Occupied Stock	N/A	1,057,994	1,095,994	1,057,994	1,047,794	1,057,994	1,063,784	1,049,784	1,084,389	2.4%
Occupancy	N/A	100.0%	100.0%	100.0%	99.0%	100.0%	91.5%	90.9%	93.9%	-6.5%
Hayward										
Total Stock	37,718,047	37,718,047	39,080,019	39,670,599	40,322,090	39,487,425	40,086,731	40,490,268	41,009,032	8.0%
Occupied Stock	N/A	36,448,691	37,191,043	38,444,566	38,303,435	36,044,880	36,732,991	37,424,111	37,935,459	3.9%
Occupancy	N/A	96.6%	95.2%	96.9%	95.0%	91.3%	91.6%	92.4%	92.5%	-4.5%
East of the Hills:										
San Ramon										
Total Stock	N/A	N/A	1,294,544	1,419,637	1,419,637	N/A	1,313,758	1,349,366	1,349,366	4.1%
Occupied Stock	N/A	N/A	1,294,544	1,396,724	1,395,637	N/A	1,296,818	1,296,818	1,313,868	1.5%
Occupancy	N/A	N/A	100.0%	98.4%	98.3%	N/A	98.7%	96.1%	97.4%	-2.7%

Sources: CBRE Local Market Reports; and CBRE Consulting.

(1) Includes Warehouse, Industrial, and Flex Space. Primary industrial markets 'east of the hills' fall outside of the studied pressure zone regions, i.e., Dublin, Pleasanton, and Livermor
(2) Percentage change is measured over the span of time for which data are available in each city.

Exhibit 30
Historical Inventory of Office Space
1997 - 2005

	1997	1998	1999	2000	2001	2002	2003	2004	2005	Net % Change(1)
West of the Hills:										
Richmond										
Total Stock	N/A	N/A	821,905	1,003,801	1,067,615	1,099,515	1,357,142	1,367,142	1,367,142	39.9%
Occupied Stock	N/A	N/A	769,071	977,752	906,673	923,691	974,064	828,178	1,024,832	25.0%
Occupancy	N/A	N/A	93.6%	97.4%	84.9%	84.0%	71.8%	60.6%	75.0%	-24.8%
Berkeley Central Business District										
Total Stock	N/A	1,337,920	1,437,470	1,390,210	1,424,840	1,445,692	1,380,766	1,385,656	1,396,956	4.2%
Occupied Stock	N/A	1,283,065	1,398,716	1,382,145	1,254,310	1,260,631	1,196,182	1,210,043	1,238,299	-3.6%
Occupancy	N/A	95.9%	97.3%	99.4%	88.0%	87.2%	86.6%	87.3%	88.6%	-8.2%
Berkeley West										
Total Stock	N/A	855,257	1,437,470	1,390,210	1,424,840	1,445,692	1,380,766	1,385,656	1,263,304	32.3%
Occupied Stock	N/A	797,100	1,133,274	1,165,737	1,106,605	1,078,219	1,045,067	1,115,943	1,202,328	33.7%
Occupancy	N/A	93.2%	78.8%	83.9%	77.7%	74.6%	75.7%	80.5%	95.2%	2.1%
Emeryville										
Total Stock	N/A	2,666,712	3,349,989	3,616,289	4,064,382	4,412,533	4,412,533	4,404,533	4,417,433	39.6%
Occupied Stock	N/A	2,493,376	3,250,104	3,409,374	2,975,064	3,350,260	3,583,784	3,602,187	3,828,926	34.9%
Occupancy	N/A	93.5%	97.0%	94.3%	73.2%	75.9%	81.2%	81.8%	86.7%	-7.9%
Oakland Airport										
Total Stock	N/A	1,882,785	1,877,835	1,848,413	1,892,662	1,911,406	1,910,497	1,909,997	1,909,997	1.4%
Occupied Stock	N/A	1,606,016	1,760,335	1,698,141	1,685,282	1,628,580	1,605,752	1,515,135	1,516,248	-5.9%
Occupancy	N/A	85.3%	93.7%	91.9%	89.0%	85.2%	84.0%	79.3%	79.4%	-7.5%
Oakland Central Business District										
Total Stock	N/A	8,967,961	9,120,263	10,058,224	10,052,714	11,587,886	11,590,746	11,670,740	11,775,579	23.8%
Occupied Stock	N/A	7,676,575	8,310,385	9,758,020	8,988,388	9,777,402	9,868,866	10,156,993	10,445,297	26.5%
Occupancy	N/A	85.6%	91.1%	97.0%	89.4%	84.4%	85.1%	87.0%	88.7%	3.5%
Oakland Jack London Square										
Total Stock	N/A	734,334	724,334	826,334	826,334	840,334	847,833	804,897	865,157	15.1%
Occupied Stock	N/A	687,337	703,398	817,157	721,921	712,203	731,173	656,264	763,468	10.0%
Occupancy	N/A	93.6%	97.1%	98.9%	87.4%	84.8%	86.2%	81.5%	88.2%	-6.1%
City of Alameda										
Total Stock	N/A	2,771,247	3,323,355	3,403,355	3,651,029	3,847,749	3,774,395	3,668,100	3,666,766	24.4%
Occupied Stock	N/A	2,405,130	3,173,661	3,245,210	3,256,091	3,238,567	2,852,562	2,810,185	2,747,327	12.5%
Occupancy	N/A	86.8%	95.5%	95.4%	89.2%	84.2%	75.6%	76.6%	74.9%	-15.8%
San Leandro										
Total Stock	N/A	630,933	630,933	630,933	628,365	576,868	576,868	639,311	639,311	1.3%
Occupied Stock	N/A	604,434	614,031	630,933	621,696	504,242	512,179	575,824	566,970	-6.6%
Occupancy	N/A	95.8%	97.3%	100.0%	98.9%	87.4%	88.8%	90.1%	88.7%	-8.0%
Walnut Creek Downtown										
Total Stock	4,790,059	N/A	4,797,784	4,805,983	4,805,983	5,007,983	4,975,983	4,976,983	4,901,013	2.3%
Occupied Stock	4,538,102	N/A	4,524,790	4,761,783	4,503,411	4,478,745	4,478,223	4,428,892	4,506,949	-0.7%
Occupancy	94.7%	N/A	94.3%	99.1%	93.7%	89.4%	90.0%	89.0%	92.0%	-3.0%
East of the Hills:										
Walnut Creek Ygnacio										
Total Stock	2,822,730	N/A	2,919,443	2,784,180	2,229,918	2,783,103	2,783,103	2,783,103	2,783,103	-1.4%
Occupied Stock	2,611,025	N/A	2,876,235	2,576,865	2,523,011	2,520,240	2,430,898	2,365,789	2,520,507	-3.6%
Occupancy	92.5%	N/A	98.5%	92.6%	113.1%	90.6%	87.3%	85.0%	90.6%	-2.1%
Pleasant Hill BART										
Total Stock	1,095,516	N/A	1,470,516	1,470,516	1,470,516	1,665,516	1,665,516	1,665,516	1,665,516	34.2%
Occupied Stock	1,040,850	N/A	1,363,168	1,454,334	1,332,063	1,421,910	1,519,818	1,459,227	1,563,279	33.4%
Occupancy	95.0%	N/A	92.7%	98.9%	90.6%	85.4%	91.3%	87.6%	93.9%	-1.2%
Pleasant Hill										
Total Stock	1,141,041	N/A	1,140,541	1,140,940	1,125,771	1,141,170	1,141,170	1,141,170	1,153,098	1.0%
Occupied Stock	1,018,265	N/A	1,131,417	1,095,863	1,074,316	1,034,533	1,018,633	996,766	1,029,648	1.1%
Occupancy	89.2%	N/A	99.2%	96.0%	95.4%	90.7%	89.3%	87.3%	89.3%	0.1%

continued

Exhibit 30
Historical Inventory of Office Space
1997 - 2005

	1997	1998	1999	2000	2001	2002	2003	2004	2005	Net % Change(1)
Lamorinda										
Total Stock	1,067,482	N/A	1,067,482	1,067,482	1,067,482	1,067,482	1,067,482	1,065,882	1,060,860	-0.6%
Occupied Stock	1,031,294	N/A	1,045,278	1,057,716	1,017,438	1,005,636	990,677	992,929	1,014,672	-1.6%
Occupancy	96.6%	N/A	97.9%	99.1%	95.3%	94.2%	92.8%	93.2%	95.6%	-1.0%
Alamo										
Total Stock	N/A	N/A	123,220	123,220	123,220	123,220	123,220	123,220	123,220	0.0%
Occupied Stock	N/A	N/A	122,875	123,220	120,441	122,405	113,455	120,720	116,520	-5.5%
Occupancy	N/A	N/A	99.7%	100.0%	97.7%	99.3%	92.1%	98.0%	94.6%	-5.5%
Danville										
Total Stock	N/A	N/A	364,481	394,481	432,481	432,481	432,481	432,481	432,481	15.7%
Occupied Stock	N/A	N/A	350,594	372,781	387,117	409,743	415,327	389,399	397,141	11.7%
Occupancy	N/A	N/A	96.2%	94.5%	89.5%	94.7%	96.0%	90.0%	91.8%	-4.7%
San Ramon										
Total Stock	N/A	4,665,352	5,007,356	5,543,704	6,027,378	6,292,378	6,476,378	6,467,578	6,462,670	27.8%
Occupied Stock	N/A	4,488,069	4,904,204	5,484,549	5,501,882	5,223,752	5,143,778	5,535,334	5,648,576	20.5%
Occupancy	N/A	96.2%	97.9%	98.9%	91.3%	83.0%	79.4%	85.6%	87.4%	-10.1%

Sources: CBRE Local Market Reports; and CBRE Consulting

(1) Percentage change is measured over the span of time for which data is available in each city.

Exhibit 31
Taxable Retail Sales
Pressure Zone Regions By Share of City in Region (1)
1996 and 2005 (in 2005 Dollars, in Thousands)

Pressure Zone Region	Adjusted % of City Population in Region (2)	In 2005 Dollars 1996 (3)	In 2005 Dollars 2005	% Change '96-'05	Adjusted for % Pop in Region 1996	Adjusted for % Pop in Region 2005	% Change '96-'05
AN							
Hercules	100.0%	$ 23,167	$ 82,702	257.0%	$ 23,163	$ 82,685	257.0%
Richmond	22.6%	$ 731,321	$ 941,586	28.8%	$ 165,279	$ 212,798	28.8%
Pinole	99.4%	$ 242,837	$ 292,996	20.7%	$ 241,429	$ 291,297	20.7%
San Pablo	9.4%	$ 122,997	$ 129,025	4.9%	$ 11,513	$ 12,077	4.9%
Region Total		$ 1,120,323	$ 1,446,309	29.1%	$ 441,383	$ 598,857	35.7%
AS							
Berkeley	13.7%	$ 975,178	$ 1,004,633	3.0%	$ 133,200	$ 137,223	3.0%
El Cerrito	2.3%	$ 209,398	$ 284,895	36.1%	$ 4,750	$ 6,463	36.1%
Oakland	1.4%	$ 2,161,477	$ 2,594,818	20.0%	$ 30,865	$ 37,053	20.0%
San Pablo	1.2%	$ 122,997	$ 129,025	4.9%	$ 1,439	$ 1,510	4.9%
Richmond	0.4%	$ 731,321	$ 941,586	28.8%	$ 2,935	$ 3,778	28.8%
Region Total		$ 4,200,371	$ 4,954,957	18.0%	$ 173,189	$ 186,027	7.4%
B							
Oakland	5.1%	$ 2,161,477	$ 2,594,818	20.0%	$ 109,781	$ 131,791	20.0%
Piedmont	20.0%	$ 12,606	$ 14,782	17.3%	$ 2,521	$ 2,956	17.3%
Berkeley	0.1%	$ 975,178	$ 1,004,633	3.0%	$ 1,234	$ 1,272	3.0%
Region Total		$ 3,149,261	$ 3,614,233	14.8%	$ 113,537	$ 136,019	19.8%
C							
Hayward	4.0%	$ 1,440,660	$ 1,537,933	6.8%	$ 57,727	$ 61,624	6.8%
San Leandro	1.3%	$ 1,129,801	$ 1,378,296	22.0%	$ 15,150	$ 18,482	22.0%
Region Total		$ 2,570,461	$ 2,916,229	13.5%	$ 72,877	$ 80,106	9.9%
D							
Orinda	100.0%	$ 65,159	$ 70,392	8.0%	$ 65,159	$ 70,392	8.0%
Moraga	100.0%	$ 68,726	$ 66,060	-3.9%	$ 68,726	$ 66,060	-3.9%
Lafayette	9.8%	$ 162,740	$ 183,865	13.0%	$ 15,949	$ 18,019	13.0%
Region Total		$ 296,626	$ 320,317	8.0%	$ 149,834	$ 154,471	3.1%

Exhibit 31
Taxable Retail Sales
Pressure Zone Regions By Share of City in Region (1)
1996 and 2005 (in 2005 Dollars, in Thousands)

Pressure Zone Region	Adjusted % of City Population in Region (2)	In 2005 Dollars 1996 (3)	In 2005 Dollars 2005	% Change '96-'05	Adjusted for % Pop in Region 1996	Adjusted for % Pop in Region 2005	% Change '96-'05
E							
Lafayette	90.0%	$ 162,740	$ 183,865	13.0%	$ 146,515	$ 165,534	13.0%
Walnut Creek	4.0%	$ 1,279,318	$ 1,553,305	21.4%	$ 51,173	$ 62,132	21.4%
Pleasant Hill	0.2%	$ 481,256	$ 576,204	19.7%	$ 745	$ 893	19.7%
		$ 1,923,315	$ 2,313,374	20.3%	$ 198,433	$ 228,558	15.2%
F							
San Ramon	100.0%	$ 435,497	$ 498,496	14.5%	$ 435,497	$ 498,496	14.5%
Danville	100.0%	$ 284,807	$ 347,459	22.0%	$ 284,807	$ 347,459	22.0%
Walnut Creek	1.0%	$ 1,279,318	$ 1,553,305	21.4%	$ 12,793	$ 15,533	21.4%
Region Total		$ 1,999,622	$ 2,399,260	20.0%	$ 733,097	$ 861,488	17.5%
GC							
Oakland	84.2%	$ 2,161,477	$ 2,594,818	20.0%	$ 1,819,553	$ 2,184,344	20.0%
Alameda	99.5%	$ 488,136	$ 449,677	-7.9%	$ 485,563	$ 447,306	-7.9%
Berkeley	32.7%	$ 975,178	$ 1,004,633	3.0%	$ 318,827	$ 328,457	3.0%
Richmond	13.2%	$ 731,321	$ 941,586	28.8%	$ 96,739	$ 124,552	28.8%
El Cerrito	19.8%	$ 209,398	$ 284,895	36.1%	$ 41,367	$ 56,281	36.1%
Piedmont	80.0%	$ 12,606	$ 14,782	17.3%	$ 10,085	$ 11,826	17.3%
Emeryville	39.9%	$ 400,379	$ 556,062	38.9%	$ 159,644	$ 221,721	38.9%
San Pablo	6.5%	$ 122,997	$ 129,025	4.9%	$ 8,013	$ 8,406	4.9%
Albany	1.0%	$ 90,819	$ 141,043	55.3%	$ 881	$ 1,368	55.3%
Region Total		$ 5,192,311	$ 6,116,521	17.8%	$ 2,940,672	$ 3,384,261	15.1%
GN							
Richmond	62.8%	$ 731,321	$ 941,586	28.8%	$ 459,101	$ 591,099	28.8%
San Pablo	83.0%	$ 122,997	$ 129,025	4.9%	$ 102,028	$ 107,028	4.9%
Berkeley	53.5%	$ 975,178	$ 1,004,633	3.0%	$ 521,925	$ 537,690	3.0%
Albany	99.0%	$ 90,819	$ 141,043	55.3%	$ 89,938	$ 139,675	55.3%
El Cerrito	78.0%	$ 209,398	$ 284,895	36.1%	$ 163,292	$ 222,165	36.1%
Emeryville	60.1%	$ 400,379	$ 556,062	38.9%	$ 240,734	$ 334,341	38.9%
Oakland	1.0%	$ 2,161,477	$ 2,594,818	20.0%	$ 20,555	$ 24,676	20.0%
Region Total		$ 4,691,569	$ 5,652,062	20.5%	$ 1,597,573	$ 1,956,675	22.5%

Exhibit 31
Taxable Retail Sales
Pressure Zone Regions By Share of City in Region (1)
1996 and 2005 (in 2005 Dollars, in Thousands)

Pressure Zone Region	Adjusted % of City Population in Region (2)	In 2005 Dollars 1996 (3)	In 2005 Dollars 2005	% Change '96-'05	Adjusted for % Pop in Region 1996	Adjusted for % Pop in Region 2005	% Change '96-'05
GS							
San Leandro	98.7%	$ 1,129,801	$ 1,378,296	22.0%	$ 1,114,651	$ 1,359,814	22.0%
Oakland	8.3%	$ 2,161,477	$ 2,594,818	20.0%	$ 179,737	$ 215,771	20.0%
Hayward	4.0%	$ 1,440,660	$ 1,537,933	6.8%	$ 57,046	$ 60,898	6.8%
Region Total		$ 4,731,938	$ 5,511,047	16.5%	$ 1,351,434	$ 1,636,483	21.1%
H							
Walnut Creek	72.0%	$ 1,279,318	$ 1,553,305	21.4%	$ 921,109	$ 1,118,380	21.4%
Pleasant Hill	1.0%	$ 481,256	$ 576,204	19.7%	$ 4,813	$ 5,762	19.7%
Lafayette	0.1%	$ 162,740	$ 183,865	13.0%	$ 222	$ 251	13.0%
Region Total		$ 1,923,315	$ 2,313,374	20.3%	$ 926,144	$ 1,124,393	21.4%

Sources: California Board of Equalization's *Taxable Sales in California (Sales & Use Tax)* during 1996 and 2005; Economic Sciences Corporation; and CBRE Consulting.

(1) For this exhibit, unincorporated areas were disregarded.
(2) The city shares were adjusted to account the difference between population and employment distribution. See Appendix B for the calculations. Because the El Cerrito hills does not have much employment, 95 percent of the share in El Ceritto in PZR AS was moved to the share of El Cerrito in region GN (flatlands). Berkeley's hills do have some employment related to the University, but still less than other parts of Berkeley and so 70 percent of the share of Berkeley in PZR AS was moved to the share of Berkeley in region GN. In addition, 95 percent of the share of Oakland in region B was moved to the share of Oakland in region GC. Other employment adjustments were 31.5 percent of Lafayette moved from region D to region E. Although only 66.1 percent of Walnut Creek's population is in the East Bay Municipal Utility District all of the employment is considered to be in the district, largely in PZR H. Most of Piedmont's employment (80 percent) is considered to be in PZR GC. For Albany, almost all of the employment (99 percent) is considered to be in region GN. These adjustments were made based upon professional knowledge of the geographic distribution of the employment base in the respective cities.
(3) The 1996 figures were inflation adjusted using the consumer price index for all urban consumers in the San Francisco-Oakland-San Jose metropolitan statistical area. Between 1996 and 2005 the price index increased by 30.7 percent; therefore, 1996 figures were adjusted upwards by 30.7 percent.

Exhibit 32
Retail Construction
Pressure Zone Regions By Share of City in Region (1)
Retail Base from Taxable Retail Sales Data
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	1996 in 2005 Dollars Base (3)	1996 to 2005 New Space (Sq. Ft.) Total (4)	Adjusted	% Change '96-'05
AN					
Hercules	100.0%	66,179	160,140	160,108	241.9%
Richmond	22.6%	472,224	343,077	77,535	16.4%
Pinole	99.4%	689,797	183,779	182,714	26.5%
San Pablo	9.4%	32,893	73,094	6,842	20.8%
Total		1,261,094	760,090	427,198	33.9%
AS				-	
Berkeley	13.7%	380,570	302,170	41,273	10.8%
El Cerrito	2.3%	13,572	227,565	5,162	38.0%
Oakland	1.4%	88,186	1,393,011	19,892	22.6%
San Pablo	1.2%	4,112	73,094	855	20.8%
Richmond	0.4%	8,385	343,077	1,377	16.4%
Total		494,825	2,338,917	68,559	13.9%
B					
Oakland	5.1%	313,661	1,393,011	70,751	22.6%
Piedmont	20.0%	7,204	-	-	0.0%
Berkeley	0.1%	3,527	302,170	382	10.8%
Total		324,391	1,695,181	71,134	21.9%
C					
Hayward	4.0%	164,934	595,272	23,852	14.5%
San Leandro	1.3%	43,285	1,504,195	20,170	46.6%
Total		208,219	2,099,467	44,023	21.1%
D					
Orinda	100.0%	186,170	-	-	0.0%
Moraga	100.0%	196,360	-	-	0.0%
Lafayette	9.8%	45,567	-	-	0.0%
Total		428,097	-	-	0.0%
E					
Lafayette	90.0%	418,614	-	-	0.0%
Walnut Creek	4.0%	146,208	560,701	22,428	15.3%
Pleasant Hill	0.2%	2,130	450,397	698	32.8%
Total		566,952	1,011,098	23,126	4.1%
F					
San Ramon	100.0%	1,244,276	392,513	392,513	31.5%
Danville	100.0%	813,735	113,342	113,342	13.9%
Walnut Creek	1.0%	36,552	560,701	5,607	15.3%
Total		2,094,563	1,066,556	511,462	24.4%
GC					
Oakland	84.2%	5,198,723	1,393,011	1,172,651	22.6%
Alameda	99.5%	1,387,322	170,386	169,487	12.2%
Berkeley	32.7%	910,935	302,170	98,792	10.8%
Richmond	13.2%	276,396	343,077	45,382	16.4%
El Cerrito	19.8%	118,190	227,565	44,955	38.0%
Piedmont	80.0%	28,815	-	-	0.0%
Emeryville	39.9%	456,127	1,335,861	532,608	116.8%
San Pablo	6.5%	22,895	73,094	4,758	20.8%
Albany	1.0%	2,517	-	-	0.0%
Total		8,401,920	3,845,164	2,068,634	24.6%

Exhibit 32
Retail Construction
Pressure Zone Regions By Share of City in Region (1)
Retail Base from Taxable Retail Sales Data
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	1996 in 2005 Dollars Base (3)	1996 to 2005 New Space (Sq. Ft.) Total (4)	1996 to 2005 New Space (Sq. Ft.) Adjusted	% Change '96-'05
GN					
Richmond	62.8%	1,311,717	343,077	215,373	16.4%
San Pablo	83.0%	291,508	73,094	60,632	20.8%
Berkeley	53.5%	1,491,214	302,170	161,724	10.8%
Albany	99.0%	256,966	-	-	0.0%
El Cerrito	78.0%	466,547	227,565	177,459	38.0%
Emeryville	60.1%	687,813	1,335,861	803,209	116.8%
Oakland	1.0%	58,729	1,393,011	13,247	22.6%
Total		4,564,495	3,674,778	1,431,644	31.4%
GS					
San Leandro	98.7%	3,184,717	1,504,195	1,484,025	46.6%
Oakland	8.3%	513,534	1,393,011	115,835	22.6%
Hayward	4.0%	162,989	595,272	23,571	14.5%
Total		3,861,240	3,492,478	1,623,431	42.0%
H					
Walnut Creek	72.0%	2,631,740	560,701	403,705	15.3%
Pleasant Hill	1.0%	13,750	450,397	4,504	32.8%
Lafayette	0.1%	636	-	-	0.0%
Total		2,646,126	1,011,098	408,209	15.4%

Sources: Construction Industry Research Board's *Private Non-Residential Building in Building Permits* ; and CBRE Consulting.

