

**CORE CAPACITY
TRANSIT STUDY**



MEMORANDUM

To: Matt Maloney, Metropolitan Transportation Commission

CC: Aidan Hughes, Tony Bruzzone, and Lauren Dong, Arup

From: Nadine Fogarty, Alison Nemirow, and Flavio Coppola, Strategic Economics

Date: December 3, 2015

Title: Final San Francisco Market Assessment

1 Introduction

The Core Capacity Transit Study (CCTS) is evaluating short-, medium-, and long-term solutions to address constrained transit capacity in San Francisco's Core. In order to inform the CCTS transit alternatives, Strategic Economics was tasked with assessing recent employment and market trends and developing a range of future employment growth scenarios for subareas within the Core. This technical memorandum provides a summary of the analysis.

Following the introduction, the memorandum includes the following sections:

- Purpose, Approach, and Limitations of the Analysis
- Historic Employment and Development Trends
- Factors Influencing Future Growth in the Core
- Results of the Employment Growth Scenarios

Appendix A provides a detailed description of the assumptions and methodology used to develop the employment growth scenarios. Appendix B defines the employment sectors used throughout this memo.

2 Purpose, Approach, and Limitations of the Analysis

2.1 Purpose of the Market Assessment

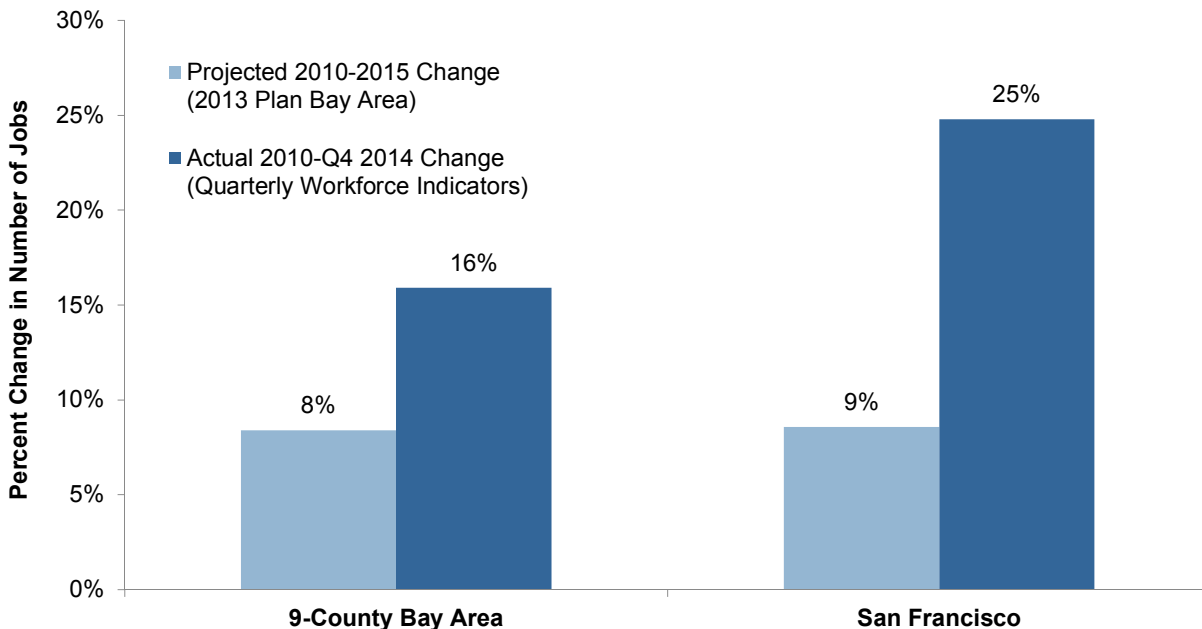
As San Francisco has recovered from the Great Recession, a rapid expansion in high tech and related sectors has driven rapid significant growth. Between 2010 and the end of 2014, the number of jobs in the city grew by 25 percent, surpassing the most recent regional projections from the 2013 Plan Bay Area and raising questions about the timing and velocity of future growth (Figure 1).¹ At the same time, there are also questions about the potential capacity for employment growth within the Core, given physical constraints on additional development and changes in the amount of space that businesses are allocating to office workers. Given the importance of employment growth in driving transit demand, this memo takes a closer look at the potential for future development and employment growth in the San Francisco Core.

This market assessment considers the potential for employment growth through 2040 in specific subareas within the San Francisco Core under a range of assumptions.² While the analysis is quantitative in nature, it is intended to help inform future transportation planning in a qualitative way. The primary purpose of the analysis is to provide insight about the extent to which development capacity is a barrier to future employment growth in the San Francisco Core, and the relative magnitude of potential growth in different subareas within the Core. The results of the market assessment will also be used to help frame the CCTS problem statement. However, the analysis is not intended to serve as a definitive land use forecast or as a direct input into transportation planning models.

¹ The Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG) are currently in the process of updating the region's employment and household projections as part of the Plan Bay Area 2017 Update.

² Note that the analysis is focused solely on employment growth and does not assess other types of uses or activities that drive transit ridership (such as tourism, schools, conventions, sports, and other special events).

Figure 1. Projected and Actual Job Growth, 2010-2015*



*Actual employment data are for 2010 through the fourth quarter of 2014.

Sources: U.S. Census Bureau, Quarterly Workforce Indicators (QWI), 2010-2014; Association of Bay Area Governments (ABAG), 2015; Strategic Economics, 2015.

2.2 Approach

Many factors will affect the extent of future job growth in the Core, including the overall competitiveness of the Bay Area economy, firm preferences for different locations within the region, changing office space utilization and other workspace trends, and the extent to which existing properties are reconfigured or redeveloped to accommodate more workers.³ To understand the potential impact of these factors, Strategic Economics analyzed industry employment trends, interviewed San Francisco real estate brokers and other experts, and reviewed data on development trends and the real estate market. Strategic Economics also worked closely with Gensler to research trends in workspace use, and with the City of San Francisco to evaluate the extent of development capacity available in each subarea within the Core.

Based on the results of this research, Strategic Economics created two simplified employment growth scenarios that illustrate a range of potential future economic conditions. The scenarios are both based on 2013 Plan Bay Area's projections for the nine-county region – the best

³ The CCTS is evaluating alternatives for expanding transit capacity to accommodate future employment growth and other sources of transit demand in the Core. Because the purpose of the CCTS is to consider solutions for addressing transit capacity constraints, this analysis assumes that transit capacity will not limit future employment growth.

available regional projections at the time of this analysis – and test the sensitivity of future growth in the Core to three key factors:

- The **share of regional employment growth** captured by the Core;⁴
- **Office employment densities**; and
- The **extent of redevelopment** that occurs in each subarea.

The two scenarios are described below.

- **Scenario 1: Continued Concentration.** This scenario assumes that the Core continues to attract a high share of regional employment growth, resulting in significant and ongoing demand for new employment space. The strong real estate market drives increasingly efficient use of new and existing office buildings, and incentivizes significant redevelopment throughout the Core.
- **Scenario 2: Reduced Competitiveness.** In this scenario, other employment centers in the region (such as Downtown Oakland) become more competitive relative to the Core. As a result, the Core captures a reduced share of regional employment growth, especially in driving industries such as professional services and information. In keeping with recent trends, office uses continue to intensify, but less rapidly than in Scenario 1. The slower market (compared to Scenario 1), reduces the extent to which existing buildings are redeveloped and replaced with higher density uses.

The scenarios also incorporate assumptions about the preferences of different types of firms for different subareas within the Core (Figure 2). For example, the Financial District remains the premier location for tenants in the professional and financial services, while SOMA and Civic Center/Mid-Market are assumed to be the most attractive subareas for tech tenants (although tech firms are assumed to locate in the Financial District and Mission Bay/Showplace Square as well). Appendix A, below, provides a more detailed description of the assumptions and methodology used to create the two scenarios.

2.3 Limitations of the Analysis

The results of the market assessment are sensitive to assumptions about regional growth rates, building utilization (including employment densities and vacancy rates), development capacity, firm preferences, and other factors. This analysis incorporates reasonable assumptions based on data and observations about current conditions and recent trends in the Core. However, the analysis was limited by the data that were available at the time of the study. In particular, the model incorporates regional projection data from the 2013 Plan Bay Area and development capacity data from the Planning Department's soft site analysis, both of which are currently in

⁴ Note that the analysis did not result in an estimate of total employment in San Francisco, because the Core (as a key regional employment center) is assumed to capture employment from the region as a whole.

the process of being updated. Appendix A describes these and other limitations of the data and analysis.

Figure 2. Subarea Geographies



Source: Strategic Economics, 2015.

3 Historic Employment and Development Trends

This section provides an overview of recent employment and development trends in the Core, City of San Francisco, and the 9-County Bay Area region. The analysis relied on publicly available employment data, supplemented with development data provided by the San Francisco Planning Department. Reliable employment data for the Core were available for 2013,⁵ while historic employment trends (including more recent data for 2014) were available for the city and region.

3.1 Current Employment in the Core

The Core is the single largest employment center in the city and the region, accounting for 53 percent of jobs in San Francisco and 10 percent of jobs in the Bay Area as of 2013 (the most recent year for which data on jobs in the Core are available).

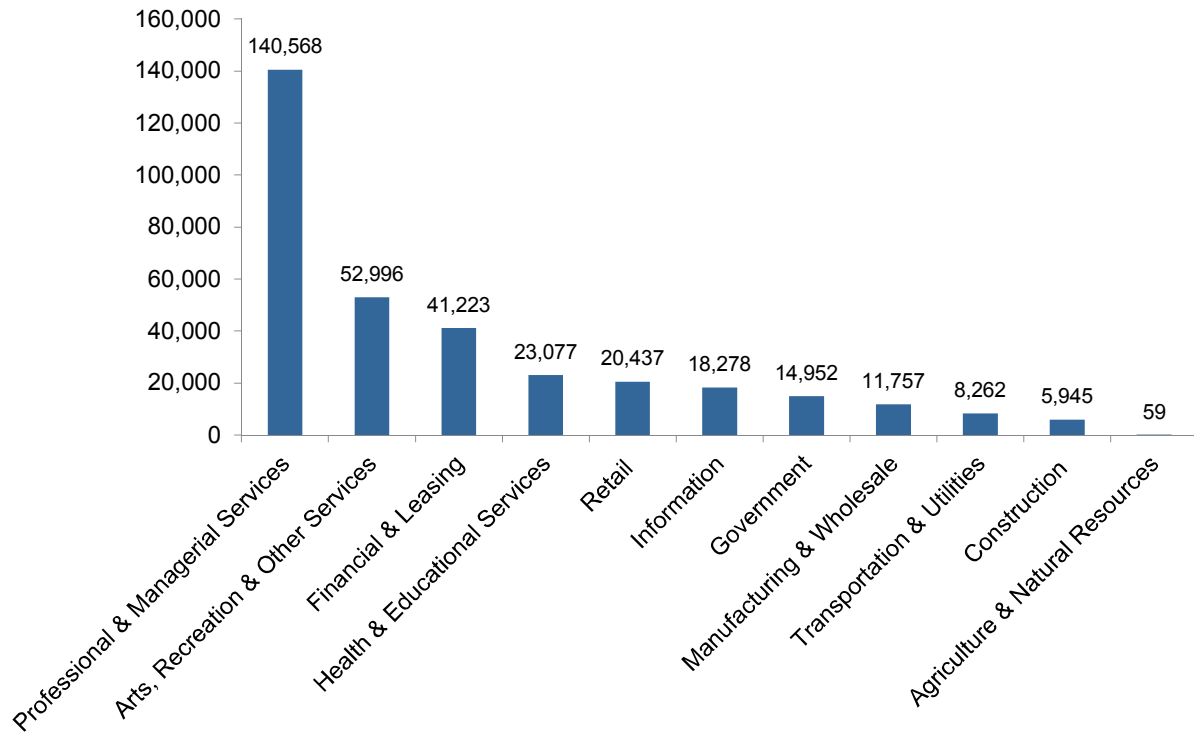
Figure 3 shows employment in the Core by sector, using the sectors defined by ABAG for Plan Bay Area (see Appendix B for a definition of the sectors). As shown in Figure 4, professional and managerial services is by far the largest sector in the Core with over 140,000 jobs, followed by arts, recreation, and other services (a category that includes restaurants and hotels) and financial and leasing services.

Figure 4 shows employment in the Core as a percent of total employment in San Francisco. Sectors that are predominantly office-based tend to be particularly concentrated in the Core. Eighty-one percent of the city's jobs in professional and managerial services, 79 percent of the city's jobs in the financial and leasing services, and 70 percent of information jobs are located in the Core. The Core also accounts for nearly half of citywide employment in arts and recreation, retail, government, and manufacturing and wholesale.

Sectors such as manufacturing and wholesale, transportation and utilities, and agriculture and natural resources include a wide variety of occupations. In the San Francisco Core, a significant share of the employment in these sectors is likely to be office-based – for example, in management, sales, and administrative positions.

