Linkage Nexus Study

Final Report

to

Boston Planning and Development Agency

Submitted by:

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Executive Summary

Boston established its Development Impact Project (DIP) Exaction policy in 1983 to collect exactions, also known as linkage fees, to mitigate the impact of large scale development projects on: (1) the need for and availability of affordable housing; and (2) job opportunities for low-income and moderate-income residents. This report provides an updated nexus study to quantify the impact of future non-residential development on the demand for affordable housing and need for employment and training services in Boston and the linkage fee rates to mitigate these impacts. It also reviews the history of Boston's linkage policies, considers potential policy changes and recommends new linkage fee rates, policies and administrative practices.

Housing Demand. Based on projected new development of 12 million square feet over the next ten years and the likely mix of tenant businesses, 32,301 new jobs are estimated to be generated in Boston by this development. Information on the occupations and earnings of these new employees was combined with data on the distribution of households by size and number of workers and the likely percentage of these new workers who will move to the city to estimate their impact on the demand for new housing units by income level. This analysis projected the need for 4,386 new housing units over the next ten years, including 951 very low-income units, 1,241 low-income units and 2,194 moderate income units[1].

Development Costs and Financing Gap. A separate analysis of the development costs and financing gap was conducted based on 1,222 ownership units and 3,168 rental units[2]. Development costs were estimated from recent comparable affordable housing projects built in Boston. For rental projects, the financing gap was calculated as the difference between total development costs and the amount of debt and equity that could be supported by the housing cash flow using affordable rents at 30% of household income and comparable operating costs. For ownership projects, the financing gap was the difference between total development costs and the affordable purchase price based on home mortgage payments, insurance and property taxes at 30% of household income and a 5% down payment. The results of this analysis are:

- Total development costs of $1,681.7 million; and
- Total financing gap of $883.7 million with $362.4 million for the very low-income units, $290.9 million for low-income units and $230.4 million for the moderate-income units.

The linkage fee rate on Development Impact Projects needed to provide the full $883.7 million financing gap is $85.55 per square foot. Since affordable housing development leverages other federal and state funding, linkage fees only need to address a portion of the financing gap. In recent years, Boston has supplied 19.7% of the funding needed to fill the financing gap for affordable housing projects.

[1] A very low-income unit is for a household with income at 50% or less of the Boston area median income, a low-income unit is for a household at 80% or less, and a moderate-income unit is for a household at or below 120%.

[2] This mix is based on all of the very low-income units developed as rental units, 90% of low- income units built as rental and 10% ownership, and moderate-income units divided 50/50 between rental and ownership housing. Total units were increased by four units to 4,390 due to the rounding of fractional units that occurred from the distribution of housing demand among rental and ownership units and households of different sizes.

Training Needs and Financing Gap. New DIP development over the next ten year is expected to create 16,188 jobs in low and middle skill occupations that are the most accessible to low-income and moderate-income workers. Using Boston's standard of 50% resident employment under the Resident Jobs Policy, the linkage fee should support training for Boston residents to fill 8,094 of these jobs, at an estimated cost of $37.6 million. An additional $8.8 to $10.4 million is needed to provide English language and adult basic education services so that Boston residents have the educational level and competencies required for training programs. After adjusting for training provided by the vocational education system and other programs, the net financing gap to address by the jobs linkage fee is $25.7 to $27.3 million. A maximum jobs linkage rate of $2.64 per square foot is needed to fund this gap under current polices.

Impact on Competitiveness. An important consideration in adjusting Boston's linkage fees is the rate's potential impact on attracting new development and tenants. This is particularly important since the maximum combined rate of $88.19 per square foot is over eight times the current rate of $10.01 and more than seven times the rate in Cambridge ($12.00) and seventeen times Somerville's $5.15 linkage fee. If the maximum rate is fully passed to tenant as higher rent, it represents a 12% to 18% increase depending on the property type and location. This would increase Boston's current rent premium with the highest cost suburban markets by 33% to 50%, eliminate the Seaport District's rent advantage over mid-Cambridge and reduce by one-third its cost advantage over East Cambridge. If developers cannot pass on the fee increase to tenants, they will need to increase their required equity investment and reduce their rate of return. When the maximum exaction increase of $77.18 per square foot is paid with developer equity, the annual return on investment is estimated to decrease by 26% to 30% for a 400,000 square feet building; this level of impact on returns is likely to reduce investment in Boston's office development.