(1) For this exhibit, unincorporated areas were disregarded.
(2) The city shares were adjusted to account the difference between population and employment distribution. See Appendix B for the calculations. Because the El Cerrito hills does not have much employment, 95 percent of the share in El Ceritto in PZR AS was moved to the share of El Cerrito in region GN (flatlands). Berkeley's hills do have some employment related to the University, but still less than other parts of Berkeley and so 70 percent of the share of Berkeley in PZR AS was moved to the share of Berkeley in region GN. In addition, 95 percent of the share of Oakland in region B was moved to the share of Oakland in region GC. Other employment adjustments were 31.5 percent of Lafayette moved from region D to region E. Although only 66.1 percent of Walnut Creek's population is in the East Bay Municipal Utility District all of the employment is considered to be in the district, largely in PZR H. Most of Piedmont's employment (80 percent) is considered to be in PZR GC. For Albany, almost all of the employment (99 percent) is considered to be in region GN. These adjustments were made based upon professional knowledge of the geographic distribution of the employment base in the respective cities.
(3) The 1996 retail sales base from Exhibit 31 was multiplied times 1,000 and then divided by an industry standard of $350 sales per square foot to get a square foot base number.
(4) Data from the value of retail building permits from the Construction Industry Research Board.

Exhibit 33
Retail Construction
Pressure Zone Regions By Share of City in Region (1)
Retail Base from Retail Employment
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	1996 Base (3)	1996 to 2005 New Space (Sq. Ft.) Total (4)	Adjusted	% Change '96-'05
AN					
Hercules	100.0%		160,140	160,108	
Richmond	22.6%		343,077	77,535	
Pinole	99.4%		183,779	182,714	
San Pablo	9.4%		73,094	6,842	
Total		1,355,862	760,090	427,198	31.5%
AS				-	
Berkeley	13.7%		302,170	41,273	
El Cerrito	2.3%		227,565	5,162	
Oakland	1.4%		1,393,011	19,892	
San Pablo	1.2%		73,094	855	
Richmond	0.4%		343,077	1,377	
Total		554,789	2,338,917	68,559	12.4%
B					
Oakland	5.1%		1,393,011	70,751	
Piedmont	20.0%		-	-	
Berkeley	0.1%		302,170	382	
Total		351,202	1,695,181	71,134	20.3%
C					
Hayward	4.0%		595,272	23,852	
San Leandro	1.3%		1,504,195	20,170	
Total		817,736	2,099,467	44,023	5.4%
D					
Orinda	100.0%		-	-	
Moraga	100.0%		-	-	
Lafayette	9.8%		-	-	
Total		527,544	-	-	0.0%
E					
Lafayette	90.0%		-	-	
Walnut Creek	4.0%		560,701	22,428	
Pleasant Hill	0.2%		450,397	698	
Total		657,867	1,011,098	23,126	3.5%
F					
San Ramon	100.0%		392,513	392,513	
Danville	100.0%		113,342	113,342	
Walnut Creek	1.0%		560,701	5,607	
Total		2,977,502	1,066,556	511,462	17.2%
GC					
Oakland	84.2%		1,393,011	1,172,651	
Alameda	99.5%		170,386	169,487	
Berkeley	32.7%		302,170	98,792	
Richmond	13.2%		343,077	45,382	
El Cerrito	19.8%		227,565	44,955	
Piedmont	80.0%		-	-	
Emeryville	39.9%		1,335,861	532,653	
San Pablo	6.5%		73,094	4,762	
Albany	1.0%		-	-	
Total		9,097,334	3,845,164	2,068,683	22.7%

Exhibit 33
Retail Construction
Pressure Zone Regions By Share of City in Region (1)
Retail Base from Retail Employment
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	1996 Base (3)	1996 to 2005 New Space (Sq. Ft.) Total (4)	Adjusted	% Change '96-'05
GN					
Richmond	62.8%		343,077	215,373	
San Pablo	83.0%		73,094	60,632	
Berkeley	53.5%		302,170	161,724	
Albany	99.0%		-	-	
El Cerrito	78.0%		227,565	177,459	
Emeryville	60.1%		1,335,861	803,209	
Oakland	1.0%		1,393,011	13,247	
Total		5,855,242	3,674,778	1,431,644	24.5%
GS					
San Leandro	98.7%		1,504,195	1,484,025	
Oakland	8.3%		1,393,011	115,835	
Hayward	4.0%		595,272	23,571	
Total		4,845,368	3,492,478	1,623,431	33.5%
H					
Walnut Creek	72.0%		560,701	403,705	
Pleasant Hill	1.0%		450,397	4,504	
Lafayette	0.1%		-	-	
Total		2,737,285	1,011,098	408,209	14.9%

Sources: Construction Industry Research Board's *Private Non-Residential Building in Building Permits* ; and CBRE Consulting.

(1) For this exhibit, unincorporated areas were disregarded.
(2) The city shares were adjusted to account the difference between population and employment distribution. See Appendix B for the calculations. Because the El Cerrito hills does not have much employment, 95 percent of the share in El Ceritto in PZR AS was moved to the share of El Cerrito in region GN (flatlands). Berkeley's hills do have some employment related to the University, but still less than other parts of Berkeley and so 70 percent of the share of Berkeley in PZR AS was moved to the share of Berkeley in region GN. In addition, 95 percent of the share of Oakland in region B was moved to the share of Oakland in region GC. Other employment adjustments were 31.5 percent of Lafayette moved from region D to region E. Although only 66.1 percent of Walnut Creek's population is in the East Bay Municipal Utility District all of the employment is considered to be in the district, largely in PZR H. Most of Piedmont's employment (80 percent) is considered to be in PZR GC. For Albany, almost all of the employment (99 percent) is considered to be in region GN. These adjustments were made based upon professional knowledge of the geographic distribution of the employment base in the respective cities.
(3) Base created using retail employment data from Exhibits 18 through 28. Employment numbers were multiplied times 500 square feet per employee to get the base square feet.
(4) Data from the value of retail building permits from the Construction Industry Research Board.

Exhibit 34
Office and Industrial Construction
Pressure Zone Regions By Share of City in Region (1)
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	Base (3)	1996 to 2005 New Space (Sq. Ft.) Total (4)	1996 to 2005 New Space (Sq. Ft.) Adjusted	% Change '96-'05
AN					
Hercules	100.0%		172,769	172,734	
Richmond	22.6%		1,049,086	237,093	
Pinole	99.4%		4,893	4,864	
San Pablo	9.4%		2,652	248	
Total		16,623,996	1,229,399	414,940	2%
AS				-	
Berkeley	13.7%		713,668	97,480	
El Cerrito	2.3%		-	-	
Oakland	1.4%		1,768,459	25,253	
San Pablo	1.2%		2,652	31	
Richmond	0.4%		1,049,086	4,210	
Total		523,572	3,533,865	126,974	24%
B					
Oakland	5.1%		1,768,459	89,820	
Piedmont	20.0%		-	-	
Berkeley	0.1%		713,668	903	
Total		2,882,242	2,482,127	90,723	3%
C					
Hayward	4.0%		2,198,234	88,083	
San Leandro	1.3%		1,646,338	22,076	
Total		615,826	3,844,573	110,159	18%
D					
Orinda	100.0%		-	-	
Moraga	100.0%		-	-	
Lafayette	9.8%		-	-	
Total		2,209,738	-	-	0%
E					
Lafayette	90.0%		-	-	
Walnut Creek	4.0%		296,576	11,863	
Pleasant Hill	0.2%		33,530	52	
Total		1,713,198	330,106	11,915	1%
F					
San Ramon	100.0%		1,064,610	1,064,610	
Danville	100.0%		15,991	15,991	
Walnut Creek	1.0%		296,576	2,966	
Total		11,570,972	1,377,176	1,083,566	9%

Exhibit 34
Office and Industrial Construction
Pressure Zone Regions By Share of City in Region (1)
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	Base (3)	1996 to 2005 New Space (Sq. Ft.) Total (4)	Adjusted	% Change '96-'05
<u>GC</u>					
Oakland	84.2%		1,768,459	1,488,706	
Alameda	99.5%		712,876	709,118	
Berkeley	32.7%		713,668	233,329	
Richmond	13.2%		1,049,086	138,772	
El Cerrito	19.8%		-	-	
Piedmont	80.0%		-	-	
Emeryville	39.9%		741,935	295,834	
San Pablo	6.5%		2,652	173	
Albany	1.0%		-	-	
Total		70,820,194	4,988,676	2,865,932	4%
<u>GN</u>					
Richmond	62.8%		1,049,086	658,584	
San Pablo	83.0%		2,652	2,200	
Berkeley	53.5%		713,668	381,962	
Albany	99.0%		-	-	
El Cerrito	78.0%		-	-	
Emeryville	60.1%		741,935	446,101	
Oakland	1.0%		1,768,459	16,818	
Total		48,154,787	4,275,800	1,505,665	3%
<u>GS</u>					
San Leandro	98.7%		1,646,338	1,624,262	
Oakland	8.3%		1,768,459	147,056	
Hayward	4.0%		2,198,234	87,044	
Total		33,331,932	5,613,031	1,858,362	6%
<u>H</u>					
Walnut Creek	72.0%		296,576	213,535	
Pleasant Hill	1.0%		33,530	335	
Lafayette	0.1%		-	-	
Total		3,581,353	330,106	213,870	6%

Sources: Construction Industry Research Board's *Private Non-Residential Building in Building Permits*; and CBRE Consulting.

(1) For this exhibit, unincorporated areas were disregarded.
(2) The city shares were adjusted to account the difference between population and employment distribution. See Appendix B for the calculations. Because the El Cerrito hills does not have much employment, 95 percent of the share in El Ceritto in PZR AS was moved to the share of El Cerrito in region GN (flatlands). Berkeley's hills do have some employment related to the University, but still less than other parts of Berkeley and so 70 percent of the share of Berkeley in PZR AS was moved to the share of Berkeley in region GN. In addition, 95 percent of the share of Oakland in region B was moved to the share of Oakland in region GC. Other employment adjustments were 31.5 percent of Lafayette moved from region D to region E. Although only 66.1 percent of Walnut Creek's population is in the East Bay Municipal Utility District all of the employment is considered to be in the district, largely in PZR H. Most of Piedmont's employment (80 percent) is considered to be in PZR GC. For Albany, almost all of the employment (99 percent) is considered to be in region GN. These adjustments were made based upon professional knowledge of the geographic distribution of the employment base in the respective cities.
(3) Base created by the number of acres in land use codes EO (Office and Industrial), EIL (Low Intensity Industrial), and EOH (High Density Office) multiplied by a floor area ratio of .35 and converted to square feet.
(4) Data from the value of office and industrial building permits from the Construction Industry Research

Exhibit 35
Industrial Construction
Pressure Zone Regions By Share of City in Region (1)
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	1996 to 2005 New Space (Sq. Ft.) Total (4)	Adjusted
AN			
Hercules	100.0%	-	-
Richmond	22.6%	799,128	180,603
Pinole	99.4%	2,939	2,922
San Pablo	9.4%	-	-
Total		802,067	183,525
AS			-
Berkeley	13.7%	616,591	84,220
El Cerrito	2.3%	-	-
Oakland	1.4%	868,466	12,401
San Pablo	1.2%	-	-
Richmond	0.4%	799,128	3,207
Total		2,284,185	99,828
B			
Oakland	5.1%	868,466	44,109
Piedmont	20.0%	-	-
Berkeley	0.1%	616,591	780
Total		1,485,057	44,890
C			
Hayward	4.0%	1,908,829	76,486
San Leandro	1.3%	1,404,037	18,827
Total		3,312,866	95,313
D			
Orinda	100.0%	-	-
Moraga	100.0%	-	-
Lafayette	9.8%	-	-
Total		-	-
E			
Lafayette	90.0%	-	-
Walnut Creek	4.0%	19,872	795
Pleasant Hill	0.2%	13,887	22
Total		33,759	816
F			
San Ramon	100.0%	58,174	58,174
Danville	100.0%	-	-
Walnut Creek	1.0%	19,872	199
Total		78,047	58,373
GC			
Oakland	84.2%	868,466	731,083
Alameda	99.5%	474,554	472,052
Berkeley	32.7%	616,591	201,590
Richmond	13.2%	799,128	105,708
El Cerrito	19.8%	-	-
Piedmont	80.0%	-	-
Emeryville	39.9%	277,354	110,590
San Pablo	6.5%	-	-
Albany	1.0%	-	-
Total		3,036,093	1,621,024

Exhibit 35
Industrial Construction
Pressure Zone Regions By Share of City in Region (1)
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	1996 to 2005 New Space (Sq. Ft.) Total (4)	Adjusted
GN			
Richmond	62.8%	799,128	501,668
San Pablo	83.0%	-	-
Berkeley	53.5%	616,591	330,006
Albany	99.0%	-	-
El Cerrito	78.0%	-	-
Emeryville	60.1%	277,354	166,764
Oakland	1.0%	868,466	8,259
Total		2,561,539	1,006,697
GS			
San Leandro	98.7%	1,404,037	1,385,210
Oakland	8.3%	868,466	72,217
Hayward	4.0%	1,908,829	75,584
Total		4,181,332	1,533,011
H			
Walnut Creek	72.0%	19,872	14,308
Pleasant Hill	1.0%	13,887	139
Lafayette	0.1%	-	-
Total		33,759	14,447

Sources: Construction Industry Research Board's *Private Non-Residential Building in Building Permits* ; and CBRE Consulting.

(1) For this exhibit, unincorporated areas were disregarded.
(2) The city shares were adjusted to account the difference between population and employment distribution. See Appendix B for the calculations. Because the El Cerrito hills does not have much employment, 95 percent of the share in El Ceritto in PZR AS was moved to the share of El Cerrito in region GN (flatlands). Berkeley's hills do have some employment related to the University, but still less than other parts of Berkeley and so 70 percent of the share of Berkeley in PZR AS was moved to the share of Berkeley in region GN. In addition, 95 percent of the share of Oakland in region B was moved to the share of Oakland in region GC. Other employment adjustments were 31.5 percent of Lafayette moved from region D to region E. Although only 66.1 percent of Walnut Creek's population is in the East Bay Municipal Utility District all of the employment is considered to be in the district, largely in PZR H. Most of Piedmont's employment (80 percent) is considered to be in PZR GC. For Albany, almost all of the employment (99 percent) is considered to be in region GN. These adjustments were made based upon professional knowledge of the geographic distribution of the employment base in the respective cities.
(4) Data from the value of industrial building permits from the Construction Industry Research Board.

Exhibit 36
Office Construction
Pressure Zone Regions By Share of City in Region (1)
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	1996 to 2005 New Space (Sq. Ft.) Total (4)	Adjusted
AN			
Hercules	100.0%	172,769	172,734
Richmond	22.6%	249,958	56,491
Pinole	99.4%	1,954	1,943
San Pablo	9.4%	2,652	248
Total		427,333	231,416
AS			-
Berkeley	13.7%	97,077	13,260
El Cerrito	2.3%	-	-
Oakland	1.4%	899,993	12,852
San Pablo	1.2%	2,652	31
Richmond	0.4%	249,958	1,003
Total		1,249,679	27,145
B			
Oakland	5.1%	899,993	45,711
Piedmont	20.0%	-	-
Berkeley	0.1%	97,077	123
Total		997,069	45,833
C			
Hayward	4.0%	289,405	11,596
San Leandro	1.3%	242,302	3,249
Total		531,707	14,845
D			
Orinda	100.0%	-	-
Moraga	100.0%	-	-
Lafayette	9.8%	-	-
Total		-	-
E			
Lafayette	90.0%	-	-
Walnut Creek	4.0%	276,703	11,068
Pleasant Hill	0.2%	19,643	30
Total		296,346	11,099
F			
San Ramon	100.0%	1,006,435	1,006,435
Danville	100.0%	15,991	15,991
Walnut Creek	1.0%	276,703	2,767
Total		1,299,129	1,025,193
GC			
Oakland	84.2%	899,993	757,623
Alameda	99.5%	238,322	237,065
Berkeley	32.7%	97,077	31,739
Richmond	13.2%	249,958	33,064
El Cerrito	19.8%	-	-
Piedmont	80.0%	-	-
Emeryville	39.9%	464,581	185,244
San Pablo	6.5%	2,652	173
Albany	1.0%	-	-
Total		1,952,582	1,244,908

Exhibit 36
Office Construction
Pressure Zone Regions By Share of City in Region (1)
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	1996 to 2005 New Space (Sq. Ft.) Total (4)	Adjusted
GN			
Richmond	62.8%	249,958	156,916
San Pablo	83.0%	2,652	2,200
Berkeley	53.5%	97,077	51,956
Albany	99.0%	-	-
El Cerrito	78.0%	-	-
Emeryville	60.1%	464,581	279,337
Oakland	1.0%	899,993	8,559
Total		1,714,260	498,968
GS			
San Leandro	98.7%	242,302	239,052
Oakland	8.3%	899,993	74,839
Hayward	4.0%	289,405	11,460
Total		1,431,700	325,351
H			
Walnut Creek	72.0%	276,703	199,226
Pleasant Hill	1.0%	19,643	196
Lafayette	0.1%	-	-
Total		296,346	199,423

Sources: Construction Industry Research Board's *Private Non-Residential Building in Building Permits* ; and CBRE Consulting.

(1) For this exhibit, unincorporated areas were disregarded.
(2) The city shares were adjusted to account the difference between population and employment distribution. See Appendix B for the calculations. Because the El Cerrito hills does not have much employment, 95 percent of the share in El Ceritto in PZR AS was moved to the share of El Cerrito in region GN (flatlands). Berkeley's hills do have some employment related to the University, but still less than other parts of Berkeley and so 70 percent of the share of Berkeley in PZR AS was moved to the share of Berkeley in region GN. In addition, 95 percent of the share of Oakland in region B was moved to the share of Oakland in region GC. Other employment adjustments were 31.5 percent of Lafayette moved from region D to region E. Although only 66.1 percent of Walnut Creek's population is in the East Bay Municipal Utility District all of the employment is considered to be in the district, largely in PZR H. Most of Piedmont's employment (80 percent) is considered to be in PZR GC. For Albany, almost all of the employment (99 percent) is considered to be in region GN. These adjustments were made based upon professional knowledge of the geographic distribution of the employment base in the respective cities.
(4) Data from the value of office building permits from the Construction Industry Research Board.

Exhibit 37
Hotel Construction
Pressure Zone Regions By Share of City in Region (1)
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	1996 to 2005 New Space (Sq. Ft.) Total (4)	1996 to 2005 New Space (Sq. Ft.) Adjusted
AN			
Hercules	100.0%	-	-
Richmond	22.6%	-	-
Pinole	99.4%	-	-
Total		-	-
AS			-
Berkeley	13.7%	30,294	4,138
Total		30,294	4,138
B			
Piedmont	20.0%	-	-
Total		-	-
C			
Total		-	-
D			
Orinda	100.0%	-	-
Moraga	100.0%	-	-
Lafayette	9.8%	-	-
Total		-	-
E			
Lafayette	90.0%	-	-
Total		-	-
F			
San Ramon	100.0%	134,956	134,956
Danville	100.0%	-	-
Total		134,956	134,956
GC			
Oakland	84.2%	536,817	451,898
Alameda	99.5%	112,762	112,168
Berkeley	32.7%	30,294	9,904
Richmond	13.2%	-	-
El Cerrito	19.8%	-	-
Piedmont	80.0%	-	-
Emeryville	39.9%	289,834	115,566
Albany	1.0%	-	-
Total		969,706	689,536

Exhibit 37
Hotel Construction
Pressure Zone Regions By Share of City in Region (1)
1996 to 2005

Pressure Zone Region	Adjusted % of City Population in Region (2)	1996 to 2005 New Space (Sq. Ft.) Total (4)	Adjusted
GN			
Richmond	62.8%	-	-
San Pablo	83.0%	-	-
Berkeley	53.5%	30,294	16,213
Albany	99.0%	-	-
El Cerrito	78.0%	-	-
Emeryville	60.1%	289,834	174,267
Total		320,127	190,481
GS			
San Leandro	98.7%	-	-
Total		-	-
H			
Walnut Creek	72.0%	-	-
Pleasant Hill	1.0%	236,243	2,362
Total		236,243	2,362

Sources: Construction Industry Research Board's *Private Non-Residential Building in Building Permits* ; and CBRE Consulting.

(1) For this exhibit, unincorporated areas were disregarded as well as cities where their share of population in the region was 10 percent or less.
(2) The city shares were adjusted to account the difference between population and employment distribution. See Appendix B for the calculations. Because the El Cerrito hills does not have much employment, 95 percent of the share in El Ceritto in PZR AS was moved to the share of El Cerrito in region GN (flatlands). Berkeley's hills do have some employment related to the University, but still less than other parts of Berkeley and so 70 percent of the share of Berkeley in PZR AS was moved to the share of Berkeley in region GN. In addition, 95 percent of the share of Oakland in region B was moved to the share of Oakland in region GC. Other employment adjustments were 31.5 percent of Lafayette moved from region D to region E. Although only 66.1 percent of Walnut Creek's population is in the East Bay Municipal Utility District all of the employment is considered to be in the district, largely in PZR H. Most of Piedmont's employment (80 percent) is considered to be in PZR GC. For Albany, almost all of the employment (99 percent) is considered to be in region GN. These adjustments were based upon professional knowledge of the geographic distribution of the employment base in the respective cities.
(4) Data from the value of hotel building permits from the Construction Industry Research Board.