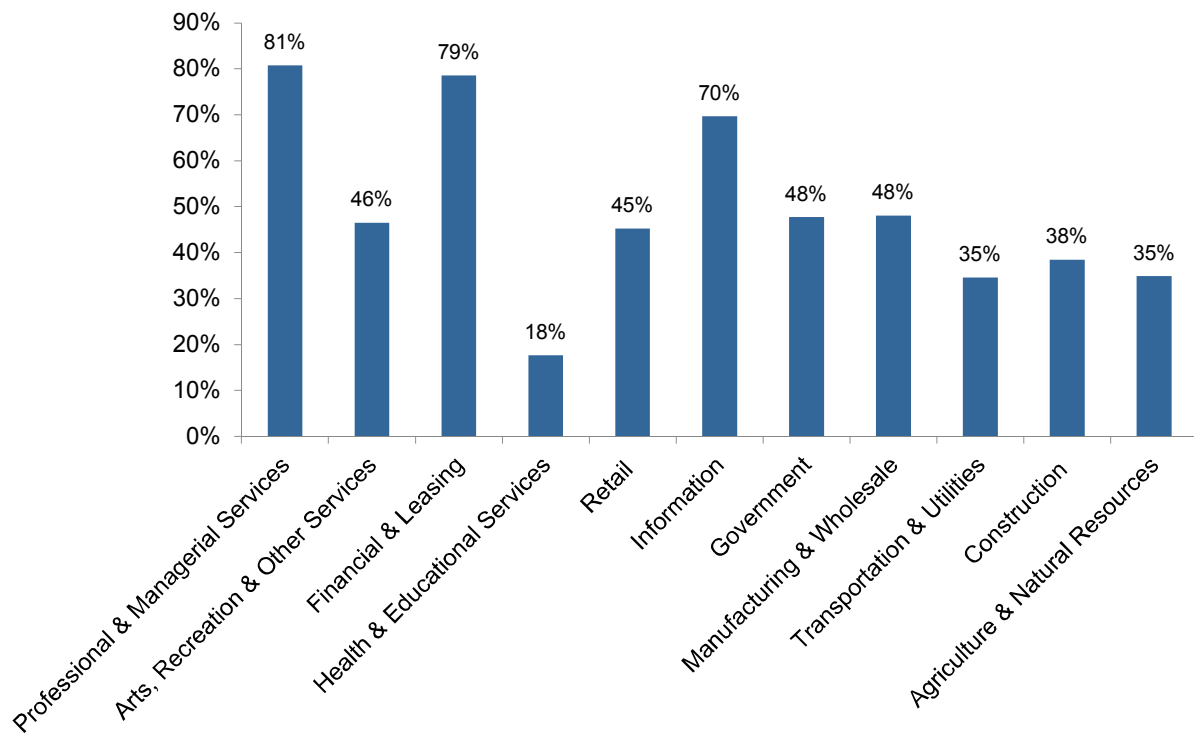
⁵ The U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) dataset provides annual employment estimates from 2002 through 2013. However, because of methodological improvements that the Census Bureau has phased in over time, LEHD does not provide reliable data on long-term trends.

Figure 3. Employment in the San Francisco Core by Sector, 2013



Source: U.S. Census Bureau, Longitudinal Employer-Household Dynamics, 2013; Strategic Economics, 2015.

Figure 4. Jobs in the Core as Percent of Total Jobs in San Francisco, 2013



Source: U.S. Census Bureau, Longitudinal Employer-Household Dynamics, 2013; Strategic Economics, 2015.

Within the Core, employment is highly concentrated in the Financial District, with smaller numbers of jobs in the Civic Center and SOMA subareas and relatively limited employment in Mission Bay/Showplace Square (Figure 5). Employment in the professional and managerial services and financial and leasing sectors is especially concentrated in the Financial District.

As mentioned above, the employment counts shown in Figures 3 through 5 are for 2013, the most recent year for which data for the Core were available. Employment is likely to have increased significantly in all the subareas since 2013.⁶ Mission Bay/Showplace Square in particular has grown significantly with the opening of major University of California San Francisco buildings (including the UCSF Medical Center) in 2014 and 2015.⁷ The employment data include part-time and temporary jobs. However, jobs may sometimes be assigned to a central administrative location (such as a contractor's headquarters or a school system's central offices) rather than to the actual location where work is performed.

⁶ For the purposes of providing a baseline the employment growth scenario, Strategic Economics estimated employment in the Core for 2015. See discussion in appendix.

⁷ Note also that part of the UCSF campus is located just south of the study area boundaries, which were drawn based on MTC's Transportation Analysis Zones (TAZs) and reflect the boundaries being used for the Core Capacity Transit Study as a whole.

Figure 5. Employment in the Core by Sector and Subarea, 2013

Sector	Financial District	Civic Center/ Mission Bay/ Van Ness	SOMA	Mission Bay/ Showplace Square	Total Core
Employment					
Professional & Managerial Services	98,204	6,768	28,805	6,791	140,568
Arts, Recreation & Other Services	25,513	15,601	7,846	4,036	52,996
Financial & Leasing	32,262	3,202	5,362	397	41,223
Health & Educational Services	9,561	9,366	3,056	1,094	23,077
Retail	10,832	5,556	3,699	350	20,437
Information	6,856	3,261	7,027	1,134	18,278
Government	3,083	9,904	1,831	134	14,952
Manufacturing & Wholesale	5,396	1,518	3,846	997	11,757
Transportation & Utilities	6,775	284	536	667	8,262
Construction	2,230	722	2,412	581	5,945
Agriculture & Natural Resources	48	5	5	1	59
Total	200,760	56,187	64,425	16,182	337,554
Percent of Total Core Employment					
Professional & Managerial Services	70%	5%	20%	5%	100%
Arts, Recreation & Other Services	48%	29%	15%	8%	100%
Financial & Leasing	78%	8%	13%	1%	100%
Health & Educational Services	41%	41%	13%	5%	100%
Retail	53%	27%	18%	2%	100%
Information	38%	18%	38%	6%	100%
Government	21%	66%	12%	1%	100%
Manufacturing & Wholesale	46%	13%	33%	8%	100%
Transportation & Utilities	82%	3%	6%	8%	100%
Construction	38%	12%	41%	10%	100%
Agriculture & Natural Resources	81%	8%	8%	2%	100%
Total	59%	17%	19%	5%	100%

Sources: U.S. Census Bureau, Longitudinal Employer-Household Dynamics, 2013; Strategic Economics, 2015.

3.2 City and Regional Employment Trends

Figures 6 and 7 show city and regional employment trends. In recent years, the San Francisco has led the Bay Area in job growth. Between 2009 and 2014, the region added approximately 338,000 new jobs, an 11 percent expansion. At the same time San Francisco added 97,000 jobs, accounting for 29 percent of total regional growth (Figure 6).

These high rates of growth in part reflect the recovery from the national recession of 2007-2009. However, longer term trends also suggest that San Francisco is becoming increasingly important to the region's economy over time. Over the last decade, San Francisco has grown more quickly than other parts of the Bay Area – including the South Bay – causing the city to increase from 15 to 19 percent of the region's total employment between 2004 and 2014 (Figure 7).

The Bay Area's economy is increasingly driven by sectors that are predominantly office-based, including professional and managerial services and information. San Francisco has proven to be particularly attractive for these types of firms. Between 2009 and 2014, the city captured 42 percent of the region's employment growth in the professional and managerial services sector, and 22 percent of new information jobs (Figure 6).

Growth in these sectors in part reflects the expansion of the city and the region's tech industry. In San Francisco, nearly 30 out of every 100 new jobs created between 2009 and 2014 were in the tech industry.⁸ In addition to directly creating new jobs, growth in the tech industry also generates demand for other goods and services, resulting in indirect (or "multiplier") effects on the economy. According to some reports, after factoring in the industry's multiplier effects, tech may be responsible for as much as two-thirds of the city's employment growth since the recession.⁹ While data on the location of tech firms within San Francisco were not available for this analysis, discussions with San Francisco brokers suggest that these firms are highly concentrated within the Core, especially in the SOMA and Civic Center subareas.

⁸For the purposes of this analysis, the tech sector was defined to include jobs in Software Publishing (NAICS code 5112), Other Information Services (5191) and Computer Systems Design and Related Services (5415). These industry categories fall within the information and professional and managerial services sectors.

⁹Jennifer Warburg, "Top Analysts Predict Another Year of Growth for SF Economy," SPUR Blog, February 20, 2015, <http://www.spur.org/blog/2015-02-20/top-analysts-predict-another-year-growth-sf-economy>.

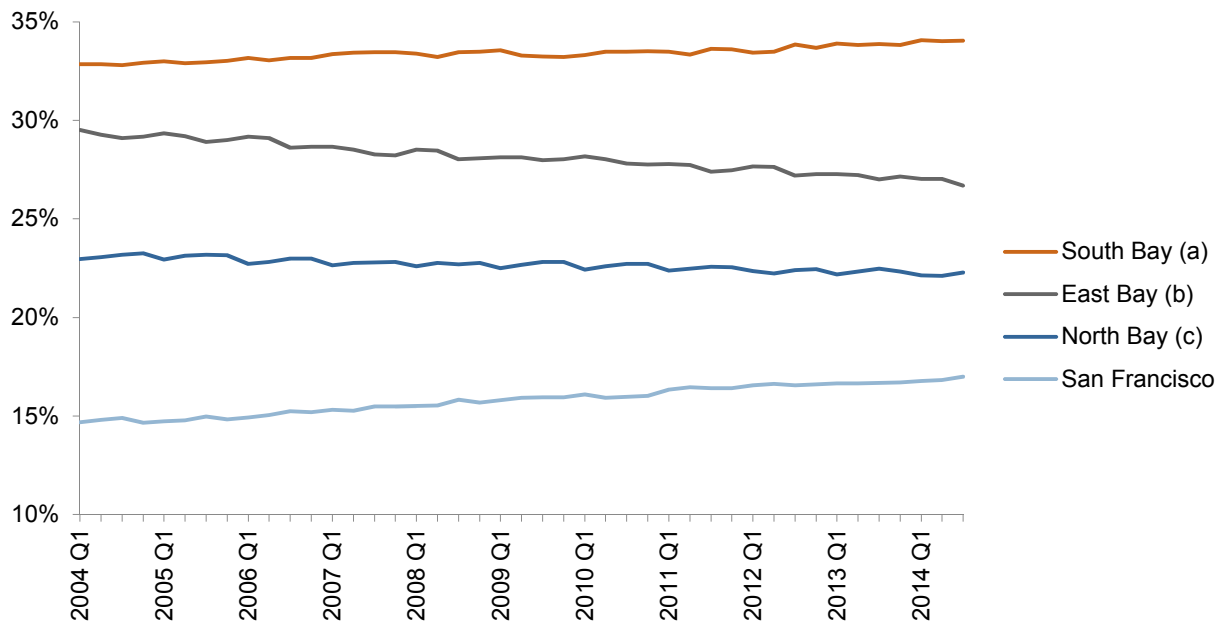
Figure 6. Employment by Sector: San Francisco and the Bay Area, 2009-2014*

Sector	City of San Francisco				Bay Area Region				City as a Percent of Region		
	2009	2014	Change, 2009-14	Percent Change, 2009-14	2009	2014	Change, 2009-14	Percent Change, 2009-14	2009	2014	Net New Jobs, 2009-14
Professional & Managerial Services	127,384	190,276	62,892	49%	576,138	724,756	148,618	26%	22%	26%	42%
Health & Educational Services	100,724	125,925	25,201	25%	627,787	745,949	118,162	19%	16%	17%	21%
Arts, Recreation & Other Services	119,931	121,711	1,780	1%	502,713	520,767	18,054	4%	24%	23%	10%
Financial & Leasing	58,779	51,927	-6,852	-12%	193,368	183,515	-9,853	-5%	30%	28%	N/A
Retail	43,401	46,278	2,876	7%	309,550	329,768	20,219	7%	14%	14%	14%
Information	20,158	27,856	7,699	38%	119,638	154,892	35,254	29%	17%	18%	22%
Manufacturing & Wholesale	22,025	25,461	3,437	16%	445,483	453,705	8,222	2%	5%	6%	42%
Government	27,630	25,245	-2,385	-9%	116,954	105,467	-11,486	-10%	24%	24%	N/A
Transportation & Utilities	22,392	23,119	728	3%	122,902	126,387	3,485	3%	18%	18%	21%
Construction	14,606	16,636	2,030	14%	143,182	151,321	8,139	6%	10%	11%	25%
Agriculture & Natural Resources	246	192	-54	-22%	23,721	22,642	-1,080	-5%	1%	1%	N/A
Total	557,274	654,626	97,352	17%	3,181,435	3,519,166	337,734	11%	18%	19%	29%

*2014 employment estimated based on first three quarters of the year.

Sources: U.S. Census Bureau, Quarterly Workforce Indicators, 2014; Strategic Economics, 2015.

Figure 7. Share of Regional Employment, South Bay, East Bay, North Bay and San Francisco, 2004-2014, by Quarter



Source: U.S. Census Bureau, Quarterly Workforce Indicators, 2004-2014; Strategic Economics, 2015.

Notes:

(a) San Mateo and Santa Clara Counties.

(b) Alameda and Contra Costa Counties.

(c) Marin, Sonoma, Napa and Solano Counties.