Recommendations. Since adoption of the maximum determined contribution rate is likely to impair Boston's regional competiveness, we recommend that Boston increase the jobs exaction rate to $2.64 per square foot and the housing rate to $17.11 to $21.39 per square foot, sufficient to fill 20% to 25% of the affordable housing financing gap. If the current 100,000 square foot exemption is eliminated, as recommend below, then the comparable housing exaction rate would be $12.87 to $16.08 per square foot and the jobs exaction would be $1.99 per square foot, for a combined housing and jobs rate of $14.86 to $18.07. By adopting a rate in the $15 to $18 range, Boston reduces the potential for adverse impacts on the city's commercial rents and competitiveness in attracting and retaining businesses and continued investment.
Several changes to exaction policies are recommended to apply the exactions to all comparable uses, simplify policies and their administration and accelerate fee collection:

- Expand the definition of DIP uses to include check cashing businesses and tattoo parlors;
- Eliminate the "first" 100,000 square feet of DIP use space exemption;
- Shorten housing exaction payments to three payments made at the building permit date, the COO date, and one year after COO ; change the jobs exaction to one payment at the building permit date;
- Consolidate the payment schedule for each payment after COO to January 15 of year after the COO anniversary to simplify book keeping and administration of fee collection;

- Continue the current process for rate adjustments based on the CPI but make the change automatic unless deferred by action of the BPDA board;
- Create a schedule for nexus studies or comparable analysis on a routine basis (e.g., every three to five years) to review the DIP pipeline, market conditions, project economic performance and their impacts; and
- Seek state legislative authority to adjust the exaction rates and policies without approval by the Massachusetts General Court.

History and Overview of Boston's Linkage Program

Boston has a long standing policy, first created in 1983, to collect Development Impact Exactions, also known as linkage fees, to address and mitigate the impact of large scale development projects on: (1) the need for and availability of affordable housing; and (2) job opportunities for low-income and moderate-income residents. To address these dual impacts, Boston levies two separate exactions: a Housing Exactions and a Jobs Exaction. The applicable types of development projects and uses are the same for both exactions but their fee level and payment options are different. This section summarizes Boston's current Development Impact Exaction policies, discusses how the policy and fee levels have changed over time and highlights key policy issues for the city to review and reconsider in conjunction with the Nexus Study.

Current Development Impact Exaction Policy

Boston's Development Impact Exaction Policy is defined under Article 80 of the city zoning code, which addresses development project review, in Section 80B-7. This policy requires housing and jobs exaction contributions for any real estate development that meets the definition of a "Development Impact Project" (DIP). Four characteristics establish a real estate project as a DIP subject to exactions:

1. The project cannot be built "as-of-right" and requires some forms of zoning relief;
2. The project involves either more than 100,000 square feet of new construction, addition to an existing building or renovation of an existing building;
3. Includes the proposed use of more than 100,000 square feet of gross floor area for uses defined as a Development Impact Use (explained below); and
4. Is not wholly owned by a government agency.

Since virtually all projects over 100,000 square feet require zoning relief, Development Impact Exactions apply to any new construction or renovated non-government owned real estate project with over 100,000 square feet of "Development Impact Uses." The definition of Development Impact Use (DIU) is very broad and covers 40 distinct uses that fall within seven categories:

- Office;
- Retail Businesses;
- Public Services;
- Other Service Uses;
- Institutional;
- Educational; and
- Hotel/Motel.

The major building uses not subject to Development Exactions are residential, wholesale businesses, storage, industrial uses, and accessory parking garages. Several smaller retail and service uses also are not included in the DIU definition: Marijuana Medical Treatment Center, Body Art Establishment and Check Cashing Business.