Exhibit 38
School Enrollment and School Employment
Pressure Zone Regions By Share of City in Region
1995-1996 School Year

Pressure Zone Region	Public School District	Public Schools	Private Schools	Public & Private Schools Total	Share of City in PZR	Adjusted Public & Private Schools Total
AN						
Hercules	WEST CONTRA COSTA UNIFIED	1,373 (1)	N/A	1,373	100.0%	1,373
Richmond	WEST CONTRA COSTA UNIFIED	12,470 (1)	N/A	12,470	22.6%	2,818
Pinole	WEST CONTRA COSTA UNIFIED	5,189 (1)	N/A	5,189	99.4%	5,159
San Pablo	WEST CONTRA COSTA UNIFIED	5,776 (1)	N/A	5,776	9.4%	541
El Sobrante	WEST CONTRA COSTA UNIFIED	2,285 (1)	N/A	2,285	91.5%	2,090
All	WEST CONTRA COSTA UNIFIED	N/A	5,536 (2)	5,536	0.0% (3)	-
Rodeo/Crockett	JOHN SWETT UNIFIED	2,305	492	2,797	0.0% (3)	-
Region Total Unincorporated		29,398	6,028	35,426		11,980
AS						
Berkeley	BERKELEY UNIFIED	8,777	2,296	11,073	45.5%	5,042
El Cerrito	WEST CONTRA COSTA UNIFIED	4,239 (1)	-	4,239	45.4%	1,923
Oakland	OAKLAND UNIFIED	55,075	10,130	65,205	1.4%	931
San Pablo	WEST CONTRA COSTA UNIFIED	5,776 (1)	-	5,776	1.2%	68
Richmond	WEST CONTRA COSTA UNIFIED	12,470 (1)	-	12,470	0.4%	50
Kensington	WEST CONTRA COSTA UNIFIED	562 (1)	-	562	91.9%	517
El Sobrante	WEST CONTRA COSTA UNIFIED	2,285 (1)	-	2,285	8.5%	195
All	WEST CONTRA COSTA UNIFIED	N/A	5,536 (2)	5,536	0.0% (3)	-
Region Total Unincorporated		89,184	17,962	107,146		8,725
B						
Oakland	OAKLAND UNIFIED	55,075	10,130	65,205	16.9%	11,036
Piedmont	PIEDMONT CITY UNIFIED	2,756	485	3,241	60.7%	1,967
Berkeley	BERKELEY UNIFIED	8,777	2,296	11,073	0.1%	14
Region Total Unincorporated		66,608	12,911	79,519		13,018
C (4)						
San Leandro	SAN LEANDRO UNIFIED	7,588	856	8,444	1.3%	113
Castro Valley	CASTRO VALLEY UNIFIED	7,327	915	8,242	91.3%	7,523
Region Total Unincorporated		14,915	1,771	16,686		7,636
D						
Orinda	ORINDA UNION ELEMENTARY	2,386	N/A	2,386	100.0%	2,386
Moraga	MORAGA ELEMENTARY	1,932	113	2,045	100.0%	2,045
Lafayette	LAFAYETTE ELEMENTARY	3,469	560	4,029	41.3%	1,664
Orinda/Moraga/Lafayette	ACALANES UNION HIGH	3,110 (1)	N/A	3,110	0.0% (3)	-
Region Total Unincorporated		10,897	673	11,570		6,095

Exhibit 38
School Enrollment and School Employment
Pressure Zone Regions By Share of City in Region
1995-1996 School Year

Pressure Zone Region	Public School District	Public Schools		Private Schools		Public & Private Schools Total	Share of City in PZR		Adjusted Public & Private Schools Total
E									
Lafayette	LAFAYETTE ELEMENTARY	3,469		560		4,029	58.5%		2,358
Walnut Creek	WALNUT CREEK ELEMENTARY	3,236		1,503		4,739	13.2%		626
Walnut Creek	ACALANES UNION HIGH	1,355	(1)	161		1,516	13.2%		200
Walnut Creek	MT. DIABLO UNIFIED	3,017	(1)	N/A		3,017	13.2%		398
Pleasant Hill	MT. DIABLO UNIFIED	7,589	(1)	N/A		7,589	0.2%		12
Region Total Unincorporated		18,667		2,224		20,891			3,594
F									
San Ramon/Danville/Alamo	SAN RAMON VALLEY UNIFIED	19,201		1,273		20,474	0.0%	(3)	-
Walnut Creek	WALNUT CREEK ELEMENTARY	3,236		1,503		4,739	8.2%		387
Walnut Creek	ACALANES UNION HIGH	1,355	(1)	161		1,516	8.2%		124
Walnut Creek	MT. DIABLO UNIFIED	3,017	(1)	N/A		3,017	8.2%		247
Region Total Unincorporated		26,809		2,937		29,746			758
GC									
Oakland	OAKLAND UNIFIED	55,075		10,130		65,205	72.3%		47,161
Alameda	ALAMEDA CITY UNIFIED	10,865		1,913		12,778	99.5%		12,711
Berkeley	BERKELEY UNIFIED	8,777		2,296		11,073	32.7%		3,620
Richmond	WEST CONTRA COSTA UNIFIED	12,470	(1)	-		12,470	13.2%		1,650
El Cerrito	WEST CONTRA COSTA UNIFIED	4,239	(1)	-		4,239	19.8%		837
Piedmont	PIEDMONT CITY UNIFIED	2,756		485		3,241	39.3%		1,274
Emeryville	EMERY UNIFIED	712		260		972	39.9%		387
San Pablo	WEST CONTRA COSTA UNIFIED	5,776	(1)	-		5,776	6.5%		376
Albany	ALBANY CITY UNIFIED	3,141		536		3,677	11.2%		411
Kensington	WEST CONTRA COSTA UNIFIED	562	(1)	-		562	8.1%		45
All	WEST CONTRA COSTA UNIFIED	N/A		5,536	(2)	5,536	0.0%	(3)	-
Region Total Unincorporated		104,373		21,156		125,529			68,472

Exhibit 38
School Enrollment and School Employment
Pressure Zone Regions By Share of City in Region
1995-1996 School Year

Pressure Zone Region	Public School District	Public Schools	Private Schools	Public & Private Schools Total	Share of City in PZR	Adjusted Public & Private Schools Total
GN						
Richmond	WEST CONTRA COSTA UNIFIED	12,470 (1)	-	12,470	62.8%	7,828
San Pablo	WEST CONTRA COSTA UNIFIED	5,776 (1)	-	5,776	83.0%	4,791
Berkeley	BERKELEY UNIFIED	8,777	2,296	11,073	21.7%	2,397
Albany	ALBANY CITY UNIFIED	3,141	536	3,677	88.8%	3,267
El Cerrito	WEST CONTRA COSTA UNIFIED	4,239 (1)	-	4,239	34.9%	1,479
Emeryville	EMERY UNIFIED	712	260	972	60.1%	584
Oakland	OAKLAND UNIFIED	55,075	10,130	65,205	1.0%	620
All	WEST CONTRA COSTA UNIFIED	N/A	5,536 (2)	5,536	0.0% (3)	-
Region Total Unincorporated		90,190	18,758	108,948		20,967
GS (4)						
San Leandro	SAN LEANDRO UNIFIED	7,588	856	8,444	98.7%	8,331
Oakland	OAKLAND UNIFIED	55,075	10,130	65,205	8.3%	5,422
San Lorenzo	SAN LORENZO UNIFIED	10,343	2,703	13,046	100.0%	13,046
Castro Valley	CASTRO VALLEY UNIFIED	7,327	915	8,242	7.0%	573
Region Total Unincorporated		80,333	14,604	94,937		27,372
H						
Walnut Creek	WALNUT CREEK ELEMENTARY	3,236	1,503	4,739	40.8%	1,935
Walnut Creek	ACALANES UNION HIGH	1,355 (1)	161	1,516	40.8%	619
Walnut Creek	MT. DIABLO UNIFIED	3,017 (1)	N/A	3,017	40.8%	1,232
Pleasant Hill	MT. DIABLO UNIFIED	7,589 (1)	N/A	7,589	21.9%	1,661
Lafayette	LAFAYETTE ELEMENTARY	3,469	560	4,029	0.1%	6
Region Total Unincorporated		18,667	2,224	20,891		5,453

Sources: California Department of Education's California Basic Educational Data System (CBEDS) district and school level reports for 1995-1996 school year; and CBRE Consulting.

(1) These districts serve more than one city. School data were used to calculate enrollment. Employment data were not available by school and so were excluded.

(2) Data for private schools in school year 1995-96 do not have detail on how many students are in each city in the West Contra Costa district.

(3) Certain school districts are located in more than one city/unincorporated area. In those cases, the shares of the area in each PZR were combined before being applied to the enrollment total. Detailed school data was not available for private schools in West Contra Costa Unified District. The same technique was applied to estimate the share of private school enrollment in this district in each PZR. See Appendix C for the detailed calculation.

(4) Hayward was excluded from regions C and GS because only a small percentage of Hayward's population is in the water district. Hayward has a very large school district so taking even the small share that is in the district (4.0 percent in each region) would probably exaggerate the actual schools in the water district.

Exhibit 39
School Enrollment and School Employment
Pressure Zone Regions By Share of City in Region
2004-2005 School Year

Pressure Zone Region	Public School District	Public Schools		Private Schools	Public & Private Schools Total	Share of City in PZR		Adjusted Public & Private Schools Total
AN								
Hercules	WEST CONTRA COSTA UNIFIED	3,332	(1)	N/A	3,332	100.0%		3,331
Richmond	WEST CONTRA COSTA UNIFIED	13,947	(1)	2,109	16,056	22.6%		3,629
Pinole	WEST CONTRA COSTA UNIFIED	4,202	(1)	353	4,555	99.4%		4,529
San Pablo	WEST CONTRA COSTA UNIFIED	5,740	(1)	450	6,190	9.4%		579
El Sobrante	WEST CONTRA COSTA UNIFIED	1,645	(1)	1,060	2,705	91.5%		2,474
Rodeo/Crockett	JOHN SWETT UNIFIED	1,947		325	2,272	0.0%	(2)	-
Region Total Unincorporated		30,813		4,297	35,110			14,542
AS								
Berkeley	BERKELEY UNIFIED	9,434		2,876	12,310	45.5%		5,605
El Cerrito	WEST CONTRA COSTA UNIFIED	3,354	(1)	1,850	5,204	45.4%		2,361
Oakland	OAKLAND UNIFIED	52,223		10,077	62,300	1.4%		890
San Pablo	WEST CONTRA COSTA UNIFIED	5,740	(1)	450	6,190	1.2%		72
Richmond	WEST CONTRA COSTA UNIFIED	13,947	(1)	2,109	16,056	0.4%		64
Kensington	WEST CONTRA COSTA UNIFIED	497	(1)	149	646	91.9%		594
El Sobrante	WEST CONTRA COSTA UNIFIED	1,645	(1)	1,060	2,705	8.5%		230
Region Total Unincorporated		86,840		18,571	105,411			9,817
B								
Oakland	OAKLAND UNIFIED	52,223		10,077	62,300	16.9%		10,545
Piedmont	PIEDMONT CITY UNIFIED	2,823		527	3,350	60.7%		2,034
Berkeley	BERKELEY UNIFIED	9,434		2,876	12,310	0.1%		16
Region Total Unincorporated		64,480		13,480	77,960			12,594
C								
San Leandro	SAN LEANDRO UNIFIED	9,378		2,545	11,923	1.3%		160
Castro Valley	CASTRO VALLEY UNIFIED	9,001		917	9,918	91.3%		9,053
Region Total Unincorporated		18,380		6,068	24,448			9,213
D								
Orinda	ORINDA UNION ELEMENTARY	2,591		206	2,797	100.0%		2,797
Moraga	MORAGA ELEMENTARY	1,876		185	2,061	100.0%		2,061
Lafayette	LAFAYETTE ELEMENTARY	3,478		951	4,429	41.3%		1,829
Orinda/Moraga/Lafayette	ACALANES UNION HIGH	4,096	(1)	-	4,096	0.0%	(2)	-
Region Total Unincorporated		12,041		1,342	13,383			6,687

Exhibit 39
School Enrollment and School Employment
Pressure Zone Regions By Share of City in Region
2004-2005 School Year

Pressure Zone Region	Public School District	Public Schools		Private Schools	Public & Private Schools Total	Share of City in PZR		Adjusted Public & Private Schools Total
E								
Lafayette	LAFAYETTE ELEMENTARY	3,478		951	4,429	58.5%		2,592
Walnut Creek	WALNUT CREEK ELEMENTARY	3,492		3,122	6,614	13.2%		873
Walnut Creek	ACALANES UNION HIGH	1,810	(1)	-	1,810	13.2%		239
Walnut Creek	MT. DIABLO UNIFIED	4,538	(1)	-	4,538	13.2%		599
Pleasant Hill	MT. DIABLO UNIFIED	8,074	(1)	762	8,836	0.2%		14
Region Total Unincorporated		21,392		4,835	26,227			4,317
F								
San Ramon/Danville/Alamo	SAN RAMON VALLEY UNIFIED	24,064		1,597	25,661	0.0%	(2)	-
Walnut Creek	WALNUT CREEK ELEMENTARY	3,492		3,122	6,614	8.2%		540
Walnut Creek	ACALANES UNION HIGH	1,810	(1)	-	1,810	8.2%		148
Walnut Creek	MT. DIABLO UNIFIED	4,538	(1)	-	4,538	8.2%		371
Region Total Unincorporated		33,905		4,719	38,624			1,059
GC								
Oakland	OAKLAND UNIFIED	52,223		10,077	62,300	72.3%		45,060
Alameda	ALAMEDA CITY UNIFIED	11,076		1,853	12,929	99.5%		12,861
Berkeley	BERKELEY UNIFIED	9,434		2,876	12,310	32.7%		4,025
Richmond	WEST CONTRA COSTA UNIFIED	13,947	(1)	2,109	16,056	13.2%		2,124
El Cerrito	WEST CONTRA COSTA UNIFIED	3,354	(1)	1,850	5,204	19.8%		1,028
Piedmont	PIEDMONT CITY UNIFIED	2,823		527	3,350	39.3%		1,317
Emeryville	EMERY UNIFIED	845		24	869	39.9%		347
San Pablo	WEST CONTRA COSTA UNIFIED	5,740	(1)	450	6,190	6.5%		403
Albany	ALBANY CITY UNIFIED	3,617		9	3,626	11.2%		405
Kensington	WEST CONTRA COSTA UNIFIED	497	(1)	149	646	8.1%		52
Region Total Unincorporated		103,556		19,924	123,480			67,621
GN								
Richmond	WEST CONTRA COSTA UNIFIED	13,947	(1)	2,109	16,056	62.8%		10,079
San Pablo	WEST CONTRA COSTA UNIFIED	5,740	(1)	450	6,190	83.0%		5,135
Berkeley	BERKELEY UNIFIED	9,434		2,876	12,310	21.7%		2,665
Albany	ALBANY CITY UNIFIED	3,617		9	3,626	88.8%		3,221
El Cerrito	WEST CONTRA COSTA UNIFIED	3,354	(1)	1,850	5,204	34.9%		1,815
Emeryville	EMERY UNIFIED	845		24	869	60.1%		523
Oakland	OAKLAND UNIFIED	52,223		10,077	62,300	1.0%		592
Region Total Unincorporated		89,160		17,395	106,555			24,031

Exhibit 39
School Enrollment and School Employment
Pressure Zone Regions By Share of City in Region
2004-2005 School Year

Pressure Zone Region	Public School District	Public Schools		Private Schools	Public & Private Schools Total	Share of City in PZR	Adjusted Public & Private Schools Total
GS							
San Leandro	SAN LEANDRO UNIFIED	9,378		2,545	11,923	98.7%	11,764
Oakland	OAKLAND UNIFIED	52,223		10,077	62,300	8.3%	5,181
San Lorenzo	SAN LORENZO UNIFIED	12,181		1,009	13,190	100.0%	13,190
Castro Valley	CASTRO VALLEY UNIFIED	9,001		917	9,918	7.0%	689
Region Total Unincorporated		82,783		14,548	97,331		30,823
H							
Walnut Creek	WALNUT CREEK ELEMENTARY	3,492		3,122	6,614	40.8%	2,701
Walnut Creek	ACALANES UNION HIGH	1,810	(1)	-	1,810	40.8%	739
Walnut Creek	MT. DIABLO UNIFIED	4,538	(1)	-	4,538	40.8%	1,853
Pleasant Hill	MT. DIABLO UNIFIED	8,074	(1)	762	8,836	21.9%	1,934
Lafayette	LAFAYETTE ELEMENTARY	3,478		951	4,429	0.1%	6
Region Total Unincorporated		21,392		4,835	26,227		7,234

Sources: California Department of Education's California Basic Educational Data System (CBEDS) district and school level reports for 2004-2005 school year; and CBRE Consulting.

(1) These districts cover more than one city. School data were used to calculate enrollment. Employment data were not available by school and so were excluded.
(2) Certain school districts are located in more than one city/unincorporated area. In those cases, the shares of the area in each PZR were combined before being applied to the enrollment total. See Appendix C for the detailed calculation.
(3) Hayward was excluded from regions C and GS because only a small percentage of Hayward's population is in the water district. Hayward has a very large school district so taking even the small share that is in the district (4.0 percent in each region) would probably exaggerate the actual schools in the water district.

Exhibit 40
Change in School Enrollment and School Employment
Pressure Zone Regions By Share of City in Region
1995-1996 School Year to 2004-2005 School Year

Pressure Zone Region	Enrollment/ Employment Total 1995-06	Enrollment/ Employment Total 2004-05	Total Change	Percent Change
AN	11,980	14,542	2,562	21%
AS	8,725	9,817	1,092	13%
B	13,018	12,594	(424)	-3%
C	7,636	9,213	1,577	21%
D	6,095	6,687	592	10%
E	3,594	4,317	723	20%
F	758	1,059	302	40%
GC	68,472	67,621	(851)	-1%
GN	20,967	24,031	3,064	15%
GS	27,372	30,823	3,451	13%
H	5,453	7,234	1,780	33%

Sources: Exhibits 38 and 39; and CBRE Consulting.

WEBER ANALYTICAL

TECHNICAL MEMORANDUM NUMBER 4

Date: April 7, 2008

Prepared for: John Hurlburt, Jae Park, Karen Johnson

Prepared by: Jack Weber, Weber Analytical

Subject: 2005 Baseline Demand Analysis: WSMP 2040 Demand Study

INTRODUCTION

The purpose of this memorandum is to document the process and results of analyses of historical water consumption for four customer groups in each of eleven regions throughout the East Bay Municipal Utility District (District). The purpose was to normalize actual water consumption to reflect normal weather patterns, then derive an averaged or typical demand to be used as 2005 baseline water demands. The demand tracking models that were developed to track monthly water consumption in gallons per day per account (gpd/a) provide a basis for identifying two approaches to normalization of demands.

1. Weather Normalized Demand: This level removes the effects of weather departures from normal weather, where normal weather is based on 35 year averages of the weather variables used in the analysis. This level is essential to be able to forecast demand that does not include the inevitable fluctuations of weather.
2. Average, Typical, or Baseline Demand: This level reflects average weather-normalized demand over recent years (2000-2006) that averages out non-weather demand variations that could be attributable to economic, demographic, account mix changes, or other causes that cannot be quantified.

The results of the weather and average demand analyses have been used to restate 2005 as a typical demand year that will be used to establish the base year demand for the WSMP 2040 Demand Study. The results are provided in terms of percentage factors that, when multiplied by the actual water demand in 2005, will yield weather normalized baseline water demand. Percentage factors are used to facilitate application of the results to numerous sub-categories of the 44 core combinations of Customer Groups and Regions.

The District provided an excellent database of water consumption (billings prorated to consumption months) for four customer groups in eleven Demand Model Regions (DMRs) for the period January 1996 through December 2006; and 35 years of monthly weather data for six weather stations within the District. Although not requested nor used in this analysis, water prices were tested whether prices materially affected water consumption in a way that might distort the weather coefficients if price were not used in deriving weather response coefficients. This hypothesis was tested only for the Low Density Residential (LDR) customer group in one DMR (D-Lamorinda) in the service area East of the Oakland Hills (EOH) and one DMR (GN-Richmond, Albany, Emeryville) West of the Hills (WOH). This test was done in the two areas because there is a distinct difference in the application of tiered pricing related to peak consumption periods in the two areas. It was concluded that pricing had no effect.

The statistical methods used fall into three categories: Time Series Analysis, Regression Analysis, and Demand Tracking or Modeling. These statistical tools are briefly described below, and an illustration of the entire statistical process is given as part of the presentation and use of key variables in the analysis. For those who wish to dig more deeply into the statistical process, TM No. 4 Appendix A provides further discussion of Regression Analysis as applied to water demand analysis.

1. Time Series Analysis: Time series analysis is concerned with the analysis of daily, monthly, quarterly, or annual data over an extended period of time. There are four components to time series data that are usually considered: trend, seasonal, cycle, and random movements. These components are discussed in the following topics:
    a. Trend: Trends are recurring historical patterns from early periods to comparable later periods. Trends can be linear or nonlinear. The nonlinear pattern can be any shape that best fits the actual data: logarithmic, exponential, second or third degree polynomials or just a visual fitted pattern. Trends are not considered relevant in this analysis since the time period is only 11 years and changes in gpd/a demand are analyzed in terms of causal variables, not simply changes over time.
    b. Cycle: Cyclical waves or patterns are usually caused by demographic or economic factors. There may be some such effects in water demand data for some customer groups but adequate data were not available for this type of analysis. The results of demographic or economic influences are captured by use of a Weighted Moving Average (WMA) that reflects the effect of these influences but does not identify the causes. The patterns could include some demographic or economic influences but the preponderance of the WMA pattern appears to be attributed to weather, drought conditions and response measures, and ongoing conservation programs. The WMA is used extensively in the Tracking Models and is discussed at various junctures in this TM.
    c. Seasonality: The use of a seasonal index to capture seasonal patterns for a variable (gallons per day per account {gpd/a} water consumption in this case) is a standard statistical technique. The indices used in this analysis are derived using the 13 Month WMA method. This method calculates the ratio of each month's water consumption to the WMA, takes an average of the ratios for each month, and expresses those averages (calibrated to equal 12.0 for the 12 months) as an index. The result is as shown in Figure 1 for two DMRs.

The Seasonal Index is a key variable in the analysis of weather impacts on water demand since it expresses the normal pattern of water demand when calculated over a period of time that contains enough data such that the average index for each month has enough highs and lows and mid-point values in it to provide a weather normal average. Drought years should not be included since they are extreme outliers. The 11 years used in this analysis is considered a good subset for the purpose of this analysis because it does not contain drought years.

   d. Residuals: When trend, cycle, and seasonality are removed from the total variation in a time series variable (gpd/a in this case), what remains is referred to as residual or unexplained variation. The residual variation can be further explained by the use of regression analysis applied to any number of causal variables. There always remains some unexplained variation in time-series analyses.

2. Regression Analysis: Regression analysis is a statistical technique that analyzes a dependent variable (monthly gpd/a water demand) by testing how much of the variation in the dependent variable is explained by any number of independent variables. The Leased Squares Method used here simultaneously calculates coefficients for the independent variables that minimize the squared deviations of the residuals from calculated values of the dependent variable. For further discussion of regression analysis, please refer to Appendix A. Examples with discussion of the regression results for selected situation are provided in this text.

   All of the weather normalization factors for this TM were calculated with a dependent variable (gpd/a for each DMR/customer group combination) and several significant independent variables: a seasonal index, and departures from normal for weather variables such as Max Day Temp, Rainfall, Pan Evaporation (EVAP), and various transformations of these primary weather variables. The Seasonal Index captures the normal monthly pattern of demand and the residuals from that regression, which are mostly attributable to weather, are (simultaneously) regressed on the significant weather variables. The coefficients for the weather variables give: the change in gpd/a related to the change in the weather variables. These coefficients were then applied to all of the months of available data and factors were calculated for the 2005 Actual Consumption to separately derive weather normalized demand for 2005.

3. Water Demand Tracking or Modeling: The models that were developed for each of the 44 DMR/Customer Group combinations provide a means for isolating a number of demand components that can be important tools for interpretations of demand patterns for this study.
   a. A seasonal index is automatically calculated in the model
   b. A WMA is automatically calculated in the model to identify how the time series is moving during the period of analysis. The WMA was calculated

both before and after inputting weather normalization factors to be able to see the impacts of weather both arithmetically and graphically.

c. Based on the results of this analysis, it can be concluded that the WMA for recent periods can serve as a baseline for future demand forecasts on a gpd/a basis.

The finished product of this analysis is a summary table (Attachment A) with two percentage factors for: 1) Weather Normalized Demand, and 2) Baseline (Averaged) Demand, both expressed as percentage change adjustment factors to apply to 2005 consumption to get the Weather Normalized and Baseline Demands respectively for each of the 44 combinations of customer groups and DMRs. (Four baseline combinations require a reduction, rather than an increase.)

DATA AVAILABILITY

All of the data needed for this study were provided in digital format by the District and was of excellent quality in terms of accuracy, consistency, and completeness.

Three data sets were provided:

WATER CONSUMPTION

Monthly water consumption (in 100 cubic feet, CCF) for each of four Customer Groups and eleven DMRs for a total of 44 potential situation analyses.

The Customer Groups, which apply to all DMRs are as follows.

LDR	Low Density Residential which includes Single Family Residential accounts (BCC 8800) and Multi-family accounts (BCC 6514, 2-4 units on a single meter). Includes ER1 and ER2 land use categories.
HDR	High Density Residential including Multi-family Residential accounts (BCC 6513 with 5 units or more on one meter and Mobile Home Parks) and Boarding Houses (BCC 7020). Includes ER3 through ER6 land use categories.
IRR	Irrigation Accounts including BCC 100 (agriculture), BCC 6500 (cemeteries), BCC 7940 (equestrian), BCC 7950 (irrigators only: golf, gardens, aquariums), and BCC 7990 (parks and gardens). Includes EPI land use categories.
Non-Res	Includes all other BCCs and land use categories.

The DMRs are as follows. Please refer to the 2040 Demand Study report Figure 1.2, Demand Model Regions, for a map.