3.3 Commercial Development Trends

As discussed above, data on long-term employment trends in the Core were not available for this analysis. However, the Core has accounted for a significant share of citywide commercial development in the last 10 years. As shown in Figure 8, approximately 72 percent of new commercial square footage built in San Francisco between 2004 and 2014, or 35 percent of new projects, was located in the Core. During this time period, the Core attracted a particularly high share of office (89 percent of new square feet and 77 percent of projects) and hotel development (100 percent), as well as more than half of new mixed-use and retail square feet. Although the share of new development occurring in the Core varied over the course of the decade, there is no clear trend either upwards or downwards.

Figure 9 provides a map of development projects completed between 2004 and 2014. Although the Financial District has continued to attract new development, an increasing share of new development is occurring in the Civic Center, SOMA, and Mission Bay/Showplace Square subareas over time.

Figure 8. Recent Commercial Development* by Year Completed and Land Use Type:
Core and City of San Francisco, 2004-2014

	Core		City of San Francisco		Core as a Percent of City	
	Projects	Sq. Ft. (Gross)	Projects	Sq. Ft. (Gross)	Projects	Sq. Ft. (Gross)
Year						
2004	38	1,044,124	103	1,269,281	37%	82%
2005	35	928,372	92	1,818,859	38%	51%
2006	18	762,431	50	938,920	36%	81%
2007	11	878,735	43	1,024,135	26%	86%
2008	17	1,864,723	41	2,452,385	41%	76%
2009	19	1,863,986	56	2,290,045	34%	81%
2010	10	134,121	28	516,521	36%	26%
2011	7	324,131	18	382,752	39%	85%
2012	6	83,645	25	242,906	24%	34%
2013	7	644,929	27	1,171,559	26%	55%
2014	12	1,400,374	35	1,655,024	34%	85%
Land Use Category (All Years)						
Office**	27	6,610,372	35	7,429,960	77%	89%
Institutional	5	168,900	44	1,340,905	11%	13%
Mixed-Use***	62	1,832,970	171	2,850,442	36%	64%
Retail/Entertainment	6	364,086	21	653,660	29%	56%
Production, Distribution, Repair	1	50,000	12	551,539	8%	9%
Visitor	8	901,843	8	901,843	100%	100%
Other/Unclassified	71	1,400	227	34,038	31%	4%
Total	180	9,929,571	518	13,762,387	35%	72%

*Does not include institutional development in Mission Bay, which is not tracked in Planning Department data.

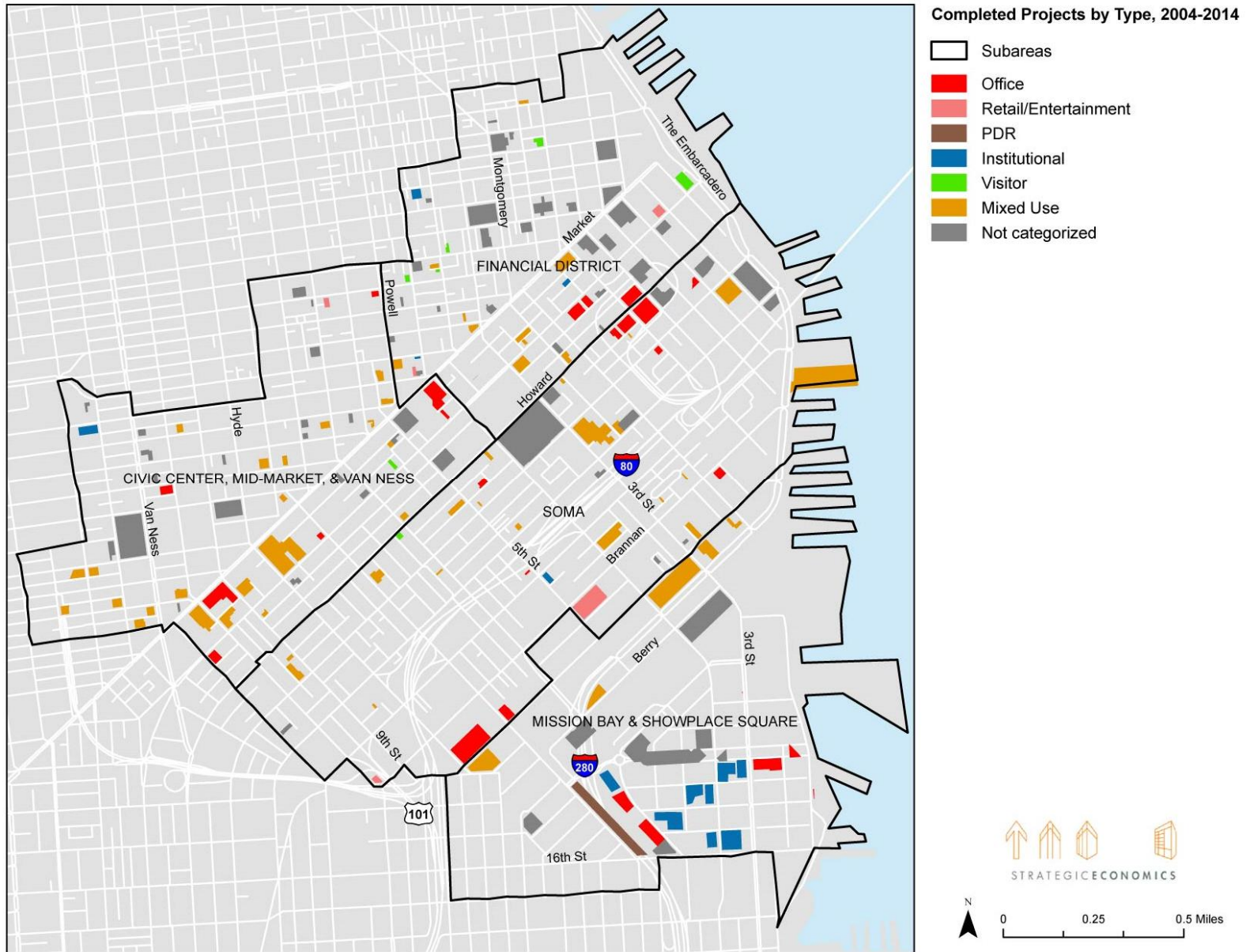
Note that square footage data were not available for all projects.

**Management, Information, and Professional Services (MIPS) land use category.

***Includes mixed office/retail as well as residential/retail projects. Square footage estimates do not include residential.

Sources: City of San Francisco Planning Department, 2015; Strategic Economics, 2015

Figure 9. Completed Development Projects in the Core, 2004-2014 (Excluding Residential Development)



4 Factors Influencing Future Growth in the Core

Recent employment and development trends suggest that the Core is highly competitive for attracting additional jobs, especially in the tech industry and other office-based sectors. However, the extent to which the Core can sustain historic growth rates depends on many factors, including the overall competitiveness of the Bay Area economy and firm preferences for different locations within the region. There are also questions about the potential capacity for employment growth within the Core, given physical constraints on additional development and changes in the amount of space that businesses are allocating to office workers. This section discusses each of these factors and provides a brief, qualitative description of how they are reflected in the two employment growth scenarios. A detailed description of the specific assumptions and methodology used in the employment growth scenarios is provided in Appendix A.

4.1 Firm Location Preferences

The rate of future employment growth in the Core will depend in part on firm location preferences and the Core's continued competitiveness in attracting employers. According to local brokers, the San Francisco Core is currently the region's most desirable location for firms in the professional services, finance, and tech sectors. The Financial District – and especially Market Street – remains the premier location for firms in the professional and financial services sectors. Tech tenants tend to be drawn to the SOMA and Civic Center/Mid-Market areas, although many tech firms are also locating in the Financial District. Employers in the Core benefit from “agglomeration economies,” or the benefits (such as easier access to clients and suppliers and more fluid exchanges of information and skills) that occur when businesses and workers cluster together in a highly concentrated area. Moreover, many firms see a location in the Core as an important advantage for recruiting and retaining skilled workers, especially given the region's tight labor market. The Core's numerous transit options, pedestrian friendly street grid, and many restaurants and other amenities are also highly attractive to employers.

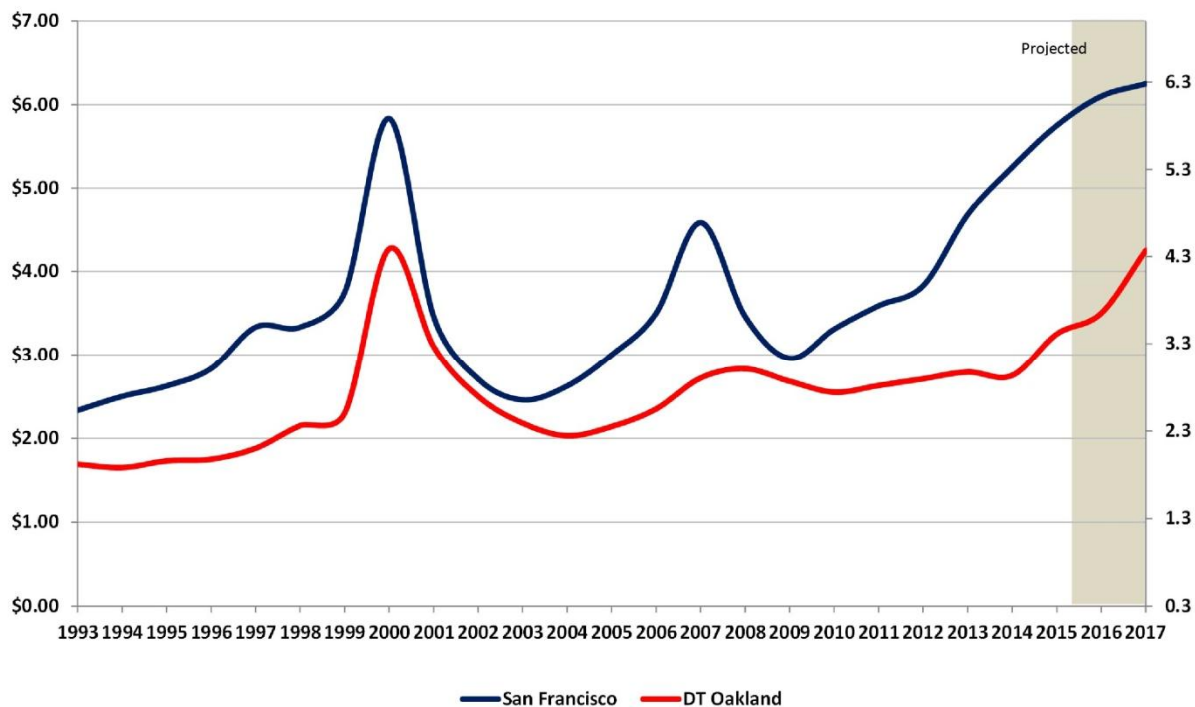
Despite the Core's current appeal for office tenants, however, there are several factors that could cause the Core to become less competitive over time relative to other employment centers in the Bay Area. First, rapidly rising rents and declining vacancy rates may affect the ability of some firms to find or afford space in the Core. Given the Proposition M cap on new office development and other constraints on supply (discussed in more detail below), some analysts have suggested that demand for office space will exceed supply by 2018.¹⁰

Second, other Bay Area employment centers may become more competitive over time, especially if limited development capacity constrains the expansion of San Francisco's office supply and rents continue to rise. In particular, downtown Oakland – with its highly developed transit network, growing concentration of restaurants and amenities, relative affordability, and significant capacity for new development – may already be emerging as an appealing alternative to the San Francisco Core for some types of employers. The current gap between

¹⁰ Jennifer Warburg, “Top Analysts Predict Another Year of Growth for SF Economy”, February 20, 2015, <http://www.spur.org/blog/2015-02-20/top-analysts-predict-another-year-growth-sf-economy>.

Class A office rents in San Francisco and Downtown Oakland is the largest it has been since the early 1990s, suggesting that firms are currently willing to pay a significant premium to locate in the San Francisco Core (Figure 10). Indeed, San Francisco brokers report that in today's market, most private sector firms would prefer to pay more for a location in the San Francisco Core, and/or accept a less desirable location within the Core, rather than relocate to Oakland. However, Oakland rents have risen rapidly in the past year, suggesting that this dynamic may be changing quickly. Oakland brokers report increased interest from tech tenants, a trend that may accelerate with Uber's announcement that the company will be expanding its headquarters into Downtown Oakland in 2017.

Figure 10. Class A Office Rents in San Francisco and Downtown Oakland



Source: Colliers International. Used with permission.

4.1.1 Assumptions Used in the Analysis

The employment growth scenarios test the sensitivity of future employment growth in the Core to a range of assumptions about the attractiveness of the Core for different sectors. In Scenario 1, the Core continues to be highly competitive, attracting 18 percent of all net new jobs in the region between 2015 and 2040. Scenario 2 assumes that other places in the region (including Downtown Oakland) become more competitive, and the Core captures a reduced share (14 percent) of regional employment growth, especially in key sectors such as professional services and information. The Consultant Team will study the potential for future employment growth in Downtown Oakland more closely in a second phase of the market assessment.

Both scenarios also incorporate assumptions about the preferences of different industry sectors for locations within the Core, based on current employment patterns, recent development proposals, and qualitative information from interviews with local real estate experts. For

example, the Financial District remains the premier location for tenants in the professional and financial services, while SOMA and Civic Center/Mid-Market are assumed to be most attractive for tech tenants (although tech firms are assumed to locate in the Financial District and Mission Bay/Showplace Square as well).