A complete list of the 40 business/use types under Development Impact Use definition is included in Appendix A.

Housing Exactions are currently paid at a rate of $8.34 per gross square foot for the project square footage above 100,000 square feet. Thus, the first 100,000 square feet of any Development Impact Project is exempt from paying the Housing Exaction (and the Jobs Exaction as noted below). Exaction obligations can be met through either payment of a cash grant (Housing Contribution Grant) or by building low-income or moderate-income housing units with cost at least equal to the required Housing Contribution Grant. In practice, all Housing Exactions have been met through the grant option. Grants are paid in seven equal annual installments with the first payment due at the earlier of the Certificate of Occupancy date or 24 months after construction starts. All Housing Contribution Grant payments are allocated to the Neighborhood Housing Trust (NHT), a separate legal trust overseen by seven trustees that include the Boston Collector-Treasurer, five trustees appointed by the Mayor and the City Council President or her/his designee. The NHT awards the funds obtained from Housing Exaction grant receipts to help finance affordable housing developments, through a periodic RFP process.

Job Exactions are currently paid at a rate of $1.67 per project gross square foot above 100,000 square feet. Exaction obligations can be met through either payment of a cash grant (Job Contribution Grant) or creation of a job training program with a cost at least equal to the required Job Contribution Grant. In practice, almost all Job Exactions have been paid through the grant option. Grants are paid in two equal installments with the first payment due at building permit issuance and the second payment one year later. All Job Contribution Grant payments are allocated to the Neighborhood Jobs Trust (NJT), similar to the NHT as a separate legal trust overseen by three trustees-- the Boston Collector-Treasurer, the Director of the Office of Jobs and Community Services and a City Council member appointed by the Mayor. The NJT awards the funds obtained from Job Exaction Grants to finance job training, education and employment programs through a periodic RFP process.

Housing and job exaction rates have been set by special state statutes and can be adjusted for inflation every three years by a vote of the Boston Planning and Development Agency (BPDA) Board of Directors. The Massachusetts authorizing statute (Chapter 371 of the Acts of 1987), dictates the specific formula to be used for each exaction. The inflation adjustment for the Housing Exaction is calculated based on a equally weighted (50%/50%) average of the change in the Boston Metropolitan Area Consumer Price Index for all urban consumers and the change in the housing component of the Boston Metro Area Consumer Price Index (CPI). For the Job Exaction, the change in the Boston Metro Area CPI for urban wage earners is used to adjust the fee level for inflation.

Combined exactions have generated combined over $6 million annually, on average, over their thirty year history. Detailed figures on Neighborhood Jobs Trust receipts from FY1986 through FY2016 show total exaction revenue of $34.6 million that average $1.19 million annually. Annual receipts have varied year-by-year and over time reflecting the cyclical nature of development projects and the growth of the exaction rate over time (See Figure 1). However,

there is a clear trend toward higher payments with annual exaction receipts below $1 million every year in the 1990s and over $1.5 million on average since 2000, with payment to the NJT exceeding $2 million in four years. For the Neighborhood Housing Trust, total exaction receipts from FY1987 to FY2016 totaled $156.7 million, averaging $5.089 million annually during this 30 year period. As with the Jobs Trust, revenues have been trending upward since FY1990 (see Figure 2). Annual exaction receipts averaged $8.4 million over the past five years, an amount that is four times the average for the 1990s and 45% above the $5.78 million collected annually from 2000 to 2009.