EOH:	Primary locations
D	Orinda, Moraga, western Lafayette
E	Lafayette
F	Danville, San Ramon, Alamo
H	Walnut Creek
WOH:	
AN	Pinole, El Sobrante, Hercules, Rodeo, Crockett
AS	Berkeley Hills and eastern downtown, El Cerrito

GN	Richmond, San Pablo, Albany, west Berkeley, north Emeryville
GC	Oakland, Alameda, central Berkeley western downtown,
B	Oakland Hills
GS	San Leandro, San Lorenzo
C	Castro Valley, Fairview, part of Hayward

WEATHER DATA

Weather data was received from 6 stations for all or some of three elements of weather within District boundaries. All of the weather variables were converted into departures from normal (average) weather.

Table 1: Weather Variables by Source and Type

Station	Max Day Temp ^oF	Rainfall (Inches)	Pan Evap (Inches)	Net Pan Evap Derived (Inches)
Chabot		√		
Lafayette Res	√	√	√	√
Orinda TP	√	√		
San Pablo Res		√	√	√
U San Leandro	√	√	√	√
Walnut Creek		√		

Note: Data not available for stations left unchecked.

Each of the 15 variables in Table 1 was transformed into 9 additional variables to capture potential weather impacts that might not be visible using the single variables. These transformations were made by setting up separate variables for:

- Summer and winter months: There are typically different responses (coefficients) in peak months and low months because they are on different water use planes.
- Positive and negative values: Water use tends to increase more with increases in peak month temperatures than with decreases in temperatures.
- Three month moving averages were taken of the four variables above for a total of nine variables to capture the effect of persistent variations in weather that can be lost by evaluating only the impacts of each month separately.
- The primary variable and its moving average equal a total of 10 variables for each reported variable or 150 variables in total.

Note that the <u>Net</u> Pan Evaporation is derived from a combination of Pan Evaporation and rainfall:

- If rain fall is less than 0.25 inches, simply use Pan Evaporation,
- If rainfall is equal to or greater than 0.25 inches and the Evap less 66% of rainfall is positive, then Net Evap = Evaporation less 66% of rainfall,
- If rainfall is equal to or greater than 0.25 inches and the Evap less 66% of rainfall is negative, then Net Evap = -0-.

This is a variable that has been used in Sonoma County by water purveyors for many years. It is a highly significant variable also for the District service area. What it says is: If rainfall is not trivial (> 0.25”), and if the rainfall is not so large that removing 66% of it would not cause Net Pan Evap to be negative, then remove 66% of the rainfall to derive

Net Pan Evaporation. And if the subtraction of 66% of rainfall from Pan Evap would produce a negative result, then use zero for Net Pan Evap.

Net Evap moderates the positive effect of pan evaporation on water demand by including 66% of the negative effect of rainfall on water demand. This is similar to regressing gpd/a on both Max Day Temp and Rainfall at the same time. Many tests were conducted trying both of these approaches to combining the positive and negative effects of Temperature and Rainfall. In virtually all situations, the Net EVAP yielded higher t-values and R^2 values than resulted from direct use of Rainfall as a variable.

A similar result was derived by using only the first two inches of rainfall as a variable rather than actual larger values. This indicates that there is a level of saturation when rainfall exceeds 2 inches that has no further effect, or at least not a further statistically significant effect. (Other amounts were also tested to find the rainfall cap that was most significant.)

All of the weather variable values were expressed as departures from normal, where the normal value was derived as the average for each month for the period January 1971 through June 2006 for all weather stations except for Orinda (MDT and Rain) and MDT in both Lafayette and USL where the data begins with July 1992. The logic for using departures from normal is that the effect of normal weather is captured by the Seasonal Index variable and the residuals (departures of gpd/a from normal gpd/a) from that relationship sometimes can be explained by the departures of weather variables from normal. All of the weather variables are derived in the same way, that is, Actual less Normal. This means that for Temperature and Evaporation variables a positive departure value will stimulate water demand; for rainfall a positive departure will moderate demand.

WATER PRICES

The tiered price structure in dollars per CCF was converted to dollars per thousand gallons (tgals) and evaluated in several ways using the aggregate data provided. Data by individual customer which was not available would have provided a more accurate analysis but results of the aggregate data analysis suggests that analyzing individual customers would not yield a materially different result. The analysis of price effects was done for two DMRs, one EOH (DMR D-Lamorinda) and one WOH (GN-Richmond, etc.). The aggregate consumption for each month was evaluated as if it were a single customer and the average price (from total volume), marginal price (highest rate block entered), and total bill (volume + service charge) values were derived. All of these values would always be higher in summer months since they are a function of volume and if price were regressed on volume, the result would be that the higher the price, the greater the volume which is counter intuitive. Consequently, each of these price variables was converted into an index where all the months of the first year (1996) were set to the base of 1.0 and the matching months of each subsequent year were expressed as a ratio to the base year. In this way the prices for each July and each January are related to the prior year. But this method has the drawback that lower volumes in the later years, whether caused by price or conservation, would also reflect lower prices as volume fell into lower rate blocks. Price and volume are not mutually exclusive in a tiered rate structure.

A more meaningful test would be to express the prices as those that would have been paid if 'normal' volume had been maintained; these higher prices might then have caused the lower volume. A new full set of variables as described above was calculated using the higher prices that would have occurred if no reduction in consumption had occurred. Neither set of prices was statistically significant although some variables were close to being significant. This result is not surprising since the volume rate increases during this period averaged only 3.5% per year which is not high enough to jolt customers into reducing volume.

MORE ON KEY VARIABLES

The objective in regression analysis is to find any number of significant independent (explanatory) variables that will explain the variation in the dependent variable. In time series regression, it is rare to have more than four or five significant variables because it is difficult to identify more variables that are actual causal influences. It is important to include all known or suspected causes so that the coefficients derived for those variables included are not distorted by the omission of key causal influences. For example, water prices were included in two test models to see if price was a key driver of the pattern of water use. It was not but if it had been, the coefficients for the weather variables would have been different since all of the coefficients are simultaneously determined in regression analysis. After including all available variables in time series analysis, there always remains some residual variation that simply cannot be explained by available causal variables. In most cases the residual variation is caused by random unexplained event and it is not a cause for concern in the validity of the regression results as long as the residuals are randomly distributed, that is, they do not have a pattern other than a random distribution. (It will be shown in this TM that some cases did have patterned residuals.)

SEASONALITY

Water consumption by residential and some non-residential customers in any semi-arid climate such as northern California follow a highly predictable pattern that is built around the need for irrigation. This is because there is little if any rainfall in summer months so that lawn and garden irrigation occurs on a regular basis, and in the winter there is little if any need for irrigation because of substantial rainfall and dormant vegetation.

The seasonal pattern of water demand can be captured most effectively by the use of a Seasonal Index (SI). A SI is usually derived by fitting a 13 or 15 month moving average to the time series data and expressing each period (in this case monthly data) as a ratio to the moving average. For this study, there were eleven years of data and a 13 month WMA was applied; so there were eleven ratios for each month January through December. The average of the eleven ratios for each month is the SI for that month (calibrated to equal 12.0 for the sum of the ratios). Calculation of the SI for each of the

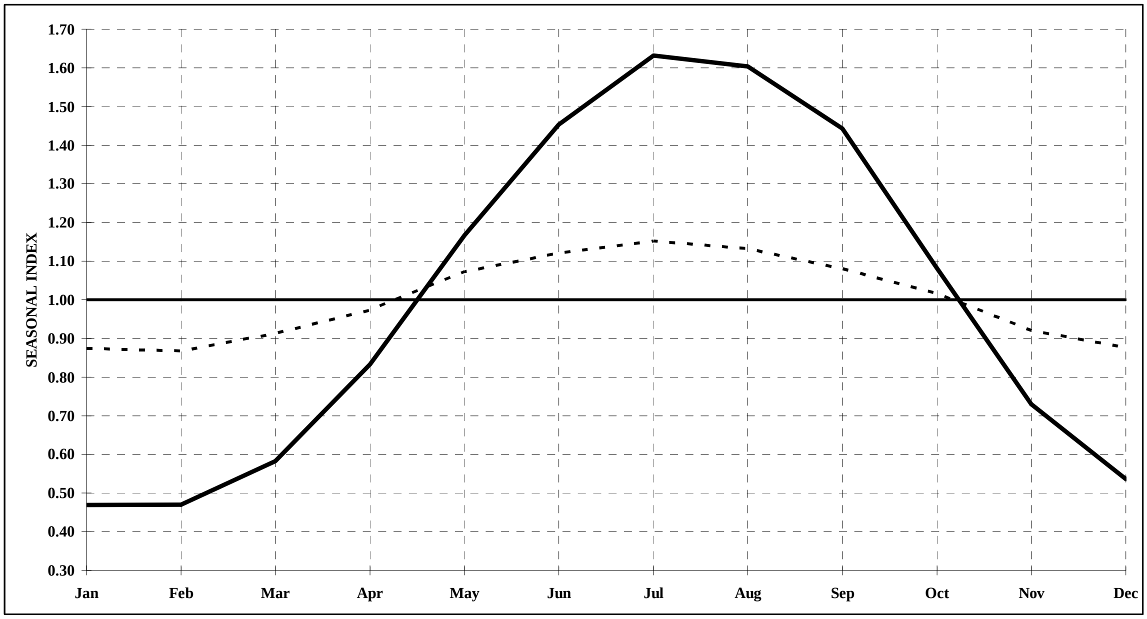
44 scenarios in this study is done automatically in the Tracking Model discussed above. An illustration is given in Figure 1 for the LDR customers in DMRs F (Danville, San Ramon, Alamo) and GN (Richmond, etc.). Note the substantial difference in seasonality between the EOH and WOH locations.

Figure 1 shows that peak demand in DMR F (Danville, San Ramon, Alamo), which is typical of all East of Hills DMRs, is about 160% of average month water use, while the summer peaking for the Richmond area is only about 115% of average month. The major significance of this is that there is less outdoor water use in the WOH area than in the EOH area and there will be less impact from departures of weather variables from normal. Weather is not the sole cause for the substantial difference in the seasonal pattern for these two areas. Lot size, household income, conservation measures in place, family size, and other unknown factors are also determinants of the seasonal pattern. The SI for each DMR/customer group is the key regression variable that is used to statistically explain the variation in monthly demand. If variables for lot size, household income, and other causal influences were available, they could also be used in a cross-sectional regression analysis to derive causal coefficients for each of those variables.

It can be inferred from the description of how the SI is calculated that the SI identifies normal water demand. This is so if the period (in this case 11 years) of data availability is long enough to provide enough dry, wet, and normal weather years such that the average ratios for all the months constitute a normal year. The data must also be normalized for the number of connections increasing over time. The 11 years used in this analysis are believed to reasonably reflect normal seasonal demand since they do not include a drought period which should not be included in the calculation since it includes outlier conditions. Also, it appears that this time frame has generally rebounded from the previous drought. An adequate range of dry to wet years occurred during this period and a similar adequate pattern of temperature was observed.

It should be useful from a methodological viewpoint to go through the regression analysis used step-by-step to show the effects of each key variable as the variables are introduced. Figure 2 give the results of the regression of LDR (ER1 and ER2) gpd/a demand in DMR F (LDRDMRFGPD) on the SI variable (LDRDMRFSI). Note that the SI alone accounts for an R^2 value of 0.954 (95.4%), meaning that seasonality alone explains 95.4% of the monthly variation in LDR customer demand in DMR F. For DMR GN (Figure 3), the SI explains only 90.0% of monthly variation, but that is still excellent for typical time series analyses. In time series analysis, the greater the volatility (amplitude of peaking), generally the higher the percentage explained with all other conditions the same; so it is not surprising that the R^2 for DMR F is higher than for GN. However, it is important to note that there is a less consistent consumption pattern in DMR GN. This difference is apparent in comparing data for Region F (Danville) and Region AN (Pinole).

Figure 1: Seasonal Indices for LDR Customers in DMRs F (Danville, San Ramon, Alamo) & GN (Richmond, etc.) based on 1996-2006 Data



Note: DMR F is solid line; DMR GN is dashed line.

Please refer to Appendix A for further explanation of the statistical results from regression analysis. Suffice it to say here that the SI variable, based on the t-Statistic (highlighted) is highly significant with a virtual zero probability that it could be deemed significant by chance. Note also that a forecast of normal demand for any desired month can be derived by multiplying the SI coefficient (which equates to mean demand [highlighted in Figure 2]) by the SI.

Figure 2 Regression Results for LDR in DMR F on SI only

Dependent Variable: LDRDMRFGPD
Method: Least Squares
Date: 01/29/08 Time: 13:18
Sample (adjusted): 1996M01 2006M12
Included observations: 132 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
LDRDMRFSI	508.8758	3.786773	134.3825	0.0000

R-squared	0.953867	Mean dependent var	508.7968
Adjusted R-squared	0.953867	S.D. dependent var	219.6705
S.E. of regression	47.18205	Akaike info criterion	10.55345
Sum squared resid	291625.1	Schwarz criterion	10.57529
Log likelihood	-695.5278	Hannan-Quinn criter.	10.56233
Durbin-Watson stat	0.360898		

Figure 3 Regression Results for LDR in DMR GN on SI only

Dependent Variable: LDRDMRGNGPD
Method: Least Squares
Date: 01/29/08 Time: 13:32
Sample (adjusted): 1996M01 2006M12
Included observations: 132 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
LDRDMRGNSI	207.4080	0.637690	325.2492	0.0000

R-squared	0.899590	Mean dependent var	207.4191
Adjusted R-squared	0.899590	S.D. dependent var	23.25169
S.E. of regression	7.367872	Akaike info criterion	6.839682
Sum squared resid	7111.405	Schwarz criterion	6.861521
Log likelihood	-450.4190	Hannan-Quinn criter.	6.848556
Durbin-Watson stat	0.210527		

WEATHER VARIABLES

In the initial analyses of weather impacts on water demand, about 150 weather variables were systematically evaluated to see which ones best explain the variance in monthly gpd/a for each DMR/Customer Group combination. A pattern develops quickly in this process where the same variables recur for each new situation. This is logical since the same forces are at work for the entire District service area, although differently for the EOH and WOH areas.

In most cases there were several combinations of weather variables that were significant. Some of the most logical combinations were:

- Max Day Temp (DMT) and Rainfall (DR): The rainfall element in this combination often failed the significance requirement of t-statistic of 2.0 or higher.
- Evaporation (DEVAP) and Rainfall: DEVAP and DR were generally more significant than the DMT and DR combination.
- Net EVAP (NDEVAP) was frequently a stronger variable than Evaporation and Rainfall.
- The 3 Month Moving Average of NDEVAP was stronger than without the moving average. The moving average smoothes out periods where there might be two hot and one cool month or other similar but longer strings. The individual months do not seem to capture the demand characteristic of the entire period as well as the moving average.
- Frequently the transformations from a single variable to positive and negative variables were more significant than the single variable. The reason is that water demand reacts differently to positive (hot summer days) influences than to negative (cool summer days) influences.

- Frequently Summer and Winter transformations of variables were more significant than the single variable. This results from the greater volatility of summer demand.
- The final weather coefficients selected for each case are summarized in Attachment B with key statistical properties associated with the regression analyses. Weather variables were not statistically significant in only four cases, but the impact of weather was less than 1.0% of 2005 demand in an additional 12 cases. All of these marginal cases were in the HDR and Non-Res customer categories where weather is much less a factor than in the LDR or IRR account groups which have substantially greater irrigation requirements.

It is essential to realize that some combinations are not permissible. For example, if a positive departure variable is used, the negative departure variable must also be used or the result will have a strong positive bias. The same is true for Summer/Winter variables. Also it would be improper to use DMT and DEVAP in the same model because these two variables are highly correlated with each other. And of course one cannot use, for example, the gross national product of India or any other such variable even if the t-statistic were strong since it has nothing to do with water demand in the Bay Area.

All time series regression analysis has a fairly high content of serial correlation, that is, where the errors in any given month are correlated with the errors in prior months. This phenomenon can be overcome by the use of lagged dependent variables or by the use of autoregressive variables that yield a coefficient for such correlations. These relationships were tested in this study and found to be highly correlated with the weather variables (multicollinearity) and were not used in the study. Another way to look at this is that both the current month and the prior (lagged) month are correlated with the weather variables so that the correlation of the lagged residuals is also correlated. The goal however is to derive the impact of weather on demand not the relationship with autoregressive (lagged) residuals. See Appendix A for further discussion of Serial Correlation.

To gain a broad perspective of the weather variables it is useful to view graphs of how departures of the key variables vary over time and then how water demand moves with the weather variables. This sort of analysis can be done for the many prime weather variables but just three should provide adequate perspective.

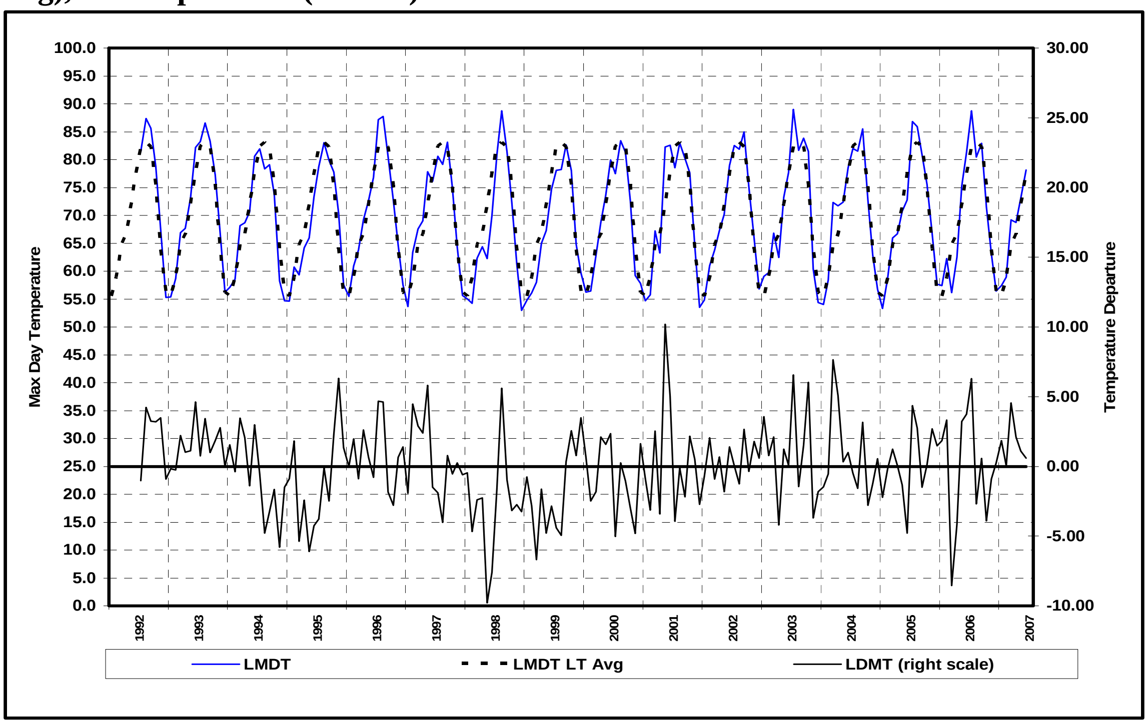
The graphic view will be followed by the regression analyses that incorporate the weather variables presented in the graphs to provide both the graphic and numeric or quantitative results together. This illustration for the LDR customers in DMR F (Danville, San Ramon, and Alamo) will be used to explain the process of choosing variables and the development of the best practical results. The amount of data presented might be a bit tedious to endure but the purpose is to provide full disclosure of the process. It will not be repeated for other customer groups or DMRs; however, key differences in process and findings for some other situations will be discussed. This data for all Customer Group/DMR combinations has been provided to the District in digital format for anyone who desires to further pursue this process.

Lafayette Reservoir DMT

Actual reported Max Day Temperature, calculated Normal DMT (long run average), and the departures of actual from normal (DMDT) are shown in Figure 4. It is difficult to see the patterns that exit in the top array (left scale); so the departures from normal are given in the bottom array (right scale). There are a number of findings or inferences that can be identified in the departure data.

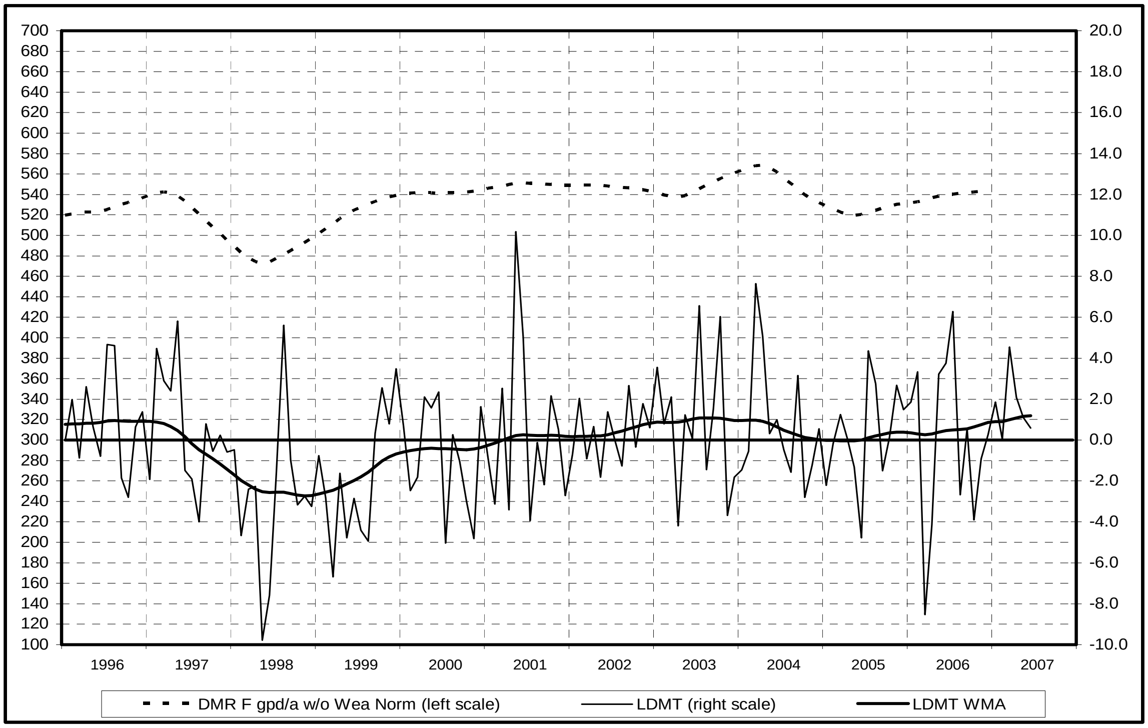
- MDT and other weather variables do not follow a random pattern. There are sustained periods of positive and negative departures.
- There are four periods when MDT was above normal for sustained periods: 1992 through mid-1994, late 1995 through mid-1997, 2001 through mid-2004, and (marginally) mid-2005 through mid-2007. These periods should be obvious in the regression analysis with reductions in the actual water use to get normalized water use.
- There are three periods when MDT was below normal for sustained periods: mid-1994 through late 1995, mid-1997 though late-2000, and mid-2004 through mid-2005. These periods should result in a higher level of actual water demand in the normalization process.

Figure 4 Lafayette Reservoir Actual MDT, Long Run Average MDT (LMDT LT Avg), and Departures (LDMT)



The WMA of gpd/a for LDR Customers in DMR F (Danville, San Ramon, Alamo) has been plotted in Figure 5 with the WMA of Lafayette Reservoir DMT. This graph reveals that there is a similar pattern between the WMA of DMT and the WMA of LDR Water Consumption in DMR F (Danville, San Ramon, Alamo). One would expect the regression analysis of these two variables to be significant.