4.2 Increasing Office Densities and Other Workplace Trends

National literature on workspace trends and interviews with local architects and brokers indicate that office-based employers are decreasing the amount of space they allocate to each worker.¹¹ Factors that are contributing to this long-term trend towards increasingly efficient use of office space include:

- **High office rents and low vacancies:** San Francisco's expensive, supply-constrained office market creates an incentive for firms to increase employee densities as they expand.
- **Increased use of technology and mobility of the workforce:** The ability to work and collaborate remotely is allowing employers to plan for less space per employee, on average. Sectors that rely heavily on sales are particularly likely to plan for higher levels of mobile workers. For example, one Gensler client with many mobile employees is planning for a spatial allocation of below 100 gross square feet per employee.
- **Increased emphasis on flexible, collaborative workspaces:** Companies in tech and other creative industries (e.g., architecture and design) are increasingly prioritizing large, open floor plates with less space per individual worker and more common meeting space as a way to encourage collaboration and facilitate productivity.
- **Outsourcing amenities:** Traditional office campuses provide many amenities, including food services, health and wellness, and other day-to-day support for employees. Some San Francisco employers provide these types of on-site amenities. However, other companies are choosing not to provide on-site amenities, in part to reduce the amount of space required per employee.

While these factors are leading to gradual decreases in the average amount of gross space (i.e., total space including meeting and gathering space, hallways, etc.) utilized per office worker, the trend is not universal. Space allocations per worker vary by sector. For example, law firms – which have many highly paid workers in jobs that require confidential interactions with clients – may require as much as 250-350 square feet on average per employee. In contrast, some tech companies are reportedly planning for as little as 100-120 square feet per employee. Across sectors, firms with existing, long-term leases may prefer to increase efficiency within their existing space in order to accommodate growth, but are constrained by the costs of remodeling existing buildings. San Francisco's highly competitive office market also leads to some counterintuitive outcomes. For example, many expanding tech companies are leasing

¹¹ This section draws on analysis conducted by Gensler San Francisco, including a survey of national and local literature, a review of publicly available datasets, and interviews with Gensler leadership serving various employment sectors in San Francisco and the Bay Area.

more space than they currently need in order to reserve space for future growth, leading to relatively high space allocations per employee in the short term. Indeed, there is some evidence to suggest that the San Francisco office market has, on average, more space per worker compared to other cities because of “shadow vacancies” (i.e., space that is leased but not occupied), and because the city has many highly paid workers (who tend to occupy more space per person).¹²

In other sectors that are not office-based, employment densities are highly variable. For example, firms in production, distribution and repair (PDR), research and development (R&D), and biotech/medical research typically plan for more space per employee (e.g., more than 500 gross square feet per employee), because of the need to accommodate significant equipment. For sectors that require a high degree of customer service (such as education, medical office, and hospitality) spatial allocation per employee is variable and dependent upon the level of interaction between customers and employees at a given location.

4.2.1 Assumptions Used in the Analysis

The employment growth scenarios assume that the average amount of space allocated per office worker continue to decrease over time in both new and existing buildings. Figure 11 shows the worker density assumptions used in the two scenarios, which were developed based on the trends described above and data on the existing employment base and building stock in the San Francisco Core. In Scenario 1, stronger market demand is assumed to drive more rapid decreases in the amount of space allocated per office worker. In Scenario 2, space allocation per office worker also decreases, but more slowly. The analysis differentiates between creative/high tech office uses, which are experiencing a stronger trend towards increased densities, and traditional office uses (such as law and accounting firms, company headquarters, and other professional services and management firms) which typically require more space per worker.

Figure 11. Gross Square Feet per Employee Assumptions

Land Use	2015	2040	
		Scenario 1: Continued Concentration	Scenario 2: Reduced Competitiveness
Traditional Office	300	250	265
Creative & High Tech Office	225	170	195
Retail	540	540	540
Hotel	1,240	1,240	1,240
PDR	455	455	455
Institutional	520	520	520

Sources: Gensler San Francisco and Strategic Economics, 2015.

¹² Norm G. Miller, “Workplace Trends in Office Space: Implications for Future Office Demand,” University of San Diego, 2014.

4.3 Development Capacity

As office worker densities continue to increase, the existing building stock is expected to accommodate additional employees over time. However, continued employment growth in the Core will also require new development. Factors affecting the amount of new development that can be accommodated in the Core include:

- **Site availability and development feasibility:** In a dense urban center with few vacant lots, most new development will take the form of redeveloping relatively low-intensity, outdated buildings with higher-intensity uses. The financial feasibility of redeveloping underutilized sites will depend on many factors including market conditions, construction costs, height restrictions, and other zoning requirements.
- **Future regulatory changes:** Future changes to the City's land use policies could also affect the amount of development that occurs in the Core. For example, the Planning Department is currently finalizing the Central SOMA Plan, which is expected to result in increased maximum heights and modified zoning to facilitate the development of additional residential and commercial space. It is reasonable to expect that additional regulatory changes will occur over the next few decades.
- **Proposition M:** Proposition M, a voter initiative passed in 1986, limits the amount of office space that can be approved annually for small projects (between 25,000 and 49,999 square feet) and large projects (50,000 square feet or more).¹³ Any available space that is not allocated in a given year is carried over into subsequent years. The cap for small projects has never been met. However, the city recently reached the large project cap for the second time since the initiative was passed. As of May 2015, the amount of office space in the City's entitlement process exceeded the square footage available for large projects under Proposition M by over 9 million square feet.¹⁴ Based on anecdotal conversations with brokers, developers, and San Francisco planners, office developers appear willing to wait many years to receive development allocations. However, to the extent that the Proposition M allocation process delays the supply of new office development needed to meet demand, the initiative could reduce the number of firms that can find (or afford) space in the Core in the short to medium term.

4.3.1 Assumptions Used in the Analysis

In order to determine the overall potential for new development in each subarea, Strategic Economics worked with the San Francisco Planning Department to identify parcels that are under-developed relative to their total potential capacity under current height and density regulations.¹⁵ These under-developed parcels are known "soft sites." The Planning Department

¹³ Proposition M mandates that the City authorize no more than 950,000 gross square feet of office space every year, of which 75,000 gross square feet are reserved for Small Allocation Projects (office buildings between 25,000 and 49,999 square feet) and the remaining square feet are available for Large Allocation Projects (50,000 square feet or more).

¹⁴ San Francisco Planning Department, "Office Development Annual Limitation ("Annual Limit") Program," May 1, 2015, <http://www.sf-planning.org/Modules/ShowDocument.aspx?documentID=9314>.

¹⁵ At the time this analysis was conducted, the Planning Department was beginning a new, citywide study of development capacity. This analysis is based on the Department's soft site database as of summer

also provided data about Mission Bay and other planned projects, including both projects that are currently in the entitlement process as well as longer-term projects that have not yet submitted development applications. Based on this information, Strategic Economics estimated total development capacity, incorporating the following basic assumptions about future land use regulations:

- Proposition M remains in place.
- The City will allow flexibility in the types of uses developed over time (e.g., office, retail, housing).
- Permitted heights and densities are assumed to remain in place, with the exception of major planned projects as provided by the Planning Department.

Figure 12 shows the total estimated development capacity of each subarea, including planned projects and soft sites.

- **Scenario 1: Continued Concentration** assumes that strong market demand drives redevelopment of sites that are currently developed to up to 50 percent of their total capacity (i.e., 50 percent soft sites).¹⁶ For example, a parcel that could accommodate a 100,000 square foot building under existing zoning, but is currently occupied by a 40,000 square foot building, would be considered a soft site given this threshold because it is developed at 40 percent of total capacity.
- **Scenario 2: Reduced Competitiveness** assumes that slightly weaker demand makes redevelopment of existing properties less likely, and sites are only redeveloped if they are currently developed to no more than 30 percent of total capacity (30 percent soft sites).

In total, there is capacity for an additional 75 to 80 million square feet of new net development¹⁷ in the Core (assuming a 30 percent and 50 percent soft site threshold, respectively). Planned projects account for approximately 70 percent of this total. This includes the 300-acre Mission Bay redevelopment area, which is expected to absorb 11.4 million square feet of new residential and commercial development between 2015 and 2025.¹⁸ SOMA has the most development capacity, followed by Mission Bay/Showplace Square and the Civic Center area.

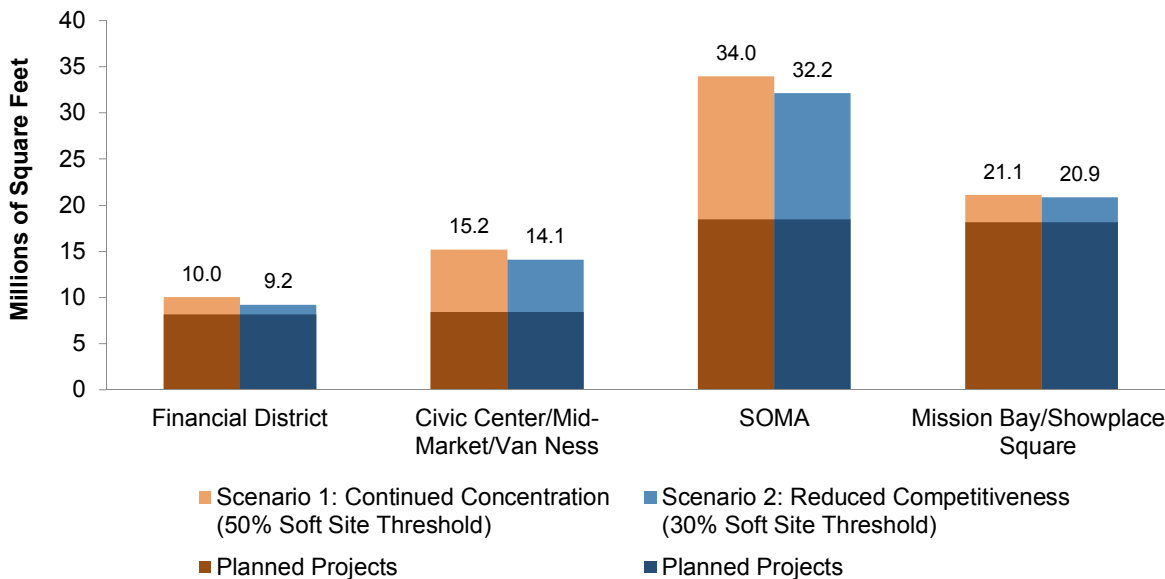
2015. Future modifications to the database could result in different estimates of the overall capacity in the Core.

¹⁶ The 50 percent soft site threshold is more aggressive than the Planning Department typically uses. This threshold was used in Scenario 1 to represent the potential for new development in a strong market, in part because the analysis does not assume that land use regulations change and therefore likely underestimates total future development capacity. However, the difference in total capacity between the 50% and 30% soft site thresholds is relatively small (approximately 4 million square feet).

¹⁷ Net new development capacity is defined as total capacity under existing zoning, minus square footage of existing buildings.

¹⁸ Excluding Mission Bay, planned projects account for approximately half of total capacity.

Figure 12. Estimated Development Capacity by Subarea (Millions of Square Feet)



*Capacity is shown as net new square feet (i.e., total capacity under existing zoning, minus square footage of existing buildings). Sources: City of San Francisco, 2015; Strategic Economics, 2015.

4.4 Other Factors Affecting Regional Employment Growth

This analysis is based on the Association of Bay Area Governments' (ABAG's) 2013 Plan Bay Area projections for the 9-county Bay Area region. The analysis did not test the sensitivity of future employment growth to different assumptions about regional growth rates.

However, it is important to recognize that future employment growth in the Core will be strongly influenced by the overall economic health and competitiveness of the Bay Area region. Many factors could affect future regional economic growth, ranging from local infrastructure capacity constraints to national economic trends and macroeconomic policies (for example, in the short term, increases in federal interest rates could reduce the investment dollars flowing to Bay Area companies). However, economists have identified several risk factors that are particularly important to the Bay Area. These include:

- Sustainability of tech sector growth:** The dot-com boom and bust of the late 1990s and early 2000s had a far-reaching impact on the Bay Area economy, and the recent, rapid acceleration in the tech sector has raised concerns about the likelihood of another major crash. Many analysts, citing factors such as national spending on equipment and software and the ratio between tech share prices and company revenues, believe that a crash similar to the one that occurred in 2001 is unlikely.¹⁹ Tech companies today are more established, less reliant on venture capital, and better structured to survive

¹⁹ Jennifer Warburg, "Top Analysts Predict Another Year of Growth for SF Economy", February 20, 2015, <http://www.spur.org/blog/2015-02-20/top-analysts-predict-another-year-growth-sf-economy>.

business cycles.²⁰ However, any slowdown in the tech industry could have significant consequences for the economy of the Core and the rest of the region.

- **Housing costs:** The rapidly increasing cost of housing in San Francisco, and in the Bay Area more generally, are also potential limiting factors for the region's ability to attract and retain firms and workers over time.