Figure 1. Annual Exaction Receipts, Neighborhood Jobs Trust, FY1998 to FY2016

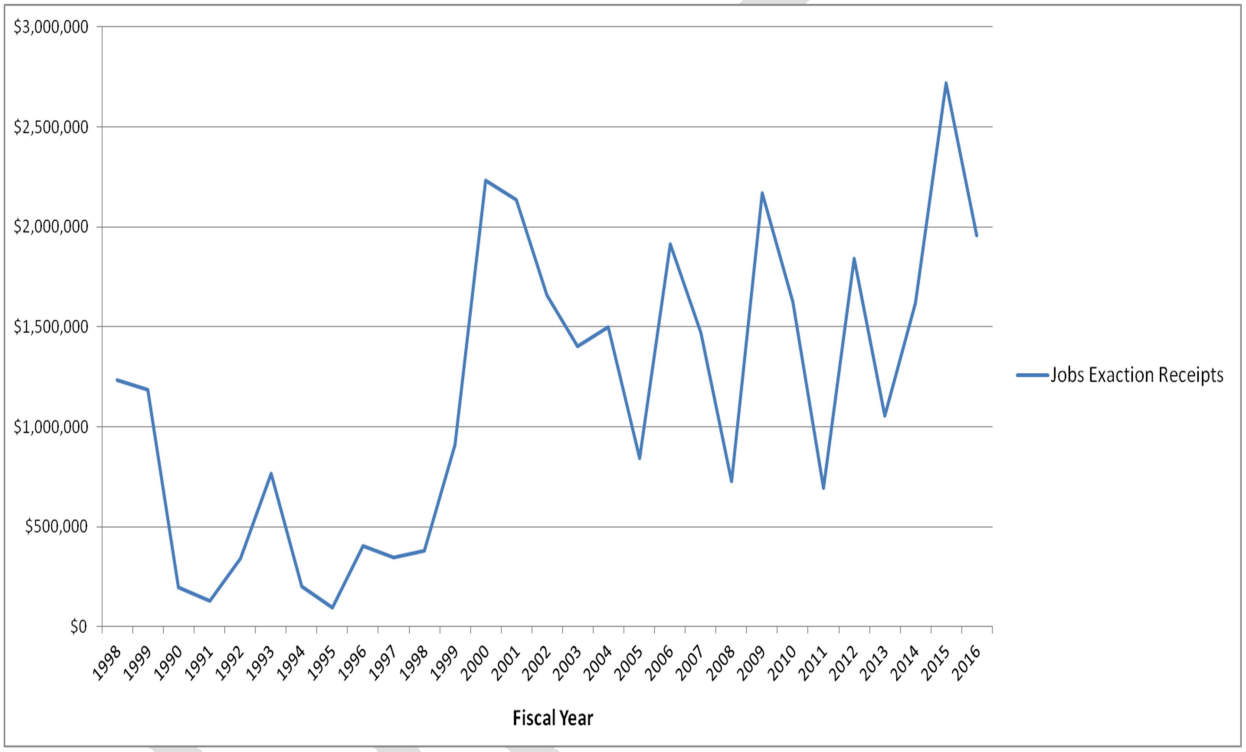
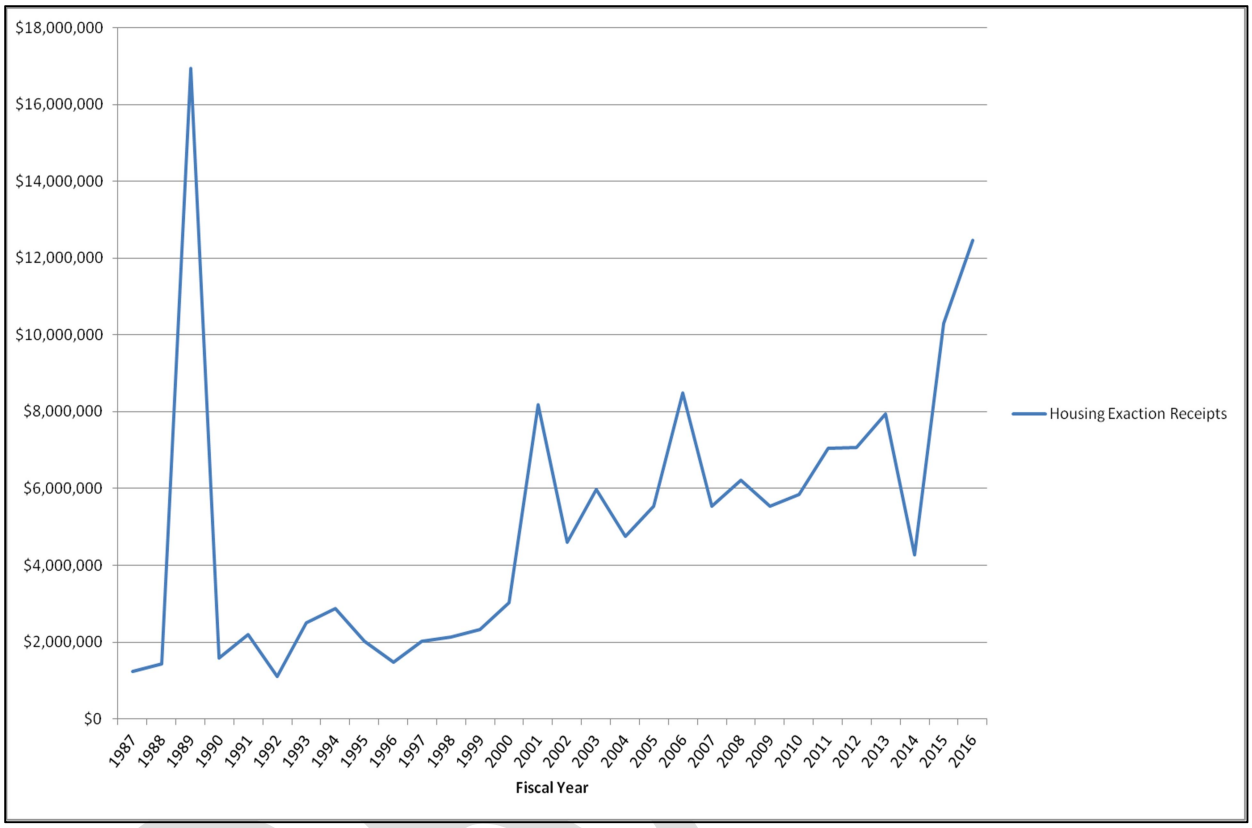