Figure 5 DMR F LDR gpd/a without Weather Norm, Departures (LDMT), and Departures with Weather Norm (LDMT WMA)



At this point the regression output through the use of Lafayette Reservoir Departure of Max Day Temperature (LDMT) is provided to see how the visible similarity between monthly demand (before weather normalization) and Max Day Temperature in Figure 5 comes out statistically. For the sake of brevity, the bottom of some of the regression output figures are truncated to just show the key outputs. Figure 6 shows that the SI alone explains 96.0% of the monthly variation in demand in DMR F. Figure 7 shows that LDMT is also highly significant with a t-statistic of 7.9, substantially above the 2.0 t-statistic associated with a 97.5% level of confidence that LDMT has not been determined to be statistically significant by chance. The inclusion of LDMT in the model increases the total variation explained from 96.0% to 97.3%. The LDMT coefficient of 8.26 can be interpreted as the amount that gpd/a would increase with a 1.0 increase in LDMT. Note also that these models include the entire period of data availability from 1996 through 2006. Some subsequent models will not include all years because of the substantial difference in patterns between early years and later years; two separate analyses were done.

Figure 6 Regression Output for LDR on SI for LDR Customers in DMR F (Danville, San Ramon, Alamo)

Dependent Variable: LDRDMRFGPD
Method: Least Squares
Date: 01/30/08 Time: 17:42
Sample (adjusted): 1996M01 2006M12
Included observations: 132 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
LDRDMRFSI	532.9739	3.740529	142.4862	0.0000
R-squared	0.960180	Mean dependent var		533.0571

Figure 7 Regression Output for LDR Customers on SI and LDMT in DMR F (Danville, San Ramon, Alamo)

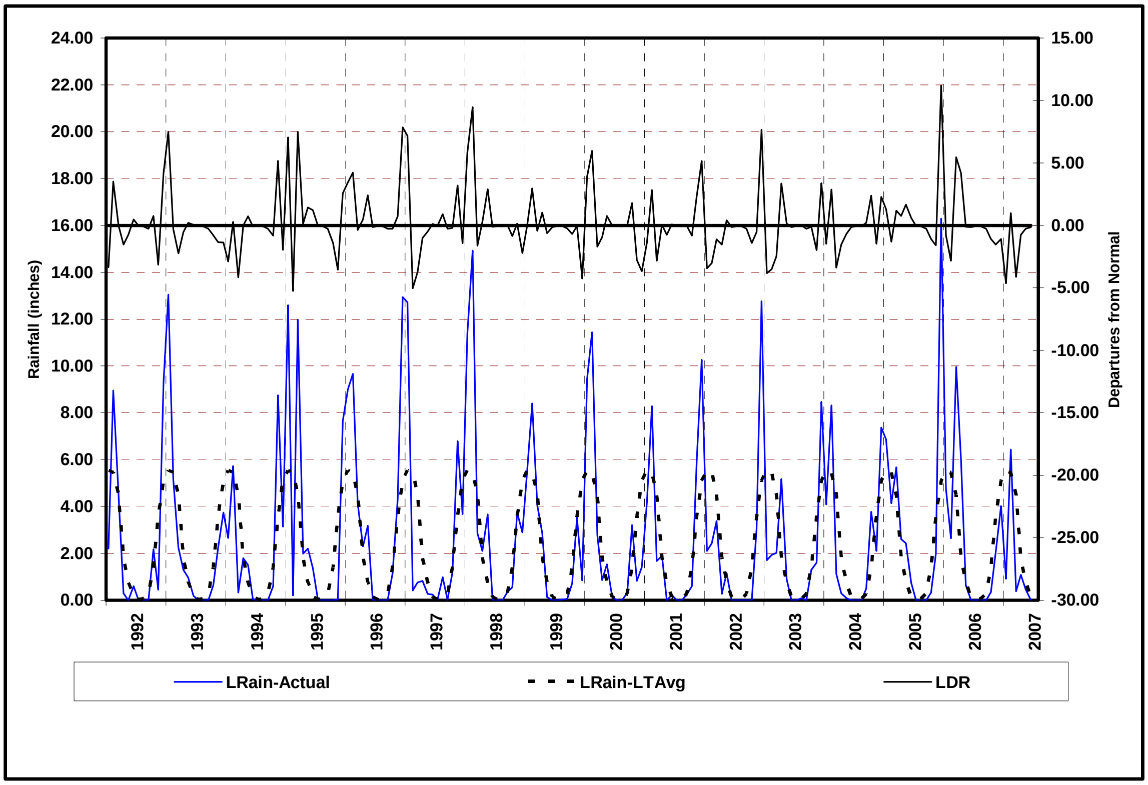
Dependent Variable: LDRDMRFGPD
Method: Least Squares
Date: 01/30/08 Time: 17:45
Sample (adjusted): 1996M01 2006M12
Included observations: 132 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
LDRDMRFSI	533.6048	3.084822	172.9775	0.0000
LDMT	8.258742	1.042676	7.920717	0.0000
R-squared	0.973142	Mean dependent var		533.0571

Lafayette Reservoir Rainfall

Rainfall at the Lafayette Reservoir appears to not move in sustained cycles to the extent that LDMT did. However, there is a substantial amount of high peaking as evidenced in the bottom array in Figure 8 (left scale) where the long run (1971-2007) average (dashed line) is exceeded by extreme rainfall amounts in near random patterns. The lack of rainfall in 1993-94 is apparent, and the generally lower rainfall from 1998 through late 2005 stands out.

Figure 8 Lafayette Reservoir Actual Rain and Long Term Average Rain



There is clearly a causal relationship between water demand and rainfall as shown in Figure 9. The effect is reversed from that of max day temperature since the departures for both variables are derived as the difference between Actual and Normal. When LDR is below its average line (in Figure 9) the WMA of water demand is above its average line, but the relationship does not appear as strong as for LDMT. This graph uses LDR2 which is the departures of rainfall from normal not to exceed ± 2.0 inches. Successive regression analyses with decreasing magnitudes of departures were undertaken and ± 2.0 yielded the highest significance. The inference is that if it is wet, people won't water their lawns, no matter if the rainfall was 2 inches or much greater.

The regression analysis with SI, LDMT, and LAFDR2 is given in Figure 10. The t-statistic for LAFDR2 is 2.66 which leaves only a 0.89% probability (in last column of Figure 10) that the variable selected for inclusion in the model is actually a chance event. The coefficient for rainfall (-7.22) indicates that for each 1.0 inch increase in rainfall, water demand for LDR customers in DMR F (Danville, San Ramon, Alamo) would decrease by 7.22 gpd/a. Total R^2 improves from 97.3% to 97.5% with the inclusion of the LAFDR2 variable, not a large rainfall effect. Note, however, that rainfall is statistically significant. This might appear contradictory to some but it isn't: rainfall is a significant variable, that is, it has a consistent and measurable causal relationship with gpd/a water consumption, but it doesn't have a large impact in explaining the huge fluctuations in water use. Remember that most of the variation is explained by the Seasonal Index.

Figure 9 DMR F LDR gpd/a w/o Weather Norm and LDR2 with WMAs

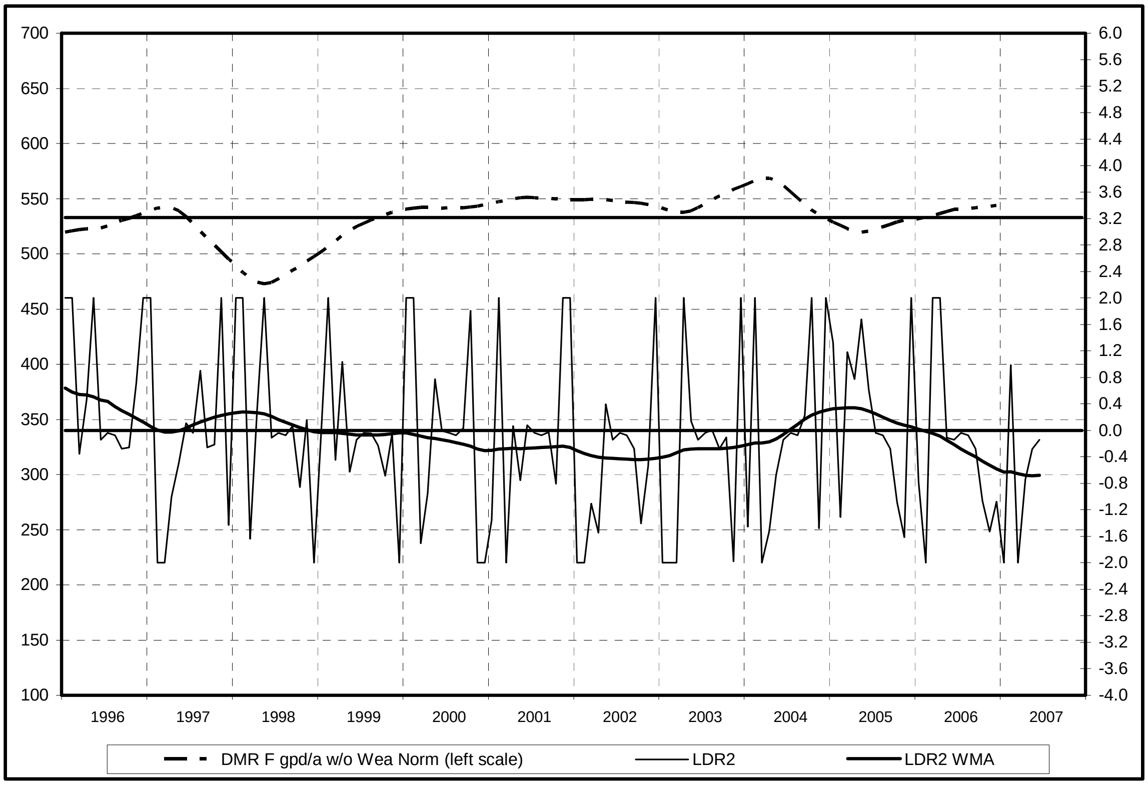


Figure 10 Regression Output for LDR Customers on SI, LDMT & LDR in DMR F (Danville, San Ramon, Alamo)

Dependent Variable: LDRDMRFGPD
Method: Least Squares
Date: 01/30/08 Time: 17:46
Sample (adjusted): 1996M01 2006M12
Included observations: 132 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
LDRDMRFSI	533.3453	3.016898	176.7860	0.0000
LDMT	7.467628	1.061770	7.033190	0.0000
LAFDR2	-7.221202	2.717301	-2.657491	0.0089

R-squared	0.974536	Mean dependent var	533.0571

Just to close the loop on this topic, the regression analysis of the total departure of rainfall (not just 2 inches) from normal is given in Figure 11. The t-statistic is -1.55 which equates to a 12.3% probability of chance inclusion. And the R^2 is about the same at 97.4% (in Figure 10) since rainfall doesn't have enough statistical impact to materially change the R^2 in either case.

Figure 11 Regression Output for LDR Customers on SI, LDMT & LDR00

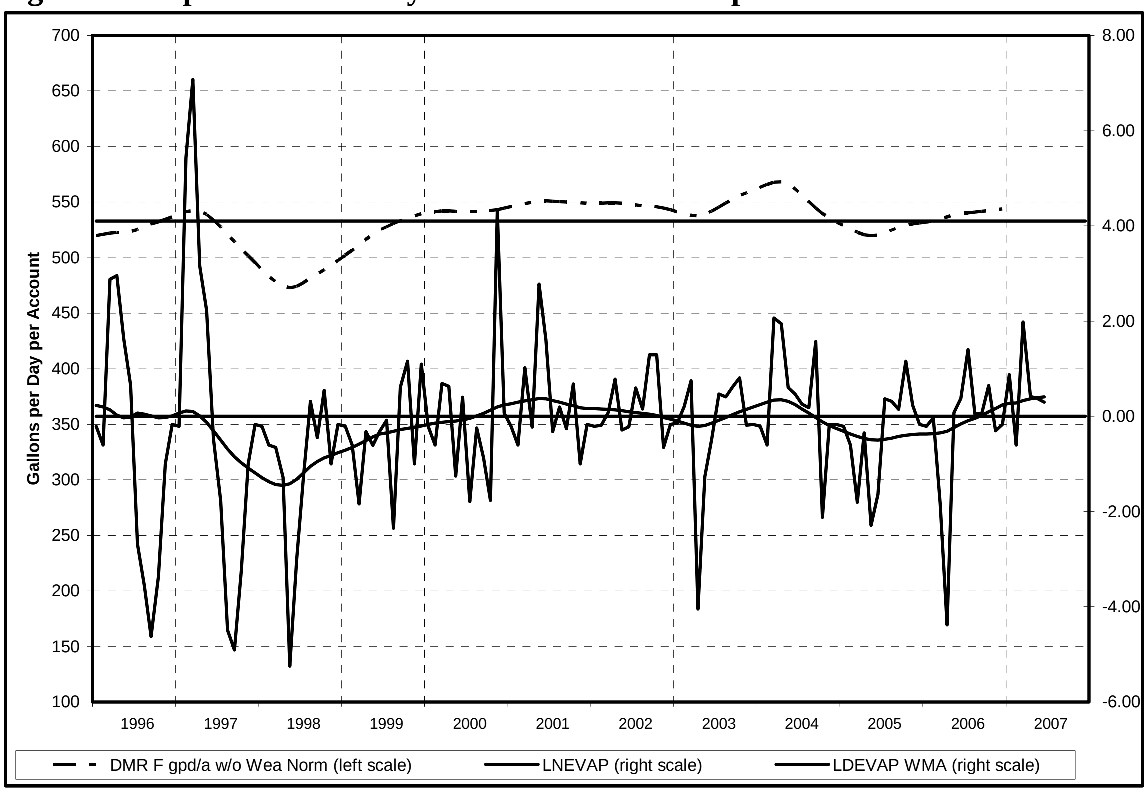
Dependent Variable: LDRDMRFGPD
Method: Least Squares
Date: 01/30/08 Time: 17:47
Sample (adjusted): 1996M01 2006M12
Included observations: 132 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
LDRDMRFSI	533.8513	3.072320	173.7617	0.0000
LDMT	7.812054	1.076222	7.258776	0.0000
LAFDR00	-2.079862	1.339451	-1.552772	0.1229
R-squared	0.973634	Mean dependent var		533.0571

Lafayette Reservoir Net Evaporation

The third primary weather variable that is available is Pan Evaporation which is highly correlated with Max Day Temperature. Figure 12 shows the relationship between gpd/a and Net Evaporation for the LDR customers in DMR F (Danville, San Ramon, Alamo). The two WMAs appear to be almost a mirror reflection of each other. One would expect the regression analysis to yield a high level of significance.

Figure 12 Departures of Lafayette Reservoir Net Evap from Normal with WMAs



Since LMDT and LDR2 are a significant combination of logical weather variables, it seems that Net Pan Evaporation should also be a logical combination of Pan Evaporation as a surrogate for LDMT with a portion of rainfall offsetting some of the Evaporation. The regression of LDR gpd/a on LNDEVAP (Figure 13) yields a higher R^2 than the combination of LDMT and LDR2 as shown in Figure 10. The t-statistic is excellent at 9.9 and the R^2 of 97.7% is nominally higher than the 97.5% for the LDMT and LDR2 combination. Additional variable combinations were evaluated and it was found that the 3 Month Moving Average of the LNEVAP variable yielded a stronger fit of the data as shown in Figure 14 where the R^2 increases to 98.0% and the t-statistic is an exceptionally strong 11.6.

Figure 13 Regression Output for LDR gpd/a on SI & <u>LNDEVAP</u>

Dependent Variable: SFRDMRFGPD
Method: Least Squares
Date: 01/30/08 Time: 17:51
Sample (adjusted): 1996M01 2006M12
Included observations: 132 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
SFRDMRFSI	537.7588	2.877588	186.8783	0.0000
LNDEVAP	17.65838	1.785673	9.888923	0.0000
R-squared	0.977275	Mean dependent var		533.0571

The moving averages of the primary variables tend to smooth out the up and down movement of weather in given months to reflect the 'period' effect of a cool or hot summer or a wet or dry spring and fall.

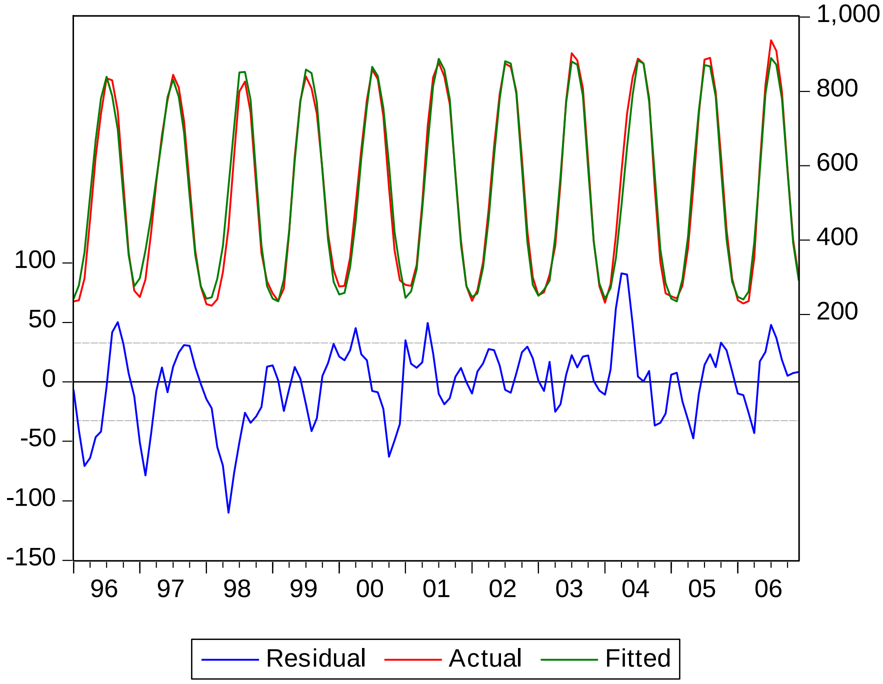
Figure 14 Regression Output for LDR gpd/a on SI & <u>LNDEVAPMA3</u>

Dependent Variable: LDRDMRFGPD
Method: Least Squares
Date: 01/30/08 Time: 17:54
Sample (adjusted): 1996M01 2006M12
Included observations: 132 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
LDRDMRFSI	539.3565	2.686459	200.7686	0.0000
LNDEVAPMA3	24.54577	2.112212	11.62089	0.0000
R-squared	0.980469	Mean dependent var		533.0571

A graph of the regression analysis in Figure 14 is provided in Figure 15 to highlight the irregularity of the first four years, which have a lower level of gpd/a than subsequent years. This residual distortion occurred in at least six of the Customer Group/DMR situations. The lower level of demand in this period could be some sort of final drought recovery or it could be that the weather coefficients simply do not pick up the full measure of the weather in this period. The weather coefficients are derived simultaneously using all the months of data and the impacts of outlier weather could be minimized in the 'average' coefficients that result from all 132 months of data. There are a number of ways to avoid the distortion to weather coefficients that stem from other unidentified variables. The method elected was to regress separately on the latter years which reflect a consistent pattern of residuals. In the process it was determined that the Summer and Winter variables for LNDEVAPMA3 yield a stronger relationship than the single variable. This final regression (Figure 16) is the one used to normalize the weather for LDR customer demand in DMR F (Danville, San Ramon, and Alamo).

Figure 15 Graph of the regression fit from Figure 14



For this last regression in the process of finding the best fit (in Figure 16), the R^2 is almost perfect with 99.1% of the variation in monthly water use explained by just the SI (normal seasonality) and a 3 Month Moving Averages of Net Evaporation viewed separately for summer and winter months. Note that this regression analysis is for the period 2000 through 2006 to avoid the unexplained lower consumption in the period 1996-1999.

Figure 16 Regression Output for LDR gpd/a on SI & LDNEVAPS&WMA3

Dependent Variable: SFRDMRFGPD
Method: Least Squares
Date: 01/30/08 Time: 18:01
Sample: 2000M01 2006M12 (Note change of timing)
Included observations: 84

	Coefficient	Std. Error	t-Statistic	Prob.
SFRDMRFSI	543.1754	2.403083	226.0328	0.0000
LDNEVAPSMA3	53.82097	7.121228	7.557821	0.0000
LDNEVAPWMA3	40.38463	3.755506	10.75345	0.0000

R-squared	0.991016	Mean dependent var	544.1758
Adjusted R-squared	0.990794	S.D. dependent var	240.9431
S.E. of regression	23.11781	Akaike info criterion	9.154145
Sum squared resid	43289.09	Schwarz criterion	9.240960
Log likelihood	-381.4741	Hannan-Quinn criter.	9.189044
Durbin-Watson stat	1.008917		

The Regression Equation

The data in Figure 16 provides a formula or equation for forecasting (actually back-casting) monthly demand based on the SI and weather variables.

$gpd/a_t = 543.2*SI_t + 53.8*$ $\text{LDNEVAPSMA3}_t + 40.4*$ $\text{LDNEVAPWMA3}_t + e$

This formula yields the forecast of monthly gpd/a that is given in the top array of Figure 15 (using the right scale). With an R^2 of 0.991, it is not surprising that the forecast is nearly perfect as compared with actual demand; and the residuals (unexplained variation) are mostly within one standard error of the mean of zero (bottom part of the figure using the left scale). Note the highlighted Standard Error of 23.1 in Figure 16, which indicates an expected 68% level of confidence that the forecasts made would fall within the ± 23.1 gpd/a range. For a t-statistic of 2.0, an expected 95% level of confidence applies that forecasts would fall within ± 2 x 23.1 gpd/a or 46.1 gpd/a, leaving only a 2.5% probability in each tail of a probability distribution that the actual values would exceed the forecasted values, ± two standard errors. The average monthly volume is 544 gpd/a and the monthly range is from 250 gpd/a to 900 gpd/a. There are two outlier periods, one in the fall of 2000 and one in early 2004 which are of unknown origin. The rest of the forecasts are within the two standard errors, that is, within ± 46.1 gpd/a.

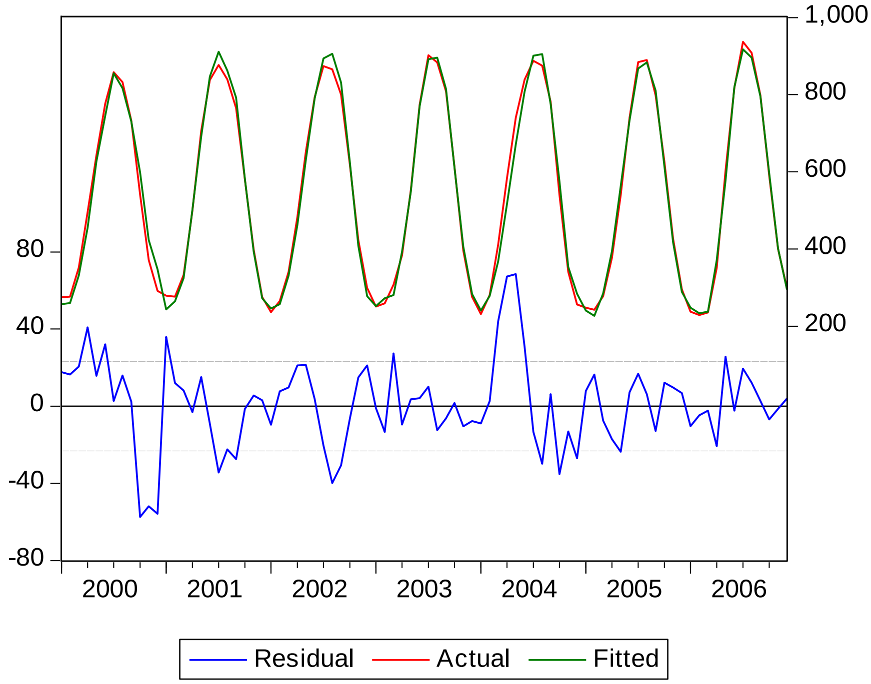
If this forecast model were used to actually forecast future periods, the two weather variables would probably be set to zero since forecasting long-term monthly weather is not feasible. In this case the forecast would then simply be the Average Demand times the SI. To convert this forecast from gpd/a to thousands of gallons, the formula would be changed to include multiplying by the forecasted number of accounts and the number of days in the month divided by 1,000 to get to TGALS.