The 2013 Plan Bay Area Projections assume that the Bay Area remains highly attractive for high tech and other companies and continues to accommodate a diverse workforce.²¹

²⁰ Jennifer Warburg, "Forecasting San Francisco's Economic Fortunes," February 27, 2014, <http://www.spur.org/blog/2014-02-27/forecasting-san-francisco-s-economic-fortunes>.

²¹ For more information about the 2013 Plan Bay Area forecasts, see ABAG and MTC, "Final Forecast of Jobs, Population and Housing," July 2013, http://planbayarea.org/pdf/final_supplemental_reports/FINAL_PBA_Forecast_of_Jobs_Population_and_Housing.pdf.

5 Results of the Employment Growth Scenarios

Based on the research and analysis described above, Strategic Economics developed a model that projected net new development and jobs²² by subarea for each of the two employment growth scenarios (summarized in Figure 13). Key findings from the analysis are described below and shown in the following figures. Figure 14 shows existing and projected jobs by subarea for each scenario. Figure 15 shows existing and projected non-residential development by subarea and scenario. Figures 16 and 17 compare the total amount of net new development projected in each scenario (including both commercial and residential uses) to the overall development capacity in each subarea. Figures 18 and 19 provide more detailed results, including employment projections for 2020, 2030, and 2040.

- **Scenario 1 projects 140,000 net new jobs in the Core between 2015 and 2040, compared to just over 100,000 in Scenario 2.** Scenario 1 (Continued Concentration) assumes that the Core continues to attract a high share of regional employment growth, driving increasingly efficient use of new and existing office buildings and significant redevelopment throughout the Core. Scenario 2 (Reduced Competitiveness) assumes that the Core captures a lower share of regional employment growth, reducing the extent to which existing buildings are redeveloped and replaced with higher density uses. Depending on the scenario, approximately 35 to 45 percent of total job growth projected for the Core is assumed to be accommodated through increased employment densities in existing buildings, while the remaining 55 to 65 percent of job growth occurs in newly developed buildings.
- **In both scenarios, the Financial District captures the most new jobs (Figure 14), despite the fact that this subarea accommodates the smallest amount of net new development.** The Financial District is expected to remain highly attractive for new employment, accommodating 55,000 net new jobs in Scenario 1 (Continued Concentration) and 38,000 new jobs in Scenario 2 (Reduced Competitiveness), resulting in a total of 251,800 to 269,000 total jobs in the Financial District by 2040 (Figure 14). Approximately 60 to 70 percent of the new jobs projected for the Financial District are accommodated in existing office buildings as employers gradually shift to more efficient use of space over time.²³ The remaining jobs are expected to occur in new development. Based on data from the City, the Financial District has capacity for 9 to 10 million square feet of additional development. Employment uses are expected to account for most of this development, in contrast to the Civic Center and SOMA submarkets, which are expected to attract more residential than commercial development (Figure 19).
- **In aggregate, SOMA and the Mission Bay/Showplace Square areas are expected to accommodate more net new jobs than the Financial District, although the Financial District will remain the primary employment center in the Core.** Together,

²² Throughout this section, “net new” jobs and development refers to the number of new jobs or square feet of new development that can be expected in 2040, net of existing employment/development as of 2015.

²³ The Financial District has 50 million square feet of existing office space, accounting for more than 60 percent of all the office space in the Core.

SOMA and Mission Bay/Showplace Square capture 62,600 jobs in Scenario 1 (Continued Concentration) and 47,000 jobs in Scenario 2 (Reduced Competitiveness) – bringing total employment in the two subareas to 132,900 to 148,500 depending on the scenario (Figure 14). Job growth in SOMA is expected to be concentrated in the Central SOMA district, around 4th Street. Note that both Civic Center and SOMA are expected to experience significantly more residential than non-residential development. Including residential, SOMA is projected to attract the most total development (Figure 19).

- **In Scenario 1, both the Financial District and the Civic Center subareas are projected to reach capacity (Figure 16).** In this scenario, the existing development capacity in the Financial District and Civic Center submarkets is fully built out between 2030 and 2040. As a result, some jobs that would otherwise locate in the Financial District and Civic Center subareas instead locate in SOMA and Mission Bay/Showplace Square. Both scenarios assume that firms that cannot find or afford space in the subarea where they would most prefer to locate will generally relocate somewhere else within the Core, rather than leave the Core for another location.²⁴ This reflects findings from the market analysis, which suggests that most private sector firms are willing to pay a premium to remain the Core.
- **In Scenario 2, only the Financial District reaches capacity by 2040 (Figure 17).** Under this scenario, some jobs relocate from the Financial District to the other three subareas after the Financial District is fully built out (between 2030 and 2040). However, there is significant remaining capacity for additional development after 2040 in Civic Center, SOMA, and Mission Bay/Showplace Square.

²⁴ However, the employment growth model does show the Proposition M cap on office development reducing the growth of new jobs in the Core in the short term (2015-2020) by approximately 13,000 jobs, by slowing the delivery of new office space.

Figure 13. Summary of the Employment Growth Scenarios

Key Factors Influencing Growth in the Core	Scenario 1: Continued Concentration	Scenario 2: Reduced Competitiveness
Capture of Regional Employment Growth	High 18% of regional growth	Low 14% of regional growth
Office Employment Densities	High Traditional: 250 sq. ft./worker Creative: 170 sq. ft./worker	Medium Traditional: 265 sq. ft./worker Creative: 195 sq. ft./worker
Extent of Redevelopment	High 50% soft sites*	Medium 30% soft sites**

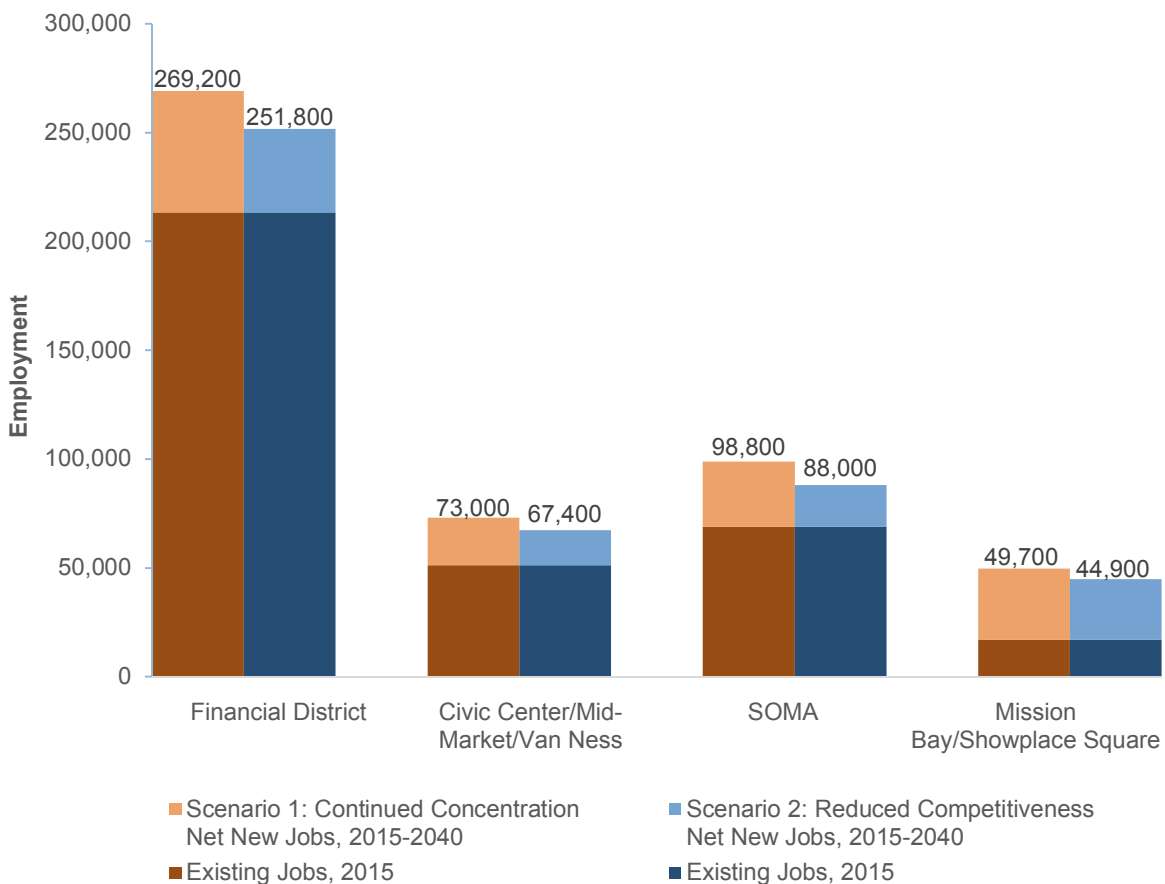
See below for additional description of the assumptions and methodology used to model each scenario.

* Assumes that sites that are currently developed to less than 50 percent of their total capacity under current zoning will redevelop over time.

** Assumes that sites that are currently developed to less than 30 percent of their total capacity under current zoning will redevelop over time.

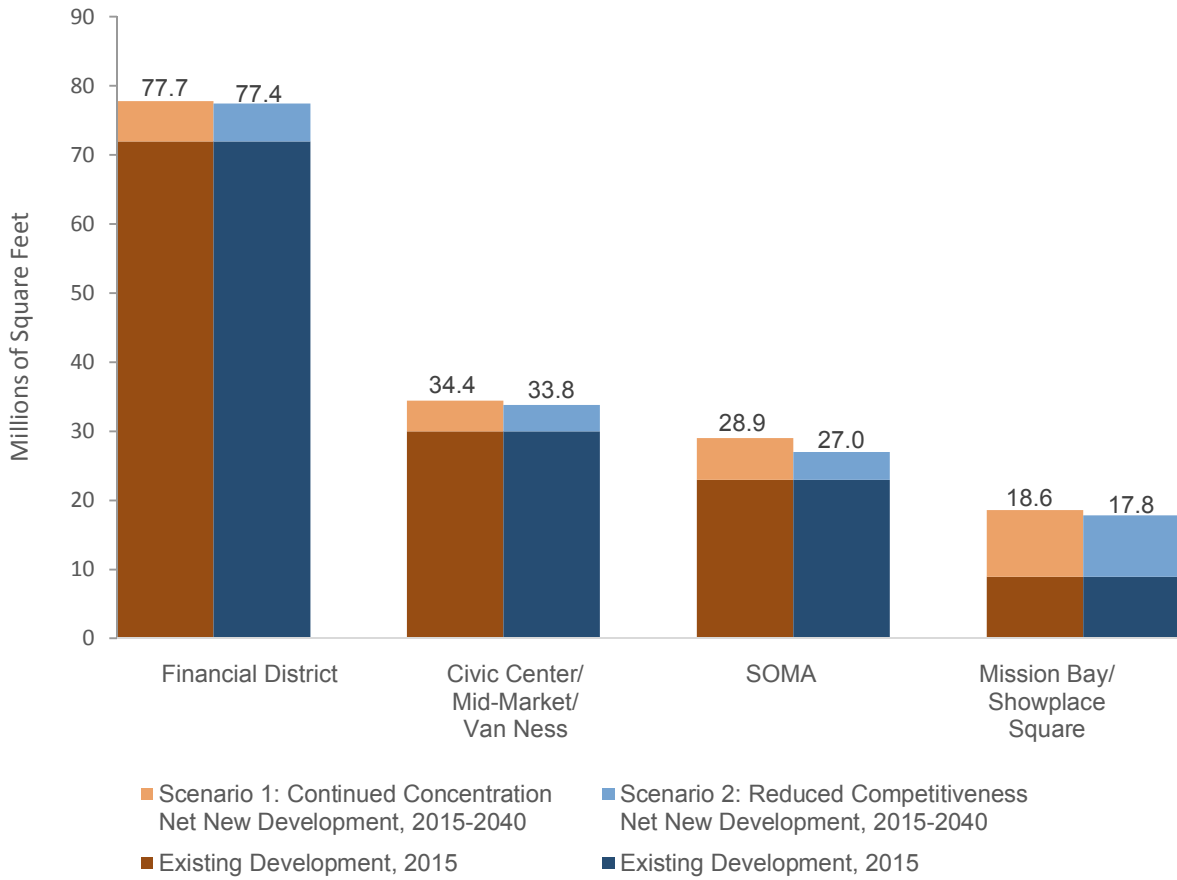
Source: Strategic Economics, 2015.