Figure 2. Annual Exaction Receipts, Neighborhood Housing Trust, FY1997 to FY2016



Evolution of Boston's Exaction Policy and Rates

Over the past thirty years, Boston's development impact exaction policies have changed through the addition of the jobs exaction, several increases in the exaction rate and other changes. Table 1 provides a timeline of the major policy and rate changes for both the housing and jobs exactions. Boston established the initial housing exaction at $5 per square foot through city council action in 1983, following the recommendations of a mayoral Housing Linkage Advisory Group. In 1986, the jobs exaction was adopted by the City Council, following a report and recommendations by Jerome Kayden, Karl Case and Robert Pollard. The Neighborhood Housing Trust and Neighborhood Jobs Trust were established in 1986 and 1987, respectively, to oversee the allocation of exaction revenue to mitigate development impacts. Legal authority to levy the housing and jobs exactions was codified in state law during 1987 with passage of Chapter 371 of the Acts of 1987. This state law also provided a mechanism for increasing the exaction rates over time through application of the CPI formulas cited earlier. Two additional legal actions occurred in 1996, when the exaction policies were incorporated in Article 80 of the Boston Zoning Code,

and 2001 when the state legislature, through Chapter 170 of the Acts of 2001 authorized increases in the housing and jobs exaction levels to $7.18 and $1.44, respectively. This act also allowed the payment period for housing exactions by "neighborhood" projects outside the central business district from 12 years to seven years. These legislative changes implemented recommendations from an April 2001 report issued by the Linkage Commission appointed by Mayor Menino. After the 2001 authorized rate increase, the BPDA board made two further increases in the exaction rates by applying the CPI escalation formula. These actions brought the housing and jobs exaction rates to the current levels of $8.34 and $1.67, respectively.