$TGALS_t = (543.2*SI_t * accounts_t * \text{days in month}_t)/1{,}000$

No error term is used in this formula because new conditions (omitting weather and adding account forecasts) have been added.

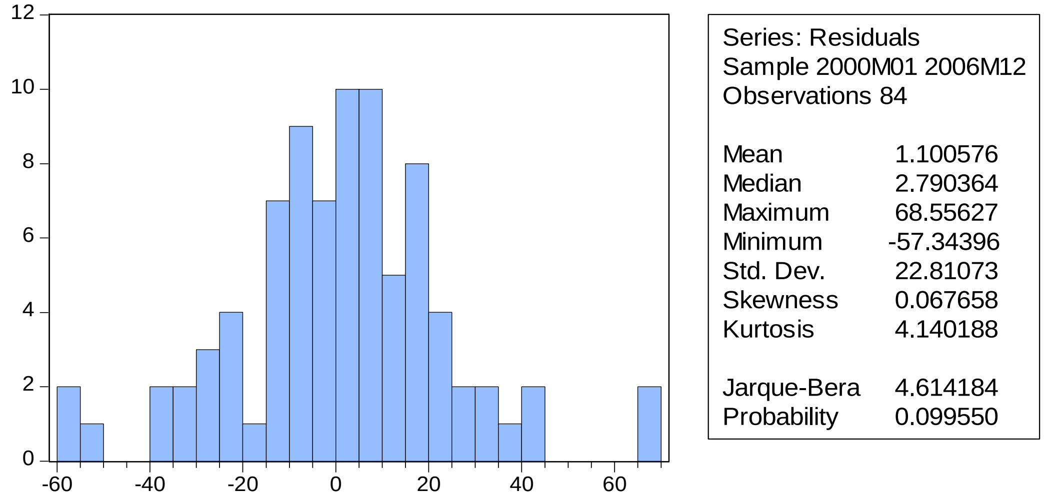
Actually, the average or typical or baseline demand in gpd/a would be used rather than the coefficient from the regression analysis (543.2) because that average could have other adjustments applied to it related to economic or demographic conditions. The rest of the formula remains appropriate.

Figure 17 Regression Fit from Figure 16



The residuals at the bottom of Figure 17 can be shown in a histogram or frequency distribution (Figure 18) to get a good view of their shape. The desired characteristics of regression residuals are that they have a mean of zero and that they are concentrated around the zero mean in a normal probability pattern (bell shaped curve). The mean of this histogram is 1.1 which is close enough to zero and the distribution is quite normally distributed with those two outliers identified above sticking out at each end.

Figure 18 Histogram of Residuals from Regression Analysis in Figure 16



The last test that will be discussed is the Mean Absolute Percentage Error (MAPE), which is 6.2% in Figure 19. This is a standard statistical test that is done automatically in the regression software. It gives the average absolute (without ± sign) forecast error that is shown in Figure 17) both in terms of the magnitude (28.9 gpd/a) and as a percentage (6.2%) of actual demand. The MAPE is shown here to reflect another way to express the high degree of variation in the dependent variable that is explained by the regression analysis. The MAPE is also useful to compare the regression results from the use of different variables and between different data sets (customer groups and DMRs). MAPE values in the 5% to 10% range are considered excellent for most time series analysis.

Figure 19 Summary of Mean Absolute Error and MAPE from regression in Fig 16

Forecast: LDRDMRFGPDF
Actual: LDRDMRFGPD
Forecast sample: 1995M12 2006M12
Adjusted sample: 1996M01 2006M12
Included observations: 132

Root Mean Squared Error	45.49321
Mean Absolute Error	28.89757
Mean Absolute Percentage Error	6.218479

WEATHER NORMALIZATION & BASELINE DEMANDS

The Weather Normalization and Baseline or Average Demand factors are separately calculated because they serve separate purposes; however, the Baseline Demand factor is derived from the use of weather normalized water consumption and therefore requires the weather normalization process for its derivation. This section will provide a brief description of the two processes and the following section will step through the actual calculation of the factors for each.

Weather Normalization
The underlying statistical basis for weather normalization has been described in the prior sections on time series analysis and regression analysis. Given the statistical results, the calculation and removal of the abnormal weather effects from actual water consumption is quite straightforward:

1. The weather variable coefficients derived from the regression analyses give the change in gpd/a consumption that results from a unit change in the weather variable.
2. Therefore the effect of weather on demand can be removed by calculating the effect and reversing it, that is, simply changing the sign of the coefficients from positive to negative for temperature and evaporation variables and from negative to positive for rainfall variables. All of the departure variables were derived as the difference between actual weather values for each month and the 35 year average for those months, that is, Actual weather for each month less Average weather over 35 years. Consequently, regression coefficients for temperature and evaporation variables must be positive since consumption increases with increases in temperature, and coefficients for rainfall variables must be negative since consumption decreases with increases in rainfall; and removing the effect of abnormal weather is done by reversing the signs of these variables.
3. The mechanics of calculating these impacts are demonstrated in the next major section of this TM.

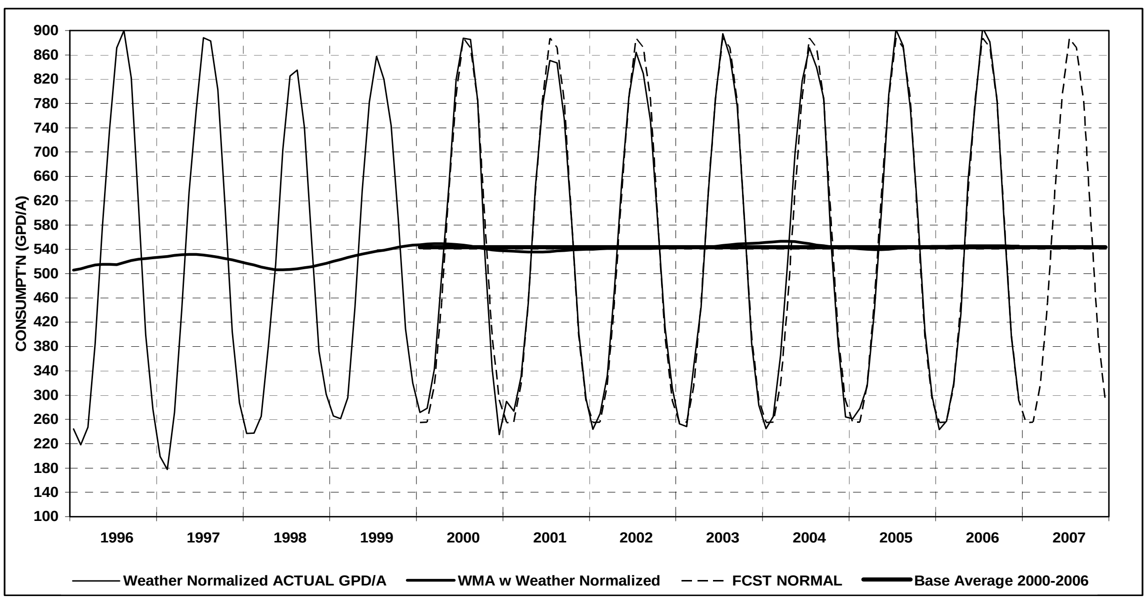
Baseline or Average Demand
Identifying the baseline level of demand for projecting demand into future periods equates to finding the level of demand that is most representative of historical patterns and most likely to provide an accurate base for projections. Historical water consumption for most of the LDR and Irrigation customers, particularly in the EOH regions demonstrated good to excellent stability during the 2000 through 2006 period. In most cases an average of consumption in that period provides a good basis or baseline for projections of the future gpd/a level of consumption.

In some cases with the LDR customers and in many cases with the HDR and Non-Res customers, the average volume of the last seven years most likely does not represent a sound long-term baseline for projections. The consumption during this period in many cases decreases substantially from the level of the early years due to non-weather related factors. The objective in this study is to clearly identify the current level of demand and the earlier level (if materially different) to define the potential for recovery or change that should be applied in the projection process.

The easiest way to see the differences in historical patterns of water consumption is by use of the Tracking Models that were developed and utilized to calculate Seasonal Indices, WMA, the impact of weather normalization on the base year (2005), and the Baseline demand that is calculated using weather normalized consumption. A primary graphic from the Tracking Model is given in Figure 20 for LDR customers in DMR F (Danville, San Ramon, Alamo). This graph has four variables.

1. Weather normalized actual gpd/a: This is the actual reported water consumption modified by removing the effects of weather as determined from the regression coefficients.
2. WMA: A 13 Month WMA of the weather normalized monthly water consumption has been applied. It is quite visible in the first four years since those years have a fairly small unexplained lower level of demand. In the years 2000 through 2006 the WMA is virtually coincident with an average of those years which constitutes a baseline or average water demand expressed as gpd/a.
3. Average or Baseline Demand: Baseline demand has been identified as the averaged demand for the years 2000-2006. For LDR customers in DMR F (Danville, San Ramon, Alamo), this is an almost perfectly stable situation with the WMA slightly below the Baseline in 2001 and slightly above the Baseline in 2004. This fit is consistent with the 99.1% of the variation (R^2) in demand being explained by the SI and LDNEVAP variables.
4. A forecast of Normal Demand is given for the baseline period (2000-06) which is the product of the SI times the Baseline Average. That forecast has been extended though 2007.

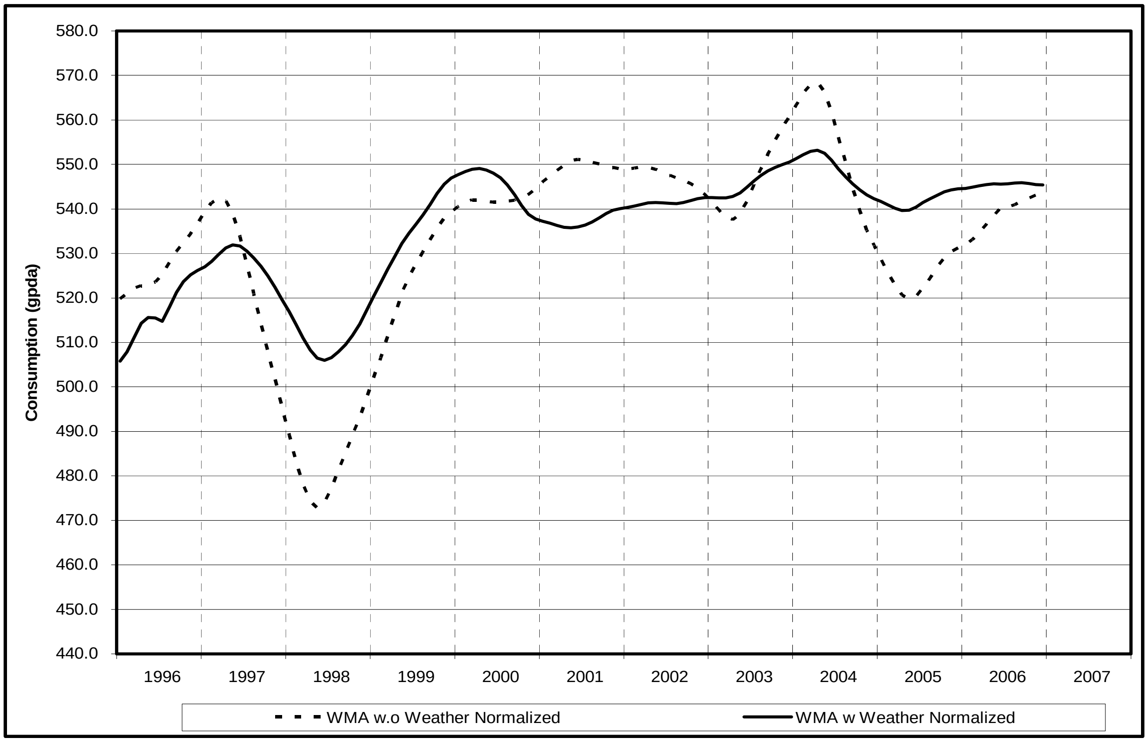
Figure 20 Tracking Model Graph of Weather Only Normalized Demand with WMA for LDR Customers in DMR F



Before the weather normalization adjustment was applied to actual monthly demand, a WMA was calculated for comparison with the WMA after the weather normalization. The impact of normalization can then be seen as the difference between the two WMAs and is given in Figure 21.

The scale of this graph has been enlarged to accentuate the impacts of weather which would not be so visible if the scale used in Figure 20 were used. The normalization changes were as high as -14 gpd/a in 1996-97, +34 gpd/a in 1998, -15 gpd/a in 2001 and 2004 and +20 gpd/a in 2005. These are not huge adjustments but the effects of weather on water demand are statistically highly significant, that is, there is a 97.5% or greater probability that weather actually caused the differences shown. Note how these adjustments fit the matching profile of gpd/a and LDNEVAP in Figure 12.

Figure 21 Impact of Weather Normalization, Comparison of WMAs Before & After Weather Normalization

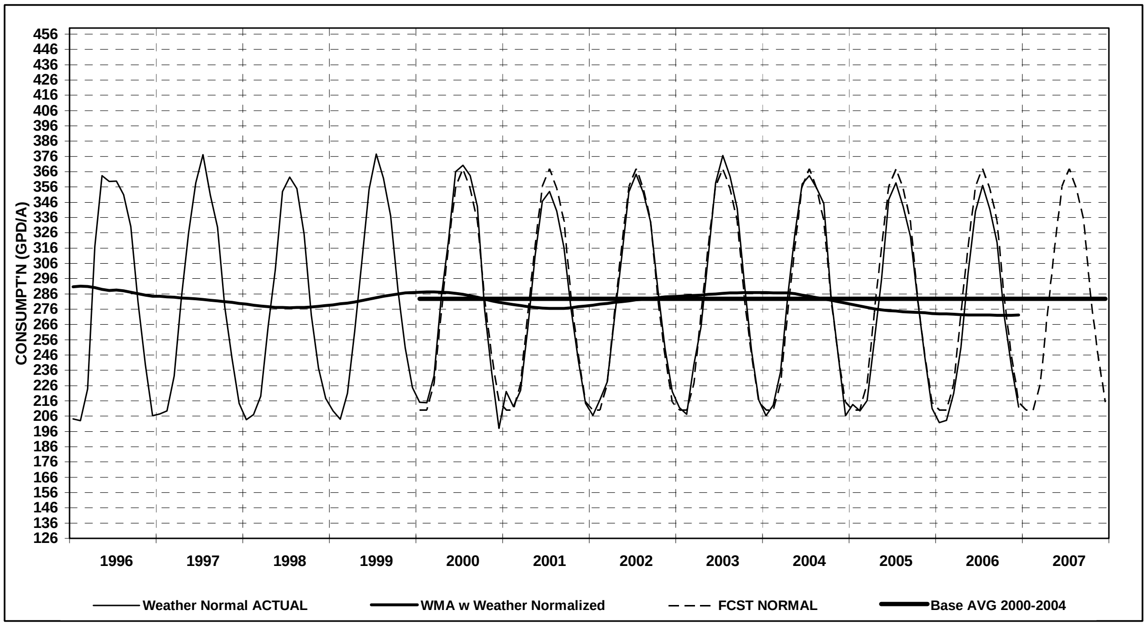


This completes a single situation (LDR customers in DMR F) illustration of the analytical process for defining the impact of weather on water demand and calculation of Baseline or Average Demand for projections. The exact same process was applied to the other 43 combinations of customer groups and DMRs. Most of them had the almost perfect regression fit that occurred in the illustration for DMR F. It will be useful to use two others that did not have such a good fit to demonstrate the development of the baseline factors that were developed using the weather normalized water consumption.

LDR Customers for DMR AN (Pinole, El Sobrante, Hercules, Rodeo, Crockett)
The LDR customer demand for DMR AN (Pinole, etc.) provides a good example of the need to go beyond weather normalization to define base year demand. In Figure 22, it can be seen that there is a drop off of demand in 2005 and 2006. The WMA in this case, as in the prior case, already includes the weather normalization; however, demand in 2005, the base year that could be used for projections to 2040, is below the average demand for the 2000 through 2006 period. The question that must be answered is whether the drop off of demand in 2005 and 2006 will be permanent, as might be caused by permanent conservation measures, or temporary, as caused by economic or demographic events that will turn around. Data are not available to address the causes for changes in demand except as caused by weather. The second factor, the baseline or

average demand adjustment factor, gives the percentage that 2005 actual Water Consumption must be increased to equal the Baseline level reflected in the Average for the period 2000 through 2006. This level of demand is considered the best base for projections unless additional information is uncovered to warrant departing from the seven year average.

Figure 22 Tracking Model Graph of Weather Only Normalized Demand with WMA for LDR Customers in DMR AN (Pinole, etc.)

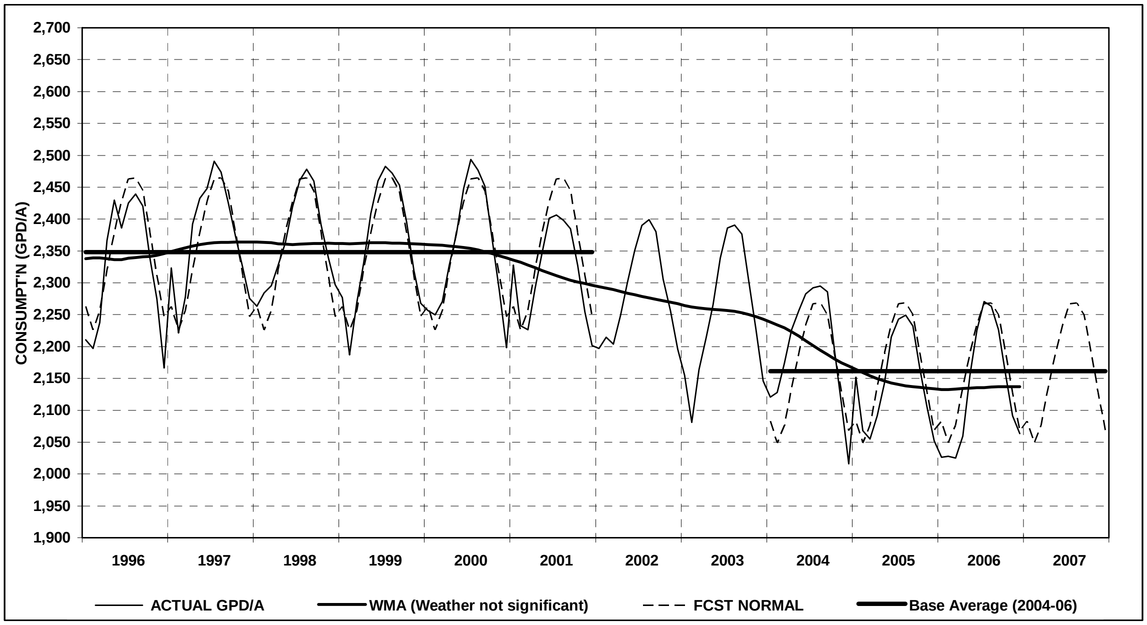


HDR Customers in DMR GC (Oakland, Berkeley, Albany, San Pablo)

Many of the HDR and Non-Residential customer group regions experienced large drops in demand as compared with the drops in LDR demand. The HDR demand in DMR GC (Oakland, etc.) provides a good illustration. It has been determined by regression analysis that the large drop in water demand in the HDR customer group in DMR GC is correlated with lower dwelling unit occupancy percentages, although it is unknown if this is the cause. The pattern of water demand for this situation is shown in Figure 23 which reflects two tiers of demand. The drop from the first level to the second could not logically or statistically be attributed to weather. For this data set, the weather variables were not significant in the regression analyses mostly because of the missing variable(s) that caused the drop.

Occupancy rates for multi-family dwellings were available for this DMR. The occupancy rate was fully stable from 1996 through 2000 at an average of 97.6%. The following years experienced a steady decline to a low of 92.7% in 2004 with a slight improvement to 93.7% in 2005. The occupancy rates beginning in 2001 were expressed as a regression variable in terms of ratios of the stable average prior to 2001 and included in a regression analysis with the SI and weather variables. The occupancy variable was calculated as actual occupancy minus the 1996-00 average so that the variables would appear as negative values as occupancy decreased. The weather variables were still not significant but the occupancy variable was highly significant as shown in Figure 24.

Figure 23 HDR Water Consumption for DMR GC with WMA and Tiered Levels



The total reduction in demand in Figure 23 was 186.7 gpd/a (2,348.3 minus 2,161.6). The regression coefficient for occupancy (37.85 gpd/a in Figure 24) times the maximum drop in the occupancy rate (4.9%) equals 185.5 gpd/a, which accounts for virtually all of the 186.7 gpd/a decrease in demand based on the baseline average from 2004-06; if 2005-06 (which is lower) had been used as the baseline average, the total decline would have been 208.3 and the occupancy variable would have accounted for 89.1% of the decline.

The inference to be drawn from this exercise is that there are various non-weather related factors that affect demand and their effects can be accounted for by using the average of recent years as the baseline demand. There are other situations (combinations of Customer Groups and DMRs) that have similar incongruent patterns such as described above for HDR customers in DMR GC. No effort was applied to identify the causes for the abnormalities. These situations that have two levels of demand have been shaded in the summary of adjustment factors in Attachment A as a reminder that further analysis is required to identify the most likely pattern of recovery, if any, from the depressed level in the 2000-2004 period.

Figure 24 HDR Accounts in DMR GC; Effect of Lower Occupancy Rates

Dependent Variable: HDRDMRGCGPD
Method: Least Squares
Date: 12/19/07 Time: 20:57
Sample (adjusted): 1996M01 2006M12
Included observations: 132 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
HDRDMRGCSI	2345.491	5.014318	467.7587	0.0000
GCOCCUPANCY	37.85288	1.921963	19.69491	0.0000
R-squared	0.862016	Mean dependent var		2283.947

CALCULATING THE ADJUSTMENT FACTORS

The logic and methodology for quantifying the effects of weather and baseline demand have been presented in previous sections. This section provides a step-by-step example of the calculation of the percentage factors that yield weather normalized and baseline demand for 2005. Two factors have been developed.

1. The Weather Normalization Factor which gives the percentage adjustment that must be applied to actual 2005 water demand to remove the calculated impact of weather departures from normal on water demand.
2. The Baseline Factor which gives the percentage adjustment that must be applied to actual 2005 Water Demand to restate 2005 in terms of the average weather normalized conditions of recent years, which are considered a sound Baseline volume (in gpd/a) for projections of future demand, allowing for the fact that some of the situations require identifying a recovery path from the current depressed baseline to a long-term baseline.

WEATHER NORMALIZATION FACTOR

The 2040 Demand Study used 2005 as the base year for projections of water demand to 2040. As can be seen from the various weather graphs provided in prior sections of this TM, 2005 was not a 'normal' weather year in all respects. LMDT was virtually normal in terms of the average temperature per month for the sum of all months, although selected months reflected significant positive and negative departures from normal. LEVAP was similarly virtually normal for the entire year. However, rainfall was 12.4 inches above normal, and this caused Lafayette Net Evaporation (a highly significant variable in the analysis) to be 4.93 inches below normal. This adverse weather caused water demand to be below normal.

The normalization goal is to remove the effect of abnormal weather from the 2005 water consumption which is done by reversing, that is removing, the calculated impact of weather on water consumption in 2005. The calculated impact of weather is given by the sum of the product of the coefficient of each weather variable times the value of the weather variables for all the months in 2005. The sign (±) of each coefficient was reversed to remove the weather impact.