Figure 14. Job Growth by Subarea and by Scenario, 2040



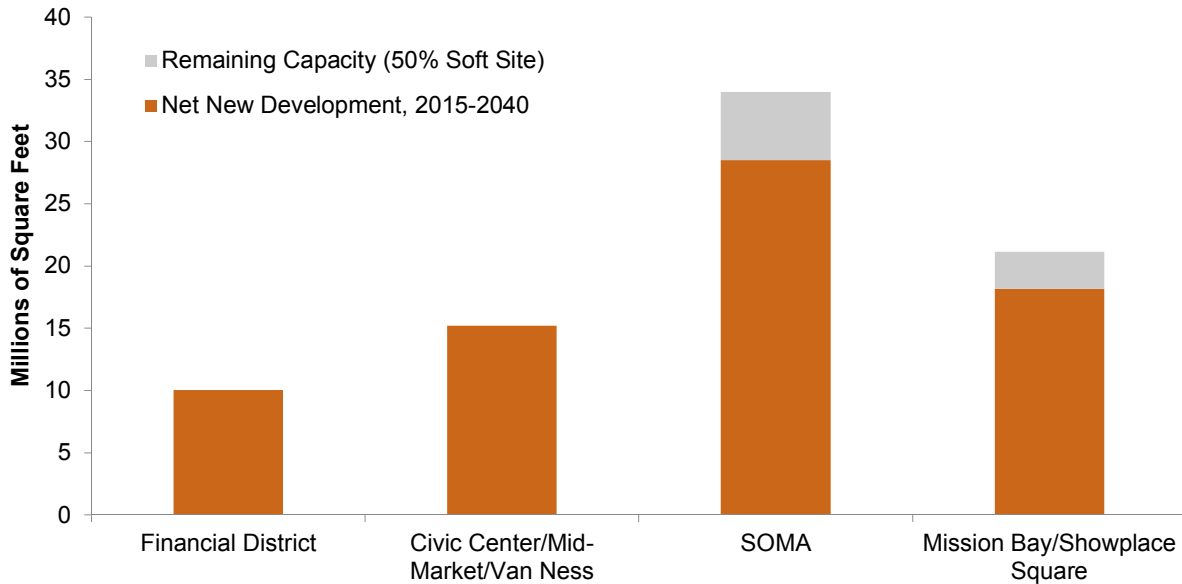
Source: Strategic Economics, 2015.

Figure 15. Non-Residential Development by Scenario, 2040



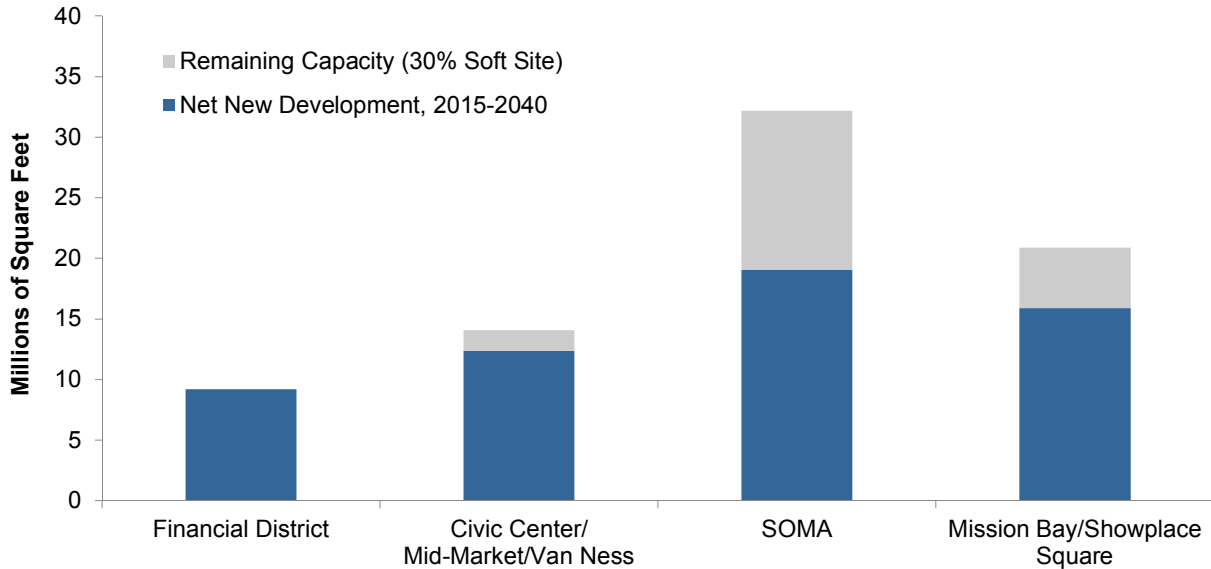
Source: Strategic Economics, 2015.

Figure 16. Scenario 1 (Continued Concentration): Total Net New Development (Non-Residential and Residential) Relative to Capacity,* 2015-2040



* Assumes that sites that are currently developed to less than 50 percent of their total capacity under current zoning will redevelop over time.
 Source: Strategic Economics, 2015.

Figure 17. Scenario 2 (Reduced Competitiveness): Total Net New Development (Non-Residential and Residential) Relative to Capacity,* 2015-2040



* Assumes that sites that are currently developed to less than 30 percent of their total capacity under current zoning will redevelop over time.
 Source: Strategic Economics, 2015.

Figure 18. Employment Growth Scenario Results: Employment by Subarea, 2015-2040 (Jobs)

Subareas	Employment				Change 2015-2040
	2015	2020	2030	2040	
Scenario 1: Continued Concentration					
Financial District	199,500	215,300	233,100	255,300	55,800
Civic Center/Mid-Market/Van Ness	64,500	72,000	77,700	86,200	21,700
SOMA	63,300	73,200	79,200	93,300	30,000
Mission Bay/Showplace Square	23,200	45,000	49,800	55,800	32,600
Total Core	350,500	405,500	439,800	490,700	140,200
Scenario 2: Reduced Competitiveness					
Financial District	199,500	212,700	223,300	237,900	38,400
Civic Center/Mid-Market/Van Ness	64,500	71,400	74,800	80,600	16,100
SOMA	63,300	72,400	76,000	82,500	19,200
Mission Bay/Showplace Square	23,200	36,100	43,900	51,000	27,800
Total Core	350,500	392,700	418,100	452,000	101,500

Columns may not add to totals due to rounding.
Source: Strategic Economics, 2015.

Figure 19. Employment Growth Scenario Results: Total Net New Development Compared to Capacity, 2015-2040 (Square Feet)

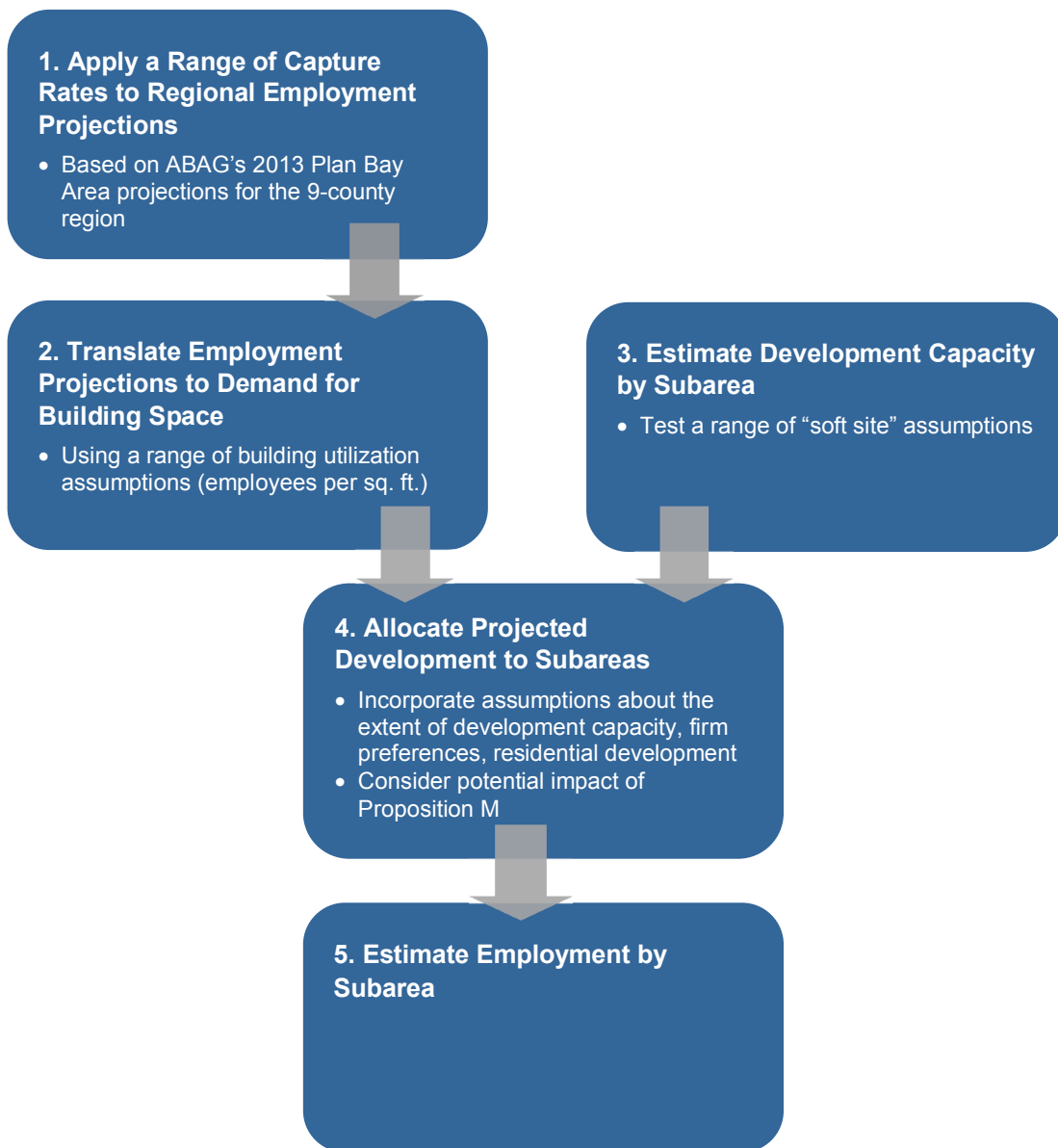
Subareas	Net New Development			Capacity	
	Residential Space	Employment Space	Total	Total Capacity	Percent Utilized
Scenario 1: Continued Concentration					
Financial District	4,260,200	5,786,200	10,046,500	10,046,500	100%
Civic Center/Mid-Market/Van Ness	10,774,500	4,422,700	15,197,200	15,197,200	100%
SOMA	22,444,200	6,060,700	28,505,000	33,984,500	84%
Mission Bay/Showplace Square	8,497,500	9,660,300	18,157,900	21,143,300	86%
Total Core	45,976,500	25,930,000	71,906,500	80,371,500	89%
Scenario 2: Reduced Competitiveness					
Financial District	3,759,700	5,429,200	9,188,900	9,188,900	100%
Civic Center/Mid-Market/Van Ness	8,545,500	3,841,300	12,386,800	14,077,100	88%
SOMA	14,989,000	4,071,700	19,060,600	32,166,000	59%
Mission Bay/Showplace Square	6,974,000	8,910,100	15,884,100	20,869,500	76%
Total Core	34,268,100	22,252,300	56,520,400	76,301,400	74%

Columns may not add to totals due to rounding.
Source: Strategic Economics, 2015.

6 Appendix A: Assumptions and Methodology for the Employment Growth Model

The employment growth scenarios are based on a model that estimates future employment by subarea using five steps, as summarized in Figure A-1. The model also incorporated assumptions about existing (2015) employment and building square footage in the Core, as a baseline for the analysis. Major assumptions made in each step of the methodology, as well as limitations of the analysis, are described below.

Figure A-1. Model Overview



6.1 Limitations of the Analysis

Among other factors, the results of the analysis are sensitive to assumptions about regional growth rates, building utilization (including employment densities and vacancy rates), development capacity, and firm preferences. This analysis incorporates reasonable assumptions based on data and observations about current conditions and recent trends in the Core, as described below. The results of the analysis provide insight about the extent to which development capacity is a barrier to future employment growth in the San Francisco Core, and the relative potential magnitude of potential growth in different subareas within the Core. However, the analysis is not intended to serve as a definitive land use forecast or as a direct input into transportation planning models.

The analysis is limited in part by data quality and availability. Some of the major data limitations are described below:

- **Regional projections:** This analysis is based on the 2013 Plan Bay Area projections for the nine-county Bay Area region. The regional projections are used as an input for estimating future demand for employment space in the Core. However, it should be noted that the Plan Bay Area projections are based in part on historic growth trends, and therefore inherently reflect historic constraints on growth and development. Note also that the Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG) are currently in the process of updating the region's employment and household projections as part of the Plan Bay Area 2017 Update.
- **Employment data:** The most recent available data on employment in the Core were from 2013 (from the U.S. Census Bureau's Longitudinal Employer-Household Dynamics, or LEHD, program). Strategic Economics estimated existing (2015) employment in the Core as described below in Section 6.2. Accurate data on long-term, historic employment trends in the Core were not available, because of methodological improvements to the LEHD program that the Census Bureau has phased in over time.
- **Building square footage data:** Existing building square footage in the Core was estimated from several different sources, including several different sources provided by the Planning Department and data from CoStar Group.
- **Development capacity data:** The development capacity estimate used in this analysis is based on the Department's soft site database as of summer 2015. At the time this analysis was conducted, the Planning Department was beginning a new, citywide study of development capacity that will include an assessment of potential future land use policy changes that may allow more growth to occur in certain locations. Future modifications to the database could result in different estimates of overall development capacity in the Core.