The adjustment factors that were developed by this process for all customer groups and DMRs are expressed as the percentage increase/decrease to 2005 actual demand that must be applied to get to Weather Normalized demand. In other words, (100% + the % factor) times Actual 2005 demand yields Weather Normalized 2005 demand. The calculations of weather normalization were done <u>for all years</u> of data availability in the Tracking Models that have been described in earlier sections. An example is provided to demonstrate the process for 2005, the Base Year.

The Weather Normalization Factor is derived by multiplying the weather variable coefficients by the weather variables for each month in 2005, converting the gpd/a data to thousand gallons (tgals), summing the results for all 12 months, dividing that total by the actual consumption, and multiplying by 100 to convert the ratio result to a percentage. The calculation of the Weather Normalization Factor is demonstrated in Figure 25 for LDR customers in Region F. The calculation includes four steps:

1. Actual 2005 water consumption in thousand gallons per month and year. This data was taken directly from the Consumption Database provided by the District and is given in Column 3 of Figure 25. The sum for the year is at the bottom of the column.
2. The weather impact in gpd/a. The Tracking models and all regression analyses are done in gpd/a; so this first step is in gpd/a. The weather impact is derived as the product of the regression coefficients for the weather variables times the value of the weather variables.
    a. Regression Coefficients: The weather coefficients were derived in the regression analysis (as shown in Figure 16) and are displayed in Columns 5 and 7.
    b. The two weather variables that were most significant in the analysis are:
        i. Lafayette Reservoir Departure of Net Evaporation from normal for summer months (June through October), expressed as a 3 month moving average: LDNEVAPS3. In Column 6 of Figure 25.
        ii. Lafayette Reservoir Departure of Net Evaporation from normal for winter months (November through May), expressed as a 3 month moving average: LDNEVAPW3. In Column 8 of Figure 25.

       The derivation of these variables is provided in the Weather Database provided to the District in an Excel Workbook.
    c. The Weather Impact and conversion from gpd/a to thousands gallons is given for each month and the total year by:
       Σ [(Col 5 x Col 6 + Col 7 x Col 8) x Col 2 x Col 4]/1,000 = Col 9. The Σ at the bottom of the array.
3. Calculating the Weather Normalization Factor. The factor is simply the ratio between the annual Weather Normalization Impact (Col 9) and Actual 2005 Consumption (Col 3), converted to a percentage. For the case in Figure 25 it is: 227,302/7,685,829 = 0.0295 x 100 = 2.95%.

4. Applying the Factor: The weather normalization factor is the percent increase that must be added to Actual 2005 Consumption to remove the abnormal weather impact. The amount can either be added to Actual 2005 Consumption, or take Actual 2005 Consumption times 1.0295 (102.95%) to get weather normalized 2005 consumption.

Figure 25: Example for Calculation of Weather Normalization Factor for LDR in DMR F (Danville, San Ramon, Alamo) for 12 months in 2005

1	2	3	4	5	6	7	8	9
Month	Days/ Month	Actual Consump tgal/mo	Number of Accounts	Summer Coefficient gpd/a	LDNEVAPS3 Value Inches/mo	Winter Coefficient gpd/a	LDNEVAPW3 Value Inches/mo	Weather Impact tgals/mo
Jan	31	305,838	39,714	-53.82	0.00	-40.38	-0.32	16,110
Feb	28	270,114	39,693	-53.82	0.00	-40.38	-0.87	39,105
Mar	31	341,204	39,644	-53.82	0.00	-40.38	-0.92	45,460
Apr	30	448,833	39,641	-53.82	0.00	-40.38	-1.48	71,061
May	31	664,777	39,688	-53.82	-0.55	-40.38	-0.88	79,732
Jun	30	880,969	39,658	-53.82	-0.42	-40.38	-0.76	63,752
Jul	31	1,088,731	39,696	-53.82	-0.32	-40.38	0.00	21,037
Aug	31	1,095,798	39,706	-53.82	0.28	-40.38	0.00	-18,295
Sep	30	951,244	39,729	-53.82	0.54	-40.38	0.00	-34,564
Oct	31	772,473	39,792	-53.82	0.43	-40.38	0.08	-32,622
Nov	30	510,617	39,797	-53.82	0.38	-40.38	0.02	-25,835
Dec	31	365,231	39,803	-53.82	0.00	-40.38	-0.05	2,361
Total		7,695,829						227,302
Factor								2.95%

BASELINE OR AVERAGE DEMAND ADJUSTMENT FACTOR

This factor recognizes that the abnormal weather is not the only factor that can distort normal water consumption in any given year. Economic, demographic and simply unexplained random events can cause water consumption to drop or spike in the short run. When these aberrant influences affect the base year used for projections, a better estimate of base year demand can be derived by averaging weather normalized water consumption for a number of recent years that reflect overall stability even though the individual years might be somewhat erratic, either positively or negatively departing from the average.

An average of consumption for the period 2000 through 2006 was used for all except twelve cases for which the seven years of data was not stable enough. Figure 20 is a graph that reflects almost perfect stability from the use of weather normalization only. Figure 22 is a graph that reflects unexplained lower consumption in 2005 and 2006. The average of the seven year WMA in the Tracking Model in Figure 22 is considered a better baseline for projections than weather normalized 2005 consumption which is well below the seven year average.

For the twelve cases that reflected an unstable pattern of consumption over the eleven year period, the average for the period 2004 through 2006 was used which was substantially more stable but at a lower level than prior years. The lower level of demand is thought to be related to economic conditions that may presumably return to normal over the planning period of the Demand Study. All of these twelve cases were WOH locations; seven were HDR customers and five Non-Res customers. (All LDR and IRR regions used the 2000-2006 base period.) A representative example of the less stable cases can be seen in Figure 23, which is a graph of gpd/a water consumption for HDR accounts in DMR GC. These situations require additional review to identify a path or recovery pattern to some portion of the early period level of consumption, which was outside the scope of this TM.

The calculation of Baseline Consumption for 2005 includes six steps:

1. Actual 2005 water consumption in thousand gallons per month and year. This data was taken directly from the Consumption Database provided by the District and is given in Column 3 of Figure 26. The sum for the year is at the bottom of the column.
2. The baseline average of 2000 through 2006. This average is taken from the tracking model expressed in gpd/a and is given in Column 4 of Figure 26. It is the average of the Weighted Moving Average (WMA) that is calculated through the <u>weather normalized consumption</u> for all the years in the analysis.
3. Seasonal Water Consumption: Seasonal water consumption must be included in the calculation to derive the different amounts of consumption in each month to give proper weight to number of accounts and days in each month. The normal monthly water consumption is given by the product of the Baseline gpd/a (Column 4) times the Seasonal Index (Column 5) with the result in Monthly gpd/a Baseline Consumption (Column 6).
4. Monthly and annual Baseline or Average Consumption in thousands of gallons over the seven year period is given by converting the Monthly Baseline (Column 6) from gpd/a to thousands of gallons per month by multiplying Column 6 by the number of accounts in Column 7 and by the number of days in the month (Column 2), and dividing by 1,000 to convert from millions to thousands of gallons. The result is the Baseline Consumption in Column 8 in thousands of gallons.
5. Calculating the Weather Normalization Factor. The factor is simply the ratio between the Baseline Consumption (Col 8) and Actual Consumption (Col 3), converted to a percentage change. For the case in Figure 26 it is: 7,905,045/7,685,829 = (1.0272 -1) x 100 = 2.72%.
6. Applying the Factor: The Baseline Consumption Factor is the percent increase that must be added to Actual 2005 Consumption to restate 2005 volume on the basis of the average of the years 2000 through 2006. The 2005 Baseline amount can be derived by multiplying Actual 2005 Consumption by 1.0272 (102.72%).

The Weather Normalization and Baseline Factors for all customer group/DMR combinations are provided on Attachment A.

Figure 26: Example for Calculation of 2005 Baseline Factor for LDR in DMR F (Danville, San Ramon, Alamo)

1	2	3	4	5	6	7	8
Month	Days/ Month	2005 Actual tgal/mo	Baseline Average gpd/a	Seasonal Index	Monthly Baseline Col 4x5	Number of Accounts	Baseline Demand tgal/mo
Jan	31	305,838	543.7	0.47	254.8	39,714	313,684
Feb	28	270,114	543.7	0.47	255.4	39,693	283,803
Mar	31	341,204	543.7	0.58	316.6	39,644	389,048
Apr	30	448,833	543.7	0.83	452.6	39,641	538,296
May	31	664,777	543.7	1.17	634.8	39,688	781,019
Jun	30	880,969	543.7	1.45	790.0	39,658	939,945
Jul	31	1,088,731	543.7	1.63	887.3	39,696	1,091,944
Aug	31	1,095,798	543.7	1.60	871.7	39,706	1,072,964
Sep	30	951,244	543.7	1.44	784.8	39,729	935,381
Oct	31	772,473	543.7	1.08	588.0	39,792	725,358
Nov	30	510,617	543.7	0.73	397.0	39,797	473,935
Dec	31	365,231	543.7	0.54	291.5	39,803	359,668
Total		7,695,829					7,905,045
Factor							2.72%

Attachment A

SUMMARY OF WEATHER AND BASELINE ADJUSTMENT FACTORS

Weather Only Normalization Factors

Location	LDR	HDR	IRR	Non-RES
East:				
D	3.49%	0.16%	4.37%	1.86%
E	2.55	0.31	3.65	1.20
F	2.95	1.08	2.29	1.28
H	2.52	0.49	3.22	0.96
West:				
AN	3.24%	1.26%	3.39%	-0.12%
AS	3.79	0.00	8.26	0.45
B	1.97	0.00	5.28	1.48
C	2.85	0.67	3.79	0.27
GC	1.98	0.00	3.53	0.10
GN	2.02	0.78	4.46	0.00
GS	1.48	0.00	4.37	0.14

Baseline Adjustment Factors

Location	LDR	HDR	IRR	Non-RES
East:				
D	4.51%	6.83%	9.70%	6.19%
E	2.30	4.48	4.52	8.97
F	2.72	2.16	10.41	1.66
H	2.84	0.81	7.53	2.45
West:				
AN	6.19%	1.36%	4.86%	-1.76%
AS	7.36	-0.11	26.48	3.02
B	5.81	0.66	26.02	1.96
C	4.49	0.74	7.99	2.19
GC	6.40	7.93	13.24	0.38
GN	6.13	-0.43	16.34	2.60
GS	4.11	0.66	15.34	-0.20

Note: Shading denotes that these cases have two levels of demand, high in early years as compared with later years that could require further analysis since the lower demands in the later years are not likely to remain low over an extended period. The factors in this table are based on the latter period, that is, the lower period of demand.

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Attachment B

	Summary of Weather Variables Used by Customer Type & Region										
Customer Type & Location											
Low Density Residential:	Variable # 1			Variable # 2			Variable # 3			% of 2005	Regression
EOH Regions:	Name	Coefficient	t-Value	Name	Coefficient	t-Value	Name	Coefficient	t-Value	Impact	R2
D	LDNEVAPS3	50.98	7.3	LNDEVAPW3	44.77	11.6				3.49	0.992
E	LDNEVAPS3	53.96	8.4	LNDEVAPW3	32.37	9.5				2.55	0.991
F	LDNEVAPS3	53.82	7.6	LNDEVAPW3	40.39	10.8				2.95	0.991
H	LDNEVAPS3	38.22	7.9	LNDEVAPW3	26.08	10.2				2.52	0.991
WOH Regions:											
AN	SPDNEVAPP3	10.91	4.7	SPDNEVAPN3	22.83	11.2				3.24	0.982
AS	SPDNEVAPP3	6.02	2.1	SPDNEVAPN3	22.13	7.0				3.79	0.970
B	USLDNEVAPP3	18.91	8.0	USLDNEVAPN3	15.03	10.0				1.97	0.981
C	USLDNEVAPS3	11.30	5.6	USLDNEVAPW3	20.64	16.3				2.85	0.987
GC	SPDNEVAPP3	5.22	2.5	SPDNEVAPN3	11.11	4.7				1.98	0.939
GN	SPDNEVAPP3	5.05	2.4	SPDNEVAPN3	10.70	4.4				2.02	0.926
GS	USLDNEVAPP3	10.23	5.0	USLDNEVAPN3	9.74	7.4				1.48	0.975
High Density Residential:											
EOH Regions:											
D	LDMDTS3	65.77	1.8	LDMDTW3	165.40	6.0	LDR2-3	266.60	-4.3	0.16	0.971
E	LDMDTS3	107.11	3.2	LDMDTW3	149.96	6.0	SPDR3	-120.95	-2.1	0.31	0.977
F	LDNEVAP3	68.25	4.2	-			-			1.08	0.934
H	LDNEVAP3(-1)	24.37	2.2	LDR2-3(-1)	-75.19	-3.5				0.49	0.933
WOH Regions:											
AN	USLDNEVAPS3	103.99	2.3	USLDNEVAPW3	102.18	4.4				1.28	0.782
AS	Weather not significant									0	
B	Weather not significant									0	
C	USLDNEVAP3	51.47	3.0							0.67	0.690
GC	Weather not significant									0	
GN	SPDNEVAP3	66.90	3.1							0.78	0.722
GS	USLDNEVAP3	29.74	1.9							0.38	0.651

Attachment B

Irrigation Accounts:		Variable # 1			Variable # 2			Variable # 3			% of 2005	Regression
EOH Regions:		Name	Coefficient	t-Value	Name	Coefficient	t-Value	Name	Coefficient	t-Value	Impact	R2
	D	LDNEVAPP3	577.94	4.6	LDNEVAPN3	404.75	4.3				4.37	0.960
	E	LDNEVAPS3	310.90	5.9	LDNEVAPW3	283.00	6.9				3.65	0.942
	F	LDNEVAPP	270.77	4.4	LDNEVAPN	287.90	5.0				2.29	0.967
	H	LDNEVAPP3	102.14	4.7	LDNEVAPN3	126.88	6.3				3.22	0.970
WOH Regions:												
	AN	USLDNEVAPP3	554.67	8.2	USLDNEVAPN3	332.61	8.0				3.39	0.981
	AS	SPDNEVAPP3	450.92	5.8	SPDNEVAPN3	423.26	6.7				8.26	0.974
	B	USLDNEVAPP3	569.16	4.5	USLDNEVAPN3	372.92	4.8				5.28	0.923
	C	USLDNEVAPP3	353.09	5.9	USLDNEVAPN3	249.64	6.8				3.79	0.973
	GC	USLDNEVAPP3	357.08	7.1	USLDNEVAPN3	228.08	7.4				3.53	0.976
	GN	SPDNEVAPP3	389.24	3.7	SPDNEVAPN3	331.59	3.8				4.46	0.924
	GS	USLDNEVAPP3	321.72	3.4	USLDNEVAPN3	253.08	4.4				4.37	0.915
Non-Res Accounts:												
EOH Regions:												
	D	LDNEVAPS3	39.00	2.5	LDNEVAPW3	92.13	7.0				1.86	0.963
	E	LDNEVAPS3	26.98	2.2	LDNEVAPW3	36.31	3.5				1.20	0.921
	F	LDNEVAPS3	91.40	5.8	LDNEVAPW3	76.39	5.8				1.28	0.966
	H	LDNEVAPS3	19.54	3.5	LDNEVAPW3	34.14	7.0				0.96	0.966
WOH Regions:												
	AN	LDMDT	39.73	2.8							0.12	0.706
	AS	SPDNEVAP	35.05	2.2							0.45	0.771
	B	USLDNEVAPP3	101.31	4.0	USLDNEVAPN3	66.94	4.1				1.48	0.890
	C	USLDNEVAPP3	111.02	4.8	USLDNEVAPN3	41.05	2.8				0.27	0.950
	GC	USLDEVAP	11.67	3.1							0.10	0.866
	GN	Weather not significant									0	
	GS	USLDEVAP	19.58	2.0							0.14	0.900

STATISTICAL BACKGROUND INFORMATION ON REGRESSION ANALYSIS

This appendix describes some of the statistical terminology and the methods used in analyzing monthly water consumption by customer classes and areas. While the methods described herein are specifically directed at water demand analysis, the terminology can be found in any good intermediate statistics book for further reading and study.

- **Regression Analysis** - This is a statistical technique that relates one dependent variable (such as monthly water consumption) with one or more independent variables (such as number of accounts, population, climate, water price). This appendix relates to monthly data. The pattern of the dependent variable depends on or is caused by the independent variables. The requirement is that there is a logical or real causal relationship between the dependent variable and the independent variables. Water use is usually expressed on a per account (gpd/a) or per capita (gpcd) basis to eliminate the impacts of account/population growth on water use.

  In water demand analysis, the dependent variable is water production or consumption per account or per capita, and the independent variables are any number of economic, demographic, or climatic variables that might help to explain the pattern of consumption. Logically, the number of accounts, the time of the year (seasonality), weather departures from normal, household income, number of occupants in the household, water prices, and numerous other variables could contribute to water demand. The use of specific variables is governed by the practical availability of data to use in the analysis and by the value (significance) of the data as an explanatory variable. The relationship between the dependent variable (gallons per day per account = gpd/a) and the independent variable(s) is defined by a linear function of the form:

  $GPD/A = a + b_1 * x_1 + b_2 * x_2 + \ldots + b_n * x_n + e$, where

  "a" is an intercept or constant (if applicable)

  the "x" terms are the values for the independent variables for each period

  the "b" terms are the regression coefficients that define the change that occurs in GPD/A related to a unit of change in the independent variables.

  "e" is an error or residual term that is the variation in GPD/A that is not explained by the independent (explanatory) variables. It is referred to as unexplained variation, residual variation, or forecast error.

- **Total Variance** - The object of regression analysis is to explain the total variance in the dependent variable. Statistically, total variance in GPD/A is the squared sum of the deviations of each period's consumption from average consumption during the period of analysis.

$$VAR = \Sigma[\text{actual GPD/A} - \text{mean GPD/A}]^2$$

It is apparent from this relationship that VAR will be relatively small if actual GPD/A does not deviate much from average GPD/A, but will be relatively large if actual GPD/A deviates greatly from average GPD/A—which is always the case when dealing with monthly demand that has strong seasonality.

- **Standard Error** (called Standard Deviation when population rather than sample statistics are use) - The Standard Error is technically the square root of the average variance, or

  $$\text{Standard Error} = (VAR/n)^{1/2}$$

  The value of the Standard Error concept is that it provides a measure of probability to the decision making process in forecasting and in evaluating explanatory variables. In a normal probability distribution, a bell shaped curve, one Standard Error value on each side of the Mean value encompasses about 68 percent of the area under the normal curve. Similarly 96 percent of the area under the curve is within ± two Standard Errors of the Mean. In regression analysis, this concept is applied most often as the standard error of the estimate (that is, of the forecast) and as the standard error of the regression coefficients derived for each independent variable.

- **R^2** - This term is technically called the "coefficient of determination" in statistics. As a practical matter, it is the most widely used of all measures of "goodness of fit" and is simply referred to as R^2 (R Squared). The unique value of R^2 is that it provides (in ratio form) the percentage of variation in the dependent variable that is explained by the regression analysis on the independent variables. For example, if the value of R^2 is 0.90 for the regression of monthly GPD/A on a seasonal index of gpd/a and departures of precipitation and temperature from normal temperature, then it would be said that these three variables explain 90 percent of the variation in monthly GPD/A, and the remaining variation of 10 percent is said to be residual or unexplained variation. The object is, of course, to explain most of the variation with as few logically sound independent variables as possible, and to have the unexplained variation randomly distributed, that is, without a pattern. In other words, the residual variation or error term should be a random variable with a mean of zero and a constant standard deviation over the full range of independent variable values.
- "**t**" value is the test value most often used to measure "goodness of fit" for individual independent variables that enter the regression equation much like R^2 measures the "goodness of fit" for the entire relationship. The "t" value is not expressed directly in terms of the percentage of variation explained as is the case for R^2. Rather "t" is related to the concept of normal probability, using numbers of standard errors to define area under a nearly normal probability curve. Two standard errors leave about 5 percent of the area under a normal curve in the two tails, that is, 2.5% in each tail. In this context, including an independent variable in a regression analysis where the "t" value for that variable is 2.0 means that there is about a 5 percent probability (95 percent level of confidence) that the variable

could be significant in the regression equation by chance (that is, not be a true causal influence). Note that the 5 percent probability is based on 2.5 percent in each tail; so when measuring a coefficient's difference from zero (which is always the case for weather variables), a one tail test is appropriate and the level of confidence is 97.5 percent. A "t" value of 2.0 is usually used to include or exclude variables from regression equations, and that is the criterion that is recommended for the statistics of water demand analysis and forecasting.

- **Serial Correlation** or **Autocorrelation** is very common in time series analysis such as with monthly water consumption. There is a tendency for errors (residuals) in one period to be correlated with errors in preceding periods. If these patterns are predictable, that is, if they can be defined with a regression coefficient just like any other independent variable, then a coefficient should be determined for autocorrelation because its inclusion will make the coefficients for the other independent variables more true to their actual causal influence. Note that this blanket statement does not always apply when regressing with weather variables because the residuals are often highly correlated with the weather variables.

  The standard test used to determine if serial correlation exists in a time series is the Durbin-Watson (DW) test. The computed value of the DW test can range from 0.0, indicating extreme positive serial correlation, to 4.0, indicating extreme negative serial correlation. A DW value of 2.0 indicates no serial correlation. Generally, it is desirable that the DW value be within the range of 1.7 and 2.3.

  There are two frequently used methods for eliminating or reducing serial correlation from a time series:

  - ✓ The easier method is to include the dependent variable (lagged by one or more periods) as an independent variable. In other words, GPD/A in the current period is regressed on GPD/A in the prior period.

    $$GPD/A_{t} = C + x_1 * GPD/A_{t-1} + x_2 * Y + \ldots + x_n * Z + e$$

    This method works to reduce serial correlation but rarely eliminates it entirely.

  - ✓ The most effective method for reducing or eliminating serial correlation is to include an autoregressive term or variable as an independent variable. The process of including the autoregressive term is to find the coefficient that best measures the relationship of the forecast error for each period with a specified prior period. This process can be done for any prior period length; the most effective length is usually the immediately prior period (first order autocorrelation). Some statistical packages do not include the iterative routine that is required to find the best fit. (Note that the error values change with each trial coefficient, so that an iterative process is required until stability is reached.) In water demand analysis, between three and six iterations are frequently required to converge on a stable coefficient. As mentioned earlier, care must be exercised in the use of autoregressive terms in time series regression analysis since some weather variables are highly correlated with the autoregressive variables. This multicollinearity occurs because both the current month and the prior (lagged) month are correlated with the weather variables such that the correlation of the lagged residuals is also correlated. The use of both the weather variables and the autoregressive variable will dilute the strength of the weather coefficients.

- **Seasonality** - There is a distinct, measurable, almost universal pattern to water demand by month in comparable micro weather climates in Northern California, which is completely applicable to EBMUD. As one might suspect, there is a pronounced summer peak of demand that is primarily tied to irrigation but also can also include tourist and seasonal residents demand in some situations. Peak water use (July and August) for EBMUD's Low Density (mostly Single Family) Residential customers in the valley area east of the Oakland Hills (Region F) is 1.6 times average month demand as shown in the Seasonal Index in Figure 1.

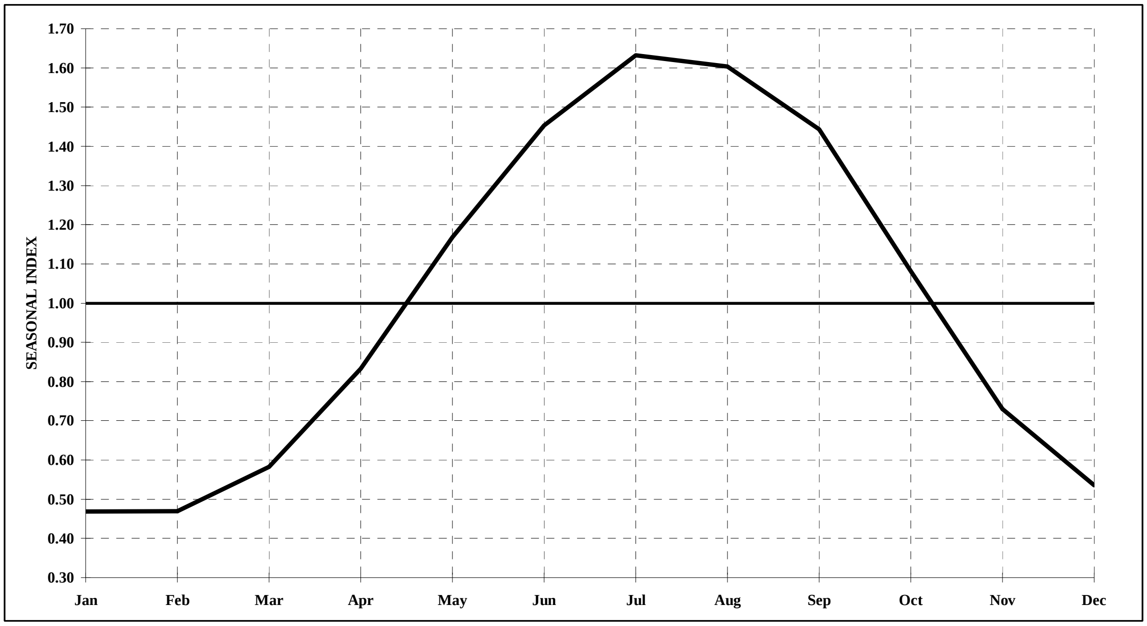
  Winter water consumption reflects the virtual absence of irrigation in the coldest and wettest months when water use is about 0.5 times average month uses. Water consumption in the lowest consumption months (January and February) is often used as a measure of indoor water use. The Seasonal Index can then be used to conveniently define typical summer, peak (summer minus indoor), indoor, and outdoor demand. This information is often useful in the design and performance measurement of conservation programs and in rate structure development.

  For non-residential accounts the Seasonal Index is not as closely tied to irrigation and indoor water use but can be useful to measure demand by season and Business Classification Code (BCC), for conservation programs and rate analyses.

  Most statistical programs use a weighted moving-average method to determine the seasonal influence of each period, by month for the case in Figure 1. The most frequently used method is to compute a centered 13 month moving average of the time series data which is centered on the middle, that is, the seventh month. Since the 13 months exceed the period of a year, the seasonal or monthly pattern is removed in the average. Then each month is expressed as a ratio to the moving average, and the ratios for all the Januarys, and all the Februarys . . . are averaged to derive a typical index (or ratio to average) for each month. The sum of all the monthly ratios is calibrated to equal 12. The graph in Figure 1 is for the Low Density Residential customer group in the EBMUD Demand Region F - Danville, San Ramon, Alamo.

  If the Seasonal Index is developed on a per account or per capita basis over a period of years that is long enough to be representative of average weather conditions, the SI will represent the "normal" demand pattern. In this case the regression of gpd/a water consumption on the SI will yield (for LDR accounts) a high R^2, generally in the 0.94 to 0.98 range, and can be the prime variable in regression analyses aimed at defining the impacts of weather on water demand. This SI can also be highly useful in forecasting monthly water demand and revenue.

SEASONAL INDEX for EBMUD Light Density Residential (LDR) Customers in Region F, based on 1996 through 2006 Data



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Appendix E

Future Adjustment Factor Table

Water demands are neither spatially nor temporally static. Existing demands change over time due to densification of lands, changes in land use, and demographic and economic changes associated with population and employment. Demands for new development differ from existing demands because of constantly evolving changes to land use, technology, related economic metrics, and consumption patterns.

This appendix contains a complete list of future adjustment factors developed for the 2040 Demand Study. The adjustment factors were developed to reflect future changes anticipated to existing demands due to changes in land use densities and patterns, demographic characteristics, and economic conditions. These adjustment factors do not include adjustments for unmetered water, normalization, non-potable water, and conservation; these are addressed elsewhere in the report.

Adjustment factors were developed by the water demand team of the 2040 Demand Study, which included economic and forecasting experts from both the District and outside consultants. The team applied their experience and knowledge in designing this unique process for developing adjustment factors. The factors presented here are very detailed: developed by land use, region, and time frame, resulting in 1,416 future adjustment factors. Although it is extremely difficult to develop absolutely accurate predictive factors due to the limited availability of predictive and spatial data, the process designed for this project nevertheless represents the most advanced methodology in the water resources industry that we are aware of. It should be noted though, that some data were of direct applicable value (e.g., sample consumption data), while other data (e.g. jobs per acre, infill potential) were used in conjunction with other sources of data. For example, if the jobs per acre or infill potential data resulted in LUDs that were significantly higher or lower than averages, the averages were used instead or in conjunction with the data.

The general approach used here was used in the previous EBMUD 2000 Demand Study with a base year of 1996; those projections tracked reasonably well over the 10 year period through 2005. The agreement of past projections and actual data supports the continued use of this method for developing adjustment factors. Although adjustment factors were developed for specific land uses and regions, the greater value is in the aggregate effect; it does well to capture larger regional changes and the total water needs forecast for EBMUD.

Future Adjustment Factor Table

Region	Land Use Category	Adjustment Factors					
		2010	2015	2020	2025	2030	2040
Existing Residential Factors							
D	ER0	0.00	0.01	0.03	0.04	0.06	0.10
E	ER0	0.00	0.01	0.03	0.04	0.06	0.10
AN	ER1	0.05	0.09	0.14	0.19	0.24	0.33
AS	ER1	0.03	0.06	0.09	0.13	0.16	0.22
B	ER1	0.03	0.06	0.09	0.13	0.16	0.22
C	ER1	0.04	0.08	0.11	0.15	0.19	0.26
D	ER1	0.05	0.10	0.15	0.19	0.24	0.34
E	ER1	0.04	0.07	0.11	0.15	0.19	0.26
F	ER1	0.04	0.08	0.12	0.17	0.21	0.29
GC	ER1	0.03	0.06	0.09	0.11	0.14	0.20
GS	ER1	0.02	0.04	0.06	0.09	0.11	0.15
H	ER1	0.03	0.06	0.10	0.13	0.16	0.23
AN	ER2	0.01	0.02	0.03	0.03	0.04	0.06
AS	ER2	0.01	0.02	0.04	0.05	0.06	0.08
B	ER2	0.01	0.03	0.04	0.05	0.07	0.09
C	ER2	0.02	0.04	0.07	0.09	0.11	0.15
D	ER2	0.01	0.02	0.03	0.04	0.05	0.08
E	ER2	0.02	0.03	0.05	0.06	0.08	0.10
F	ER2	0.01	0.02	0.02	0.03	0.04	0.06
GC	ER2	0.01	0.03	0.04	0.06	0.07	0.10
GN	ER2	0.01	0.03	0.04	0.06	0.07	0.10
GS	ER2	0.01	0.03	0.04	0.06	0.07	0.10
H	ER2	0.02	0.03	0.05	0.07	0.08	0.12
AN	ER3	0.01	0.02	0.04	0.05	0.06	0.09
AS	ER3	0.01	0.02	0.04	0.05	0.06	0.09
B	ER3	0.01	0.01	0.02	0.03	0.04	0.05
C	ER3	0.01	0.01	0.02	0.02	0.03	0.04
D	ER3	0.01	0.01	0.02	0.03	0.04	0.05
E	ER3	0.01	0.01	0.02	0.03	0.04	0.05
F	ER3	0.01	0.01	0.02	0.03	0.04	0.05
GC	ER3	0.01	0.01	0.02	0.03	0.04	0.05

Region	Land Use Category	Adjustment Factors					
		2010	2015	2020	2025	2030	2040
GN	ER3	0.01	0.02	0.02	0.03	0.04	0.06
GS	ER3	0.00	0.01	0.01	0.02	0.02	0.03
H	ER3	0.00	0.01	0.01	0.01	0.02	0.02
GC	EMUR3	0.01	0.01	0.02	0.03	0.04	0.05
AS	ER4	0.01	0.02	0.04	0.05	0.06	0.09
B	ER4	0.01	0.01	0.02	0.03	0.04	0.05
GC	ER4	0.01	0.01	0.02	0.03	0.04	0.05
GN	ER4	0.01	0.02	0.02	0.03	0.04	0.06
GS	ER4	0.00	0.01	0.01	0.02	0.02	0.03
H	ER4	0.00	0.01	0.01	0.01	0.02	0.02
AS	ER5	0.01	0.01	0.02	0.03	0.04	0.05
B	ER5	0.01	0.01	0.02	0.03	0.04	0.05
GC	ER5	0.01	0.01	0.02	0.03	0.04	0.05
GN	ER5	0.01	0.02	0.02	0.03	0.04	0.06
GC	ER6	0.01	0.01	0.02	0.03	0.04	0.05
GN	ER6	0.01	0.02	0.02	0.03	0.04	0.06
Existing Non-Residential Factors							
AN	EIL	0.05	0.09	0.14	0.19	0.24	0.33
AS	EIL	0.01	0.02	0.02	0.04	0.06	0.06
B	EIL	0.07	0.15	0.22	0.33	0.44	0.44
C	EIL	0.03	0.09	0.16	0.22	0.29	0.39
D	EIL	0.99	0.97	0.94	0.97	0.00	0.03
E	EIL	0.02	0.01	0.00	0.01	0.02	0.07
F	EIL	0.04	0.11	0.18	0.23	0.29	0.41
GC	EIL	0.99	0.07	0.15	0.22	0.28	0.28
GN	EIL	0.04	0.09	0.14	0.19	0.25	0.37
GS	EIL	0.02	0.04	0.06	0.09	0.11	0.15
H	EIL	0.02	0.05	0.07	0.13	0.18	0.24
AN	EO	0.05	0.09	0.14	0.19	0.24	0.33
AS	EO	0.01	0.02	0.02	0.04	0.06	0.06
B	EO	0.07	0.15	0.22	0.33	0.44	0.44
C	EO	0.03	0.09	0.16	0.22	0.29	0.39
D	EO	0.99	0.97	0.94	0.97	0.00	0.03
E	EO	0.02	0.01	0.00	0.01	0.02	0.07

Region	Land Use Category	Adjustment Factors					
		2010	2015	2020	2025	2030	2040
F	EO	0.04	0.11	0.18	0.23	0.29	0.41
GC	EO	0.99	0.07	0.15	0.22	0.28	0.28
GN	EO	0.04	0.09	0.14	0.19	0.25	0.37
GS	EO	0.02	0.04	0.06	0.09	0.11	0.15
H	EO	0.02	0.05	0.07	0.13	0.18	0.24
AN	EC	0.05	0.09	0.14	0.19	0.24	0.33
AS	EC	0.01	0.02	0.02	0.04	0.06	0.06
B	EC	0.07	0.15	0.22	0.33	0.44	0.44
C	EC	0.03	0.09	0.16	0.22	0.29	0.39
D	EC	0.99	0.97	0.94	0.97	0.00	0.03
E	EC	0.02	0.01	0.00	0.01	0.02	0.07
F	EC	0.04	0.11	0.18	0.23	0.29	0.41
GC	EC	0.99	0.07	0.15	0.22	0.28	0.28
GN	EC	0.04	0.09	0.14	0.19	0.25	0.37
GS	EC	0.02	0.04	0.06	0.09	0.11	0.15
H	EC	0.02	0.05	0.07	0.13	0.18	0.24
AS	EOH	0.01	0.02	0.02	0.04	0.06	0.06
F	EOH	0.04	0.11	0.18	0.23	0.29	0.41
GC	EOH	0.99	0.07	0.15	0.22	0.28	0.28
GN	EOH	0.04	0.09	0.14	0.19	0.25	0.37
GS	EOH	0.02	0.04	0.06	0.09	0.11	0.15
H	EOH	0.02	0.05	0.07	0.13	0.18	0.24
AN	ER	0.05	0.09	0.14	0.19	0.24	0.33
GN	ER	0.04	0.09	0.14	0.19	0.25	0.37
AN	ES	0.00	0.00	0.00	0.00	0.00	0.00
AS	ES	0.00	0.00	0.00	0.00	0.00	0.00
B	ES	0.00	0.00	0.00	0.00	0.00	0.00
C	ES	0.00	0.00	0.00	0.00	0.00	0.00
D	ES	0.00	0.00	0.00	0.00	0.00	0.00
E	ES	0.00	0.00	0.00	0.00	0.00	0.00
F	ES	0.00	0.00	0.00	0.00	0.00	0.00
GC	ES	0.00	0.00	0.00	0.00	0.00	0.00
GN	ES	0.00	0.00	0.00	0.00	0.00	0.00
GS	ES	0.00	0.00	0.00	0.00	0.00	0.00

Region	Land Use Category	Adjustment Factors					
		2010	2015	2020	2025	2030	2040
H	ES	0.00	0.00	0.00	0.00	0.00	0.00
AN	EPI	0.00	0.00	0.00	0.00	0.00	0.00
AS	EPI	0.00	0.00	0.00	0.00	0.00	0.00
B	EPI	0.00	0.00	0.00	0.00	0.00	0.00
C	EPI	0.00	0.00	0.00	0.00	0.00	0.00
D	EPI	0.00	0.00	0.00	0.00	0.00	0.00
E	EPI	0.00	0.00	0.00	0.00	0.00	0.00
F	EPI	0.00	0.00	0.00	0.00	0.00	0.00
GC	EPI	0.00	0.00	0.00	0.00	0.00	0.00
GN	EPI	0.00	0.00	0.00	0.00	0.00	0.00
GS	EPI	0.00	0.00	0.00	0.00	0.00	0.00
H	EPI	0.00	0.00	0.00	0.00	0.00	0.00
AN	EP	0.05	0.09	0.14	0.19	0.24	0.33
AS	EP	0.01	0.02	0.02	0.04	0.06	0.06
B	EP	0.07	0.15	0.22	0.33	0.44	0.44
C	EP	0.03	0.09	0.16	0.22	0.29	0.39
D	EP	0.99	0.97	0.94	0.97	0.00	0.03
E	EP	0.02	0.01	0.00	0.01	0.02	0.07
F	EP	0.04	0.11	0.18	0.23	0.29	0.41
GC	EP	0.99	0.07	0.15	0.22	0.28	0.28
GN	EP	0.04	0.09	0.14	0.19	0.25	0.37
GS	EP	0.02	0.04	0.06	0.09	0.11	0.15
H	EP	0.02	0.05	0.07	0.13	0.18	0.24
AN	EHW1	0.05	0.10	0.10	0.10	0.10	0.10
GC	EHW10	0.00	0.00	0.00	0.00	0.00	0.00
GC	EHW11	0.15	0.30	0.30	0.30	0.30	0.30
GS	EHW11	0.15	0.30	0.30	0.30	0.30	0.30
GC	EHW12	0.00	0.00	0.00	0.00	0.00	0.00
AN	EHW9	0.08	0.30	0.30	0.30	0.30	0.30
AN	EHW2	0.08	0.30	0.30	0.30	0.30	0.30
GN	EHW3	0.05	0.10	0.10	0.10	0.10	0.10
GN	EHW4	0.05	0.10	0.10	0.10	0.10	0.10
AS	EHW6	0.10	0.20	0.20	0.20	0.20	0.20
GS	EHW7	0.00	0.00	0.00	0.00	0.00	0.00
AS	EHW8	0.05	0.10	0.10	0.10	0.10	0.10

Region	Land Use Category	Adjustment Factors					
		2010	2015	2020	2025	2030	2040
Future Development Residential Factors							
D	FR0	0.10	0.10	0.10	0.10	0.10	0.10
E	FR0	0.10	0.10	0.10	0.10	0.10	0.10
AN	FR1	0.58	0.58	0.58	0.58	0.58	0.58
AS	FR1	0.58	0.58	0.58	0.58	0.58	0.58
B	FR1	0.58	0.58	0.58	0.58	0.58	0.58
C	FR1	0.58	0.58	0.58	0.58	0.58	0.58
D	FR1	0.48	0.48	0.48	0.48	0.48	0.48
E	FR1	0.63	0.63	0.63	0.63	0.63	0.63
F	FR1	0.78	0.78	0.78	0.78	0.78	0.78
GS	FR1	0.58	0.58	0.58	0.58	0.58	0.58
H	FR1	0.63	0.63	0.63	0.63	0.63	0.63
AN	FR2	0.73	0.73	0.73	0.73	0.73	0.73
AS	FR2	0.58	0.58	0.58	0.58	0.58	0.58
B	FR2	0.28	0.28	0.28	0.28	0.28	0.28
C	FR2	0.95	0.95	0.95	0.95	0.95	0.95
D	FR2	0.39	0.39	0.39	0.39	0.39	0.39
E	FR2	0.39	0.39	0.39	0.39	0.39	0.39
F	FR2	0.42	0.42	0.42	0.42	0.42	0.42
GC	FR2	0.58	0.58	0.58	0.58	0.58	0.58
GN	FR2	0.80	0.80	0.80	0.80	0.80	0.80
GS	FR2	0.64	0.64	0.64	0.64	0.64	0.64
H	FR2	0.64	0.64	0.64	0.64	0.64	0.64
F	FMUR2	0.42	0.42	0.42	0.42	0.42	0.42
GC	FMUR2	0.58	0.58	0.58	0.58	0.58	0.58
AN	FR3	0.67	0.67	0.67	0.67	0.67	0.67
AS	FR3	0.69	0.69	0.69	0.69	0.69	0.69
B	FR3	0.68	0.68	0.68	0.68	0.68	0.68
C	FR3	0.68	0.68	0.68	0.68	0.68	0.68
D	FR3	0.24	0.24	0.24	0.24	0.24	0.24
F	FR3	0.00	0.00	0.00	0.00	0.00	0.00
GC	FR3	0.62	0.62	0.62	0.62	0.62	0.62
GN	FR3	0.68	0.68	0.68	0.68	0.68	0.68
GS	FR3	0.68	0.68	0.68	0.68	0.68	0.68
H	FR3	0.41	0.41	0.41	0.41	0.41	0.41

Region	Land Use Category	Adjustment Factors					
		2010	2015	2020	2025	2030	2040
AN	FMUR3	0.67	0.67	0.67	0.67	0.67	0.67
AS	FMUR3	0.69	0.69	0.69	0.69	0.69	0.69
D	FMUR3	0.24	0.24	0.24	0.24	0.24	0.24
E	FMUR3	0.24	0.24	0.24	0.24	0.24	0.24
F	FMUR3	0.00	0.00	0.00	0.00	0.00	0.00
GC	FMUR3	0.62	0.62	0.62	0.62	0.62	0.62
GN	FMUR3	0.68	0.68	0.68	0.68	0.68	0.68
GS	FMUR3	0.68	0.68	0.68	0.68	0.68	0.68
H	FMUR3	0.41	0.41	0.41	0.41	0.41	0.41
AN	FR4	0.00	0.00	0.00	0.00	0.00	0.00
D	FR4	0.00	0.00	0.00	0.00	0.00	0.00
E	FR4	0.00	0.00	0.00	0.00	0.00	0.00
F	FR4	0.00	0.00	0.00	0.00	0.00	0.00
GC	FR4	0.75	0.75	0.75	0.75	0.75	0.75
GN	FR4	0.00	0.00	0.00	0.00	0.00	0.00
GS	FR4	0.49	0.49	0.49	0.49	0.49	0.49
H	FR4	0.00	0.01	0.01	0.01	0.02	0.02
AN	FMUR4	0.00	0.00	0.00	0.00	0.00	0.00
AS	FMUR4	0.00	0.00	0.00	0.00	0.00	0.00
B	FMUR4	0.00	0.00	0.00	0.00	0.00	0.00
D	FMUR4	0.00	0.00	0.00	0.00	0.00	0.00
E	FMUR4	0.00	0.00	0.00	0.00	0.00	0.00
GC	FMUR4	0.75	0.75	0.75	0.75	0.75	0.75
GN	FMUR4	0.00	0.00	0.00	0.00	0.00	0.00
GS	FMUR4	0.49	0.49	0.49	0.49	0.49	0.49
H	FMUR4	0.02	0.02	0.02	0.02	0.02	0.02
AS	FR5	0.00	0.00	0.00	0.00	0.00	0.00
GC	FR5	0.24	0.24	0.24	0.24	0.24	0.24
GN	FR5	0.00	0.00	0.00	0.00	0.00	0.00
H	FR5	0.00	0.00	0.00	0.00	0.00	0.00
GC	FMUR5	0.24	0.24	0.24	0.24	0.24	0.24
GN	FMUR5	0.00	0.00	0.00	0.00	0.00	0.00
GS	FMUR5	0.00	0.00	0.00	0.00	0.00	0.00
H	FMUR5	0.00	0.00	0.00	0.00	0.00	0.00
GC	FR6	0.57	0.57	0.57	0.57	0.57	0.57

Region	Land Use Category	Adjustment Factors					
		2010	2015	2020	2025	2030	2040
Future Development Non-Residential Factors							
AN	FIL	0.37	0.37	0.37	0.37	0.37	0.37
F	FIL	0.60	0.60	0.60	0.60	0.60	0.60
GC	FIL	0.48	0.48	0.48	0.48	0.48	0.48
GN	FIL	0.48	0.48	0.48	0.48	0.48	0.48
GS	FIL	0.48	0.48	0.48	0.48	0.48	0.48
AN	FC	0.37	0.37	0.37	0.37	0.37	0.37
AS	FC	1.04	1.04	1.04	1.04	1.04	1.04
B	FC	0.48	0.48	0.48	0.48	0.48	0.48
C	FC	0.48	0.48	0.48	0.48	0.48	0.48
D	FC	0.60	0.60	0.60	0.60	0.60	0.60
E	FC	0.60	0.60	0.60	0.60	0.60	0.60
F	FC	0.44	0.44	0.44	0.44	0.44	0.44
GC	FC	0.25	0.25	0.25	0.25	0.25	0.25
GN	FC	0.26	0.26	0.26	0.26	0.26	0.26
GS	FC	0.48	0.48	0.48	0.48	0.48	0.48
H	FC	0.75	0.75	0.75	0.75	0.75	0.75
GC	FOH	0.48	0.48	0.48	0.48	0.48	0.48
AN	FS	0.00	0.00	0.00	0.00	0.00	0.00
F	FS	0.00	0.00	0.00	0.00	0.00	0.00
GC	FS	0.00	0.00	0.00	0.00	0.00	0.00
GS	FS	0.00	0.00	0.00	0.00	0.00	0.00
AN	FPI	0.00	0.00	0.00	0.00	0.00	0.00
B	FPI	0.00	0.00	0.00	0.00	0.00	0.00
C	FPI	0.00	0.00	0.00	0.00	0.00	0.00
F	FPI	0.00	0.00	0.00	0.00	0.00	0.00
GC	FPI	0.00	0.00	0.00	0.00	0.00	0.00
GN	FPI	0.00	0.00	0.00	0.00	0.00	0.00
GS	FPI	0.00	0.00	0.00	0.00	0.00	0.00
AN	FP	5.20	5.20	5.20	5.20	5.20	5.20
D	FP	0.60	0.60	0.60	0.60	0.60	0.60
F	FP	0.60	0.60	0.60	0.60	0.60	0.60
GC	FP	0.48	0.48	0.48	0.48	0.48	0.48

Region	Land Use Category	Adjustment Factors					
		2010	2015	2020	2025	2030	2040
GN	FP	0.48	0.48	0.48	0.48	0.48	0.48
GS	FP	0.48	0.48	0.48	0.48	0.48	0.48

Notes:

- *Future adjustment factors do not include adjustments for unmetered water usage, normalization, and conservation.*
- *Factors were provided only for land uses found in the land use database. No adjustments were made for irrigated turf (EPI) and schools (ES). See Chapter 5, section titled Results for Existing Development, for further information.*

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