6.2 Existing Employment and Building Square Footage

Figure A-2 shows estimated employment, building inventory, vacancy rate, and building utilization for the Core as of 2015. Figure A-3 shows the building inventory broken out by subarea. The baseline estimates shown in Figures A-2 and A-3 were derived from a variety of data sources. As described above, the most recent available data on employment in the Core were from 2013. In order to estimate 2015 employment in the Core, Strategic Economics used the most recent available (third quarter 2014) employment data for the City of San Francisco from the Census Bureau's Quarterly Workforce (QWI), and assumed that the Core maintained the same share of citywide employment in each sector as in 2013. Estimates of existing building square footage were derived from building inventory data from the CoStar Group and San Francisco Planning Department. The numbers shown in Figures A-2 and A-3 should be interpreted as simplified, baseline estimates for the purposes of this analysis only.

Figure A-2. Estimated Employment, Building Inventory, Vacancy Rate, and Building Utilization: San Francisco Core, 2015

Land Use	Employment	Total Building Inventory (Sq. Ft.)	Occupied Space (Sq. Ft.)	Vacancy Rate	Building Utilization (Sq. Ft. per Employee)
Traditional Office	192,100	62,578,100	58,197,600	7%	300
Creative & High Tech Office	69,600	16,637,400	15,472,700	7%	225
Retail	45,500	25,249,800	24,492,300	3%	540
Hotel	11,600	14,369,200	14,369,200	N/A	1,240
PDR	10,900	5,109,300	4,956,000	3%	455
Institutional	19,000	9,943,400	9,943,400	N/A	520
Private Households	1,700	N/A	N/A	N/A	N/A
Total	350,500	133,887,100	127,431,300	N/A	365

Columns may not add to totals due to rounding.

Sources: U.S. Census Bureau, Quarterly Workforce Indicators, 2014; LEHD "On the Map" Employment Estimates, 2013; CoStar Group, 2015; San Francisco Planning Department, Parcel Land Use Data, 2015; Strategic Economics, 2015.

Figure A-3. Estimated Building Inventory (Sq. Ft.) by Subarea, 2015

Land Use	Financial District	Civic Center	SOMA	Mission Bay/ Showplace Square	Total Core
Traditional Office	39,167,700	9,385,700	10,753,400	3,271,200	62,578,100
Creative & High Tech Office	10,413,400	2,495,300	2,859,000	869,700	16,637,400
Retail	12,615,300	6,363,800	4,557,600	1,713,100	25,249,800
Hotel	5,480,100	8,447,500	441,600	0	14,369,200
PDR	288,500	894,300	3,013,000	913,500	5,109,300
Institutional	4,040,200	2,403,300	1,324,700	2,175,200	9,943,400
Total	72,005,200	29,989,900	22,949,400	8,942,600	133,887,100

Columns may not add to totals due to rounding.

Sources: U.S. Census Bureau, Quarterly Workforce Indicators, 2014; LEHD "On the Map" Employment Estimates, 2013; CoStar Group, 2015; San Francisco Planning Department, Parcel Land Use Data, 2015; Strategic Economics, 2015.

6.3 Step 1: Apply a Range of Capture Rates to Regional Growth Forecast

The Association of Bay Area Governments' 2013 Plan Bay Area projections provide employment projections in five year increments for 2010 through 2040. In order to estimate projected employment in the Core, the model first applied a range of capture rates (for each of ABAG's 11 employment sectors) to the regional Plan Bay Area forecast.

Figure A-4 shows how the capture rates for the first five-year period (2015-2020) were derived. Figure A-5 shows the sectoral capture rates used for each five-year period between 2015 and 2040. For Scenario 1, the capture rates for each sector were derived based on the share of regional employment growth (by sector) that the City of San Francisco captured between 2009 and 2014, multiplied by the share of citywide employment located in the Core in 2013 (Column A multiplied by Column B, in Figure A-4). The following adjustments were then made to arrive at the capture rates used in Scenario 1:

- The Financial & Leasing services capture rate was increased, because San Francisco's share of regional growth in this sector has historically been much higher (88 percent between 1994 and 2004) than it was between 2009 and 2014 (70 percent).
- The Health & Educational services capture rate was increased to account for the build-out of UCSF Mission Bay. Between 2015 and 2020, the Core is assumed to capture a particularly large share of Health and Educational services (17 percent) to account for the completion of UCSF Medical Center and other Mission Bay facilities.
- The Government capture rate was decreased because LEHD often assigns employment – particularly government employment – to a central administrative location (such as City Hall, located in the Core) rather than to the actual location where work is performed.
- The Transportation & Utilities capture rate was also decreased because LEHD often assigns employment to central administrative locations, and both sectors include many employees who typically work in back offices or travel throughout the region (such as taxi drivers, customer service representatives, meter readers, control and valve installers and repairers, etc).

The capture rates for Scenario 2 were adjusted downwards to reflect a hypothetical scenario in which the Core gradually becomes less competitive over time, particularly for key employment sectors such as professional services, information, financial and leasing services, health and educational services, and manufacturing and wholesale.

Multiplying the regional employment growth forecasts by the capture rates shown in Figure A-4 resulted in estimates of total net new employment for the Core over time. Overall, the Core captures 18 percent of total regional employment growth between 2015 and 2040 in Scenario 1, and 14 percent of total regional employment growth in Scenario 2.²⁵ Note that neither scenario

²⁵ While data on long-term trends in employment growth in the Core were not available for this analysis, available information supports the 18 and 14 percent capture rates. For example, LEHD reports that

included a calculation of employment for the City of San Francisco as a whole, because employment growth in the Core (as a key regional employment center) is assumed to be related to the region's overall economic growth.

between 2011 and 2013, the Core captured 55 percent of citywide employment and 13 percent of the region's employment. (Because of methodological improvements that the Census Bureau has phased in over time, LEHD does not provide reliable data on long-term trends. However, according to communications with the Census Bureau, trend analysis may be performed beginning with 2011, the last year in which major methodological changes were made.) While the Core captured 72 percent of the City's new commercial development between 2004 and 2014 (measured in square feet, as shown above in Figure 8), the development in the Core included a significant amount of retail/entertainment, visitor (hotel), and institutional uses, which tend to have relatively low employment densities – suggesting that the Core's share of the City's employment growth during this time was likely lower than 72 percent.

Figure A-4. Derivation of Capture Rates for the First Five-Year Period (2015-2020)

Sector	Column A. Share of Net New Bay Area Employment Captured in San Francisco, 2009-2014 (QWI)	Column B. Share of San Francisco Employment Located in the Core, 2013 (LEHD)	Column A x Column B	Capture Rates Used in Analysis: Share of Future Regional Employment Growth Captured by the Core, 2015-2020	
				Scenario 1: Continued Concentration	Scenario 2: Reduced Competitiveness
Agriculture & Natural Resources	5%	35%	2%	2%	1%
Arts, Recreation & Other Services	10%	46%	5%	5%	4%
Construction	25%	38%	10%	10%	8%
Financial & Leasing	70%	79%	55%	59%	50%
Government	21%	48%	10%	6%	6%
Health & Educational Services	21%	18%	4%	17%	10%
Information	22%	70%	15%	15%	10%
Manufacturing & Wholesale	42%	48%	20%	20%	15%
Professional & Managerial Services	42%	81%	34%	34%	30%
Retail	14%	45%	6%	6%	5%
Transportation & Utilities	21%	35%	7%	4%	3%
Total	29%	53%	15%	21%	17%

Sources: U.S. Census Bureau, Quarterly Workforce Indicators, 2014; Longitudinal Employer-Household Dynamics, 2013; Strategic Economics, 2015.

Figure A-5. Share of Future Regional Employment Growth Captured by the Core, by Sector

Sector	2015-2020	2020-2025	2025-2030	2030-2035	2035-2040
Scenario 1: Continued Concentration					
Agriculture & Natural Resources	2%	2%	2%	2%	2%
Arts, Recreation & Other Services	5%	5%	5%	5%	5%
Construction	10%	10%	10%	10%	10%
Financial & Leasing	59%	59%	59%	59%	59%
Government	6%	6%	6%	6%	6%
Health & Educational Services	17%	5%	5%	5%	5%
Information	15%	15%	15%	15%	15%
Manufacturing & Wholesale	20%	20%	20%	20%	20%
Professional & Managerial Services	34%	34%	34%	34%	34%
Retail	6%	6%	6%	6%	6%
Transportation & Utilities	4%	4%	4%	4%	4%
Total	21%	17%	17%	17%	17%
Scenario 2: Reduced Competitiveness					
Agriculture & Natural Resources	1%	1%	1%	1%	1%
Arts, Recreation & Other Services	4%	4%	4%	4%	4%
Construction	8%	8%	8%	8%	8%
Financial & Leasing	50%	45%	45%	40%	40%
Government	6%	6%	6%	6%	6%
Health & Educational Services	10%	5%	5%	5%	5%
Information	10%	8%	8%	8%	8%
Manufacturing & Wholesale	15%	10%	10%	10%	10%
Professional & Managerial Services	30%	25%	20%	20%	20%
Retail	5%	5%	5%	5%	5%
Transportation & Utilities	3%	3%	3%	3%	3%
Total	17%	13%	11%	11%	11%

Source: Strategic Economics, 2015.

6.4 Step 2: Translate Employment Projections to Building Space

Demand for building space was estimated based on projected employment in the Core, using the methodology and assumptions described below.

- **Translate employment categories to land use categories.** Every sector employs a range of occupations, which may occupy different types of buildings. Strategic Economics distributed the projected employment in each sector to land use categories using the percentages shown in Figure A-6. The percentages were derived based on the NAICS-code based definitions of land use categories used by the San Francisco Planning Department for several past projects, with adjustments made to reflect conditions specific to the Core. For example, a higher share of employment in sectors such as manufacturing and wholesale or transportation and utilities is expected to be office-based in the Core compared to other parts of the city.
- **Allocate jobs to buildings using a range of building utilization assumptions.** Strategic Economics converted the employment estimates into demand for building space, using building utilization assumptions (square feet per worker) developed in conjunction with Gensler and shown in Figure A-7. Space allocations per worker were assumed to decline gradually over time, and to decline more quickly in Scenario 1 than in Scenario 2. The model assumes that both existing buildings and new buildings accommodate more employees over time. The model also assumes average structural vacancy rates of 7 percent for office and 5 percent for retail and PDR.²⁶

²⁶ 7 percent is a conservative estimate of current office vacancy rates for the Core overall; according to broker reports, vacancies have been hovering in the 6 to 7 percent range for the last several quarters, although there is significant variation for different areas within the Core. The current vacancy rate is the lowest since at least 2005. The analysis assumes that this low vacancy rate continues because demand is assumed to be strong enough in both scenarios to support continued development and densification.

Figure A-6. Employment Sector to Land Use Bridge

Sector	Land Use Categories							Total
	Traditional Office	Creative & High Tech Office	Retail	Hotel	PDR	Institutional	Private Households	
Agriculture & Natural Resources	100%	0%	0%	0%	0%	0%	0%	100%
Arts, Recreation & Other Services	10%	0%	42%	20%	5%	20%	3%	100%
Construction	75%	0%	0%	0%	25%	0%	0%	100%
Financial & Leasing	100%	0%	0%	0%	0%	0%	0%	100%
Government	100%	0%	0%	0%	0%	0%	0%	100%
Health & Educational Services	50%	0%	0%	0%	0%	50%	0%	100%
Information	25%	65%	0%	0%	10%	0%	0%	100%
Manufacturing & Wholesale	75%	0%	0%	0%	25%	0%	0%	100%
Professional & Managerial Services	65%	35%	0%	0%	0%	0%	0%	100%
Retail	0%	0%	100%	0%	0%	0%	0%	100%
Transportation & Utilities	65%	10%	0%	0%	25%	0%	0%	100%

Sources: U.S. Census Bureau, Quarterly Workforce Indicators, 2014; Strategic Economics, 2015.

Figure A-7. Gross Square Feet per Employee

Land Use	2015	2020	2025	2030	2035	2040
Scenario 1: Continued Concentration						
Traditional Office	300	290	280	270	260	250
Creative & High Tech Office	225	215	205	190	180	170
Retail	540	540	540	540	540	540
Hotel	1,240	1,240	1,240	1,240	1,240	1,240
PDR	455	455	455	455	455	455
Institutional	520	520	520	520	520	520
Private Households	N/A	N/A	N/A	N/A	N/A	N/A
Scenario 2: Reduced Competitiveness						
Traditional Office	300	295	285	280	270	265
Creative & High Tech Office	225	220	215	205	200	195
Retail	540	540	540	540	540	540
Hotel	1,240	1,240	1,240	1,240	1,240	1,240
PDR	455	455	455	455	455	455
Institutional	520	520	520	520	520	520
Private Households	N/A	N/A	N/A	N/A	N/A	N/A

Sources: Gensler San Francisco and Strategic Economics, 2015.

6.5 Step 3: Estimate Development Capacity by Subarea

Strategic Economics worked with the San Francisco Planning Department to estimate development capacity by subarea. Figure A-8 shows the total, net new development capacity (i.e., additional capacity under existing zoning, over and above existing building area) estimated for each subarea under the two scenarios. Development capacity was estimated using the Planning Department's data and methodology,²⁷ and included the following components:

- **Planned development:** For sites where new development is currently planned, net new capacity was calculated as the difference between the planned building area and the existing building footprint. This methodology implicitly assumes that land use regulations will be adjusted as necessary to accommodate planned projects. The list of planned projects was assembled from the Planning Department's "pipeline" projects list – which included projects that had submitted entitlement applications as of the second quarter of 2015 – and supplemented with other major planned projects that have not yet begun the approvals process but are expected to occur in the medium to long term. For example, this includes the Transbay (Salesforce) Tower, 5M, the Flower Mart, and the 4th/King Railyards project. The Mission Bay redevelopment area was assumed to have the capacity to absorb 11.4 million square feet of new development, based on projections provided by the Planning Department.²⁸
- **Soft sites:** Sites that are currently underdeveloped relative to their total capacity under existing zoning, but are not currently the subject of a development proposal, were also assumed to have the potential to redevelop over time. For these sites, net new capacity was calculated as the difference between the total potential development capacity under current zoning, and the existing building footprint. This "soft site" analysis did not include assumptions about the types of uses that would occur on any given parcel, but rather assumed that the City will allow flexibility in the types of uses developed over time (e.g., office, retail, housing). Scenario 1 assumes that strong market demand drives new development on sites that are currently developed to up to 50 percent of their total capacity (i.e., 50 percent "soft" sites). Scenario 2 assumes that slightly weaker demand makes new development less feasible, and sites are only redeveloped if they are currently developed to no more than 30 percent of total capacity (30 percent soft sites).²⁹ Sites with development projects completed since 1998 were excluded from the soft site analysis.

The 50 percent soft site threshold is more aggressive than the Planning Department typically uses. It was used in Scenario 1 to represent the potential for new development in a strong market, in part because the analysis does not assume that the City implements major changes

²⁷ Note that at the time of this analysis, the Planning Department was initiating a new, citywide analysis of development capacity. This analysis incorporates data from the Planning Department's soft site database and current development projects list from mid-2015.

²⁸ This does not include the potential future redevelopment of existing parking garages. See Figure A-8, below, for more information.

²⁹ For a more detailed description of the Planning Department's soft site database, see Appendix D of the City's 2014 Housing Element, available at http://www.sf-planning.org/ftp/general_plan/2014HousingElement-AllParts_ADOPTED_web.pdf.

to existing land use regulations (in terms of the amount of height or density allowed), and therefore likely underestimates total future development capacity. However, the difference in total capacity between the 50% and 30% soft site thresholds is relatively small (approximately 4 million square feet, out of a total of 76 to 80 million square feet).

Figure A-8. Estimated Development Capacity: Net New Square Feet of Potential Capacity

	Financial District	Civic Center	SOMA	Mission Bay/ Showplace Square	Total
Scenario 1: Continued Concentration					
Planned Development	8,176,300	8,445,800	18,459,200	18,135,500	53,216,900
Soft Sites (50% Threshold)	1,870,100	6,751,400	15,525,300	3,007,800	27,154,600
Total Capacity	10,046,500	15,197,200	33,984,500	21,143,300	80,371,500
Scenario 2: Reduced Competitiveness					
Planned Development	8,176,300	8,445,800	18,459,200	18,135,500	53,216,900
Soft Sites (30% Threshold)	1,012,600	5,631,300	13,706,800	2,733,900	23,084,500
Total Capacity	9,188,900	14,077,100	32,166,000	20,869,500	76,301,400

Columns may not add to totals due to rounding.

Sources: San Francisco Planning Department, 2015; Strategic Economics, 2015.

6.6 Step 4: Allocate Projected Development to Subareas

Projected future development – i.e., the amount of net new building area required to accommodate future employment growth – was allocated to the subareas using the following assumptions.

- **Mission Bay redevelopment area:** New development was allocated to the Mission Bay redevelopment area based on information about the area’s projected build-out provided by the Planning Department. Scenario 1 assumes that Mission Bay builds out by 2025, per the Planning Department’s absorption schedule. Scenario 2 assumes that Mission Bay eventually accommodates the same amount of development, but that the development is spread out over the full 35-year projection period (Figure A-9).
- **Proposition M:** Proposition M mandates that the City authorize no more than 950,000 gross square feet of office space every year, of which 75,000 gross square feet are reserved for Small Allocation Projects (office buildings between 25,000 and 49,999 square feet) and the remaining square feet are available for Large Allocation Projects (50,000 square feet or more). Any available space that is not allocated in a given year is carried over into subsequent years. The cap for Small Allocation Projects has never been met. However, the city recently reached the Large Allocation Projects cap for the second time since the initiative was passed. In general, the new office development planned at Mission Bay has already received the necessary Proposition M allocations.

This analysis assumed that the Small Allocation Projects cap is not a constraint on new development. For Large Allocation Projects, the aggregate Proposition M allocation was compared against aggregate office demand for the Core (excluding Mission Bay) for every five year period.³⁰ To the extent that demand for office could not be accommodated within the Proposition M allocation in a given period, it was assumed that the excess employment would locate outside of San Francisco. In both scenarios, the Proposition M cap was only exceeded in the first five year period (2015-2020).³¹

- **Firm preferences and development capacity:** After accounting for Mission Bay and the Proposition M office cap, the remaining development projection was allocated to subareas based on 1) firm preferences and 2) development capacity. Figure A-10 shows the initial percentages used to distribute development to the subareas, which were developed qualitatively based on information about the spatial distribution of different types of planned development projects in the pipeline, as well as qualitative information about firm preferences from broker interviews. For example, the analysis assumes that the Financial District remains particularly competitive for traditional office, while creative and high tech office users concentrate in SOMA and the Civic Center area. When a given subarea reached capacity (after accounting for residential development, as described in the following bullet point, as well as employment uses), development was

³⁰ Based on an analysis of office projects completed in San Francisco the last 10 years, Small Allocation Projects were assumed to account for 5 percent of new office development and the Core was assumed to receive 88 percent of the total annual allocation for large projects.

³¹ Developers appear willing to wait many years to receive Proposition M allocations. This analysis assumes the Proposition M allocation process delays the supply of new office development needed to meet demand, reducing the number of firms that can find (or afford) space in the Core in the short term.

reallocated to the remaining subareas using an adjusted version of the percentages shown in Figure A-10.

- **Extent of residential development.** This analysis did not include a detailed demand projection for residential development. However, the development allocation incorporated assumptions about the extent of residential development. Each new job was assumed to generate demand for 0.25 housing units. New housing units were assumed to average 1,200 gross square feet each, consistent with the Planning Department's typical assumption for residential unit size. Residential development was allocated to the subareas based on the factors shown in Figure A-10, which were derived from the Planning Department's Land Use Allocation model.

Figure A-11 shows total net new development by type and subarea for the full 2015-2040 time period. Notably, more than 70 percent of the development in Civic Center and SOMA is residential.

Figure A-9. Mission Bay Development Assumptions: Square Feet Absorbed, 2015-2040

	2015-2020	2021-2025	2025-2030	2030-35	2035-2040	Total
Scenario 1: Continued Concentration*						
Traditional Office	3,002,200	197,700	0	0	0	3,199,900
Creative & High Tech Office	798,200	52,600	0	0	0	850,800
Retail	429,400	0	0	0	0	429,400
Hotel	92,000	0	0	0	0	92,000
PDR	137,100	0	0	0	0	137,100
Institutional	2,381,900	411,500	0	0	0	2,793,400
Total Employment Uses	6,840,900	661,700	0	0	0	7,502,600
Residential	3,487,200	423,600	0	0	0	3,910,800
Total	10,328,100	1,085,300	0	0	0	11,413,400
Scenario 2: Reduced Competitiveness**						
Traditional Office	1,599,900	480,000	480,000	320,000	320,000	3,199,900
Creative & High Tech Office	425,300	127,600	127,600	85,100	85,100	850,700
Retail	214,700	64,400	64,400	42,900	42,900	429,300
Hotel	46,000	13,800	13,800	9,200	9,200	92,000
PDR	68,600	20,600	20,600	13,700	13,700	137,200
Institutional	1,396,700	419,000	419,000	279,300	279,300	2,793,300
Total Employment Uses	3,751,200	1,125,400	1,125,400	750,200	750,200	7,502,400
Residential	1,955,400	586,600	586,600	391,100	391,100	3,910,800
Total	5,706,600	1,712,000	1,712,000	1,141,300	1,141,300	11,413,200

Columns may not add to totals because of rounding.

*Based on projected absorption schedule provided by the San Francisco Planning Department; office space was assumed to be 80 percent traditional and 20 percent creative/high tech. Does not include potential future redevelopment of existing parking garages.

**Assumes projected development is absorbed over full period of study (2015-2040).

Sources: San Francisco Planning Department, 2015; Strategic Economics, 2015.

*Figure A-10. Subarea Capture Rates of New Development: Percent of Projected New Development (Sq. Ft.), Excluding Planned Development in Mission Bay**

Land Use	Financial District	Civic Center	SOMA	Showplace Square	Total
Traditional Office	40%	20%	30%	10%	100%
Creative & High Tech Office	25%	30%	35%	10%	100%
Retail	40%	35%	20%	5%	100%
Hotel	45%	30%	10%	15%	100%
PDR	10%	15%	60%	15%	100%
Institutional	40%	40%	15%	5%	100%
Residential	13%	28%	49%	10%	100%

*Before accounting for development capacity.
 Source: Strategic Economics, 2015.

Figure A-11.. Total Net New Development by Type, 2015-2040

Land Use	Financial District	Civic Center	SOMA	Mission Bay/ Showplace Square	Total
Scenario 1: Continued Concentration					
Square Feet					
Traditional Office	3,277,510	1,801,495	3,470,878	4,356,810	12,906,693
Creative & High Tech Office	330,931	422,513	565,646	1,012,343	2,331,433
Retail	930,118	904,801	779,142	624,230	3,238,291
Hotel	545,940	413,072	223,538	427,307	1,609,858
PDR	59,384	91,405	377,622	231,548	759,959
Institutional	642,346	789,450	643,909	3,008,079	5,083,784
Residential	4,260,249	10,774,487	22,444,242	8,497,538	45,976,516
Total	10,046,477	15,197,224	28,504,976	18,157,856	71,906,534
Percent of Total Square Feet					
Traditional Office	33%	12%	12%	24%	18%
Creative & High Tech Office	3%	3%	2%	6%	3%
Retail	9%	6%	3%	3%	5%
Hotel	5%	3%	1%	2%	2%
PDR	1%	1%	1%	1%	1%
Institutional	6%	5%	2%	17%	7%
Residential	42%	71%	79%	47%	64%
Total	100%	100%	100%	100%	100%
Scenario 2: Reduced Competitiveness					
Square Feet					
Traditional Office	2,939,791	1,489,481	2,234,221	3,944,591	10,608,084
Creative & High Tech Office	448,730	544,622	635,392	1,032,054	2,660,799
Retail	931,110	829,314	473,894	547,918	2,782,237
Hotel	583,329	398,610	132,870	291,305	1,406,113
PDR	69,162	104,290	417,160	241,433	832,044
Institutional	457,078	474,992	178,122	2,852,817	3,963,009
Residential	3,759,720	8,545,504	14,988,958	6,973,965	34,268,147
Total	9,188,920	12,386,813	19,060,617	15,884,083	56,520,433
Percent of Total Square Feet					
Traditional Office	32%	12%	12%	25%	19%
Creative & High Tech Office	5%	4%	3%	6%	5%
Retail	10%	7%	2%	3%	5%
Hotel	6%	3%	1%	2%	2%
PDR	1%	1%	2%	2%	1%
Institutional	5%	4%	1%	18%	7%
Residential	41%	69%	79%	44%	61%
Total	100%	100%	100%	100%	100%

Columns may not add to totals due to rounding.
Source: Strategic Economics, 2015.

6.7 Step 5: Estimate Employment by Subarea

The development projections were translated back into estimates of future employment by subarea using the following steps:

- **Estimate total building area by subarea:** Net new projected development was added to the existing building area in each subarea (as shown above in Figure A-2) to arrive at estimates of the total building area, by type, for each time period.
- **Convert to employment demand:** Total building area was translated to employment demand using the employment density assumptions shown in Figure A-7.³²

³² This step also accounted for vacancies, assuming average structural vacancy rates of 7 percent for office and 5 percent for retail and PDR.

7 Appendix B: ABAG Employment Sectors

Figure B-1 shows the North American Industry Classification System (NAICS) codes that comprise the eleven ABAG sectors used throughout this analysis.

Figure B-1. ABAG Sectors: NAICS Code Definitions

ABAG Sector	NAICS Code	Industry Title
Agriculture & Natural Resources	11	Agriculture, Forestry, Fishing and Hunting
	21	Mining, Quarrying, and Oil and Gas Extraction
Arts, Recreation & Other Services	71	Arts, Entertainment, and Recreation
	72	Accommodation and Food Services
	81	Other Services (excluding Public Administration)
Construction	23	Construction
Financial & Leasing	52	Finance and Insurance
	53	Real Estate and Rental and Leasing
Government	92	Public Administration
Health & Educational Services	61	Educational Services
	62	Health Care and Social Assistance
Information	51	Information
Manufacturing & Wholesale	42	Wholesale Trade
	31-33	Manufacturing
Professional & Managerial Services	54	Professional, Scientific, and Technical Services
	55	Management of Companies and Enterprises
	56	Administration & Support, Waste Management and Remediation
Retail	44-45	Retail Trade
Transportation & Utilities	22	Utilities
	48-49	Transportation and Warehousing