Table 1. Timeline for Boston's Linkage Program and Housing and Jobs Exactions

Year	**Action**
1983	Mayor White appoints Housing Linkage Advisory Group
1983	Advisory Group recommends $5 per square foot (psf) housing exaction
1983	Article 26 approved establishing housing exaction
1984	Housing exaction takes affect at $5 psf
1986	Kayden, Case and Pollard skills gap report
1986	Article 26A adds jobs exaction
1986	Jobs exaction takes affect at $1 psf
1986	Neighborhood Housing Trust established
1987	Neighborhood Jobs Trust established
1987	State law (Chapter 371 of the Acts of 1987) provides strong legal authority for exactions
1996	Exactions Incorporated into Article 80
2000	BPDA increases fees to $5.49 and $1.09
2001	Menino Commission recommends increase in fees to $7.18 and $1.44
2001	Chapter 170 of the Acts of 2001 updates authority and level of linkage fees
2002	Exactions increased to $7.18 and $1.44
2006	Exactions increased to $7.87 and $1.57
2013	Exactions increased to $8.34 and $1.67

As demonstrated by the timeline in Table 1, the BPDA has not made all the possible CPI adjustments to the exaction levels allowed under Chapter 371 of the Acts of 1987. This law authorized the BPDA to adjust the exaction rate every three years at the anniversary of the law's enactment. Nine increases in exaction levels were possible under this authority, beginning in October 1990 and extending to the most recent three-year interval in October 2014. An analysis was conducted to compare Boston's actual exaction rates to what rates would be if the maximum CPI adjustments had occurred every three years. The results of this analysis are shown in Table 2. Actual exaction rates have been consistently lower than the maximum rate possible under the CPI adjustment. The difference between the maximum rate and the actual rate has varied between $.84 and $2.28 per square foot for the housing exaction and between $.18 and $ .49 for the jobs exaction. The current housing exaction is $1.90 below the $10.90 level that would be in place if the full CPI adjustments had been implemented. A $10.90 housing exaction is 21.7% above the current rate. Based on the estimated recent annual exaction receipts of $4.88 million,

this higher rate translates into another $1.06 million in exaction payments. For the jobs exaction, full implementation of the CPI adjustment would result in a current fee of $2.14—28.1% higher than the current level. Based on average NJT receipts over the last five years, this higher fee would increase annual job exaction payments by $494,000.

Table 2. Comparison of Actual Exaction Rates and Maximum Rate with Full CPI Adjustment

		Housing Exaction			Jobs Exaction	
Date	Actual Rate	Rate Per 3 year CPI Adjustment	Difference	Actual Rate	Rate Per 3 year CPI Adjustment	Difference
October 1987	$5.00	NA		$1.00	NA	
October 1990	$5.00	$5.84	($0.84)	$1.00	$1.18	($0.18)
October 1993	$5.00	$6.23	($1.23)	$1.00	$1.26	($0.26)
October 1996	$5.00	$6.70	($1.70)	$1.00	$1.36	($0.36)
October 1999	$5.00	$7.28	($2.28)	$1.00	$1.47	($0.47)
October 2000 Rate Change	$5.49	NA		$1.09	NA	
January 2002	$7.18	NA		$1.44	NA	
October 2002	$7.18	$8.43	($1.25)	$1.44	$1.65	($0.21)
October 2005	$7.18	$9.26	($2.08)	$1.44	$1.84	($0.40)
April 2006 Rate Change	$7.87	NA		$1.57	NA	
October 2008	$7.87	$9.99	($2.12)	$1.57	$1.99	($0.42)
October 2011	$7.87	$10.10	($2.23)	$1.57	$2.06	($0.49)
November 2013 Rate Change	$8.34	NA		$1.67	NA	
October 2014	$8.34	$10.64	($1.90)	$1.67	$2.14	($0.47)

Development Impact Exaction Policy Issues

As Boston looks to assess its development impact program, it faces several common policy issues that cities have addressed in different ways. These core issues, beyond the critical question of the appropriate and warranted exaction rate, are six fold:

- **Applicable projects for exactions**. This policy defines the uses and scale of real estate development projects that are subject to exactions and what zoning status triggers exaction payments. Boston currently applies exactions to a very broad set of uses but has a fairly high project size threshold at 100,000 square feet and only applies the requirement to projects seeking zoning relief. The city may want to consider lowering the project threshold size and applying it "as-of-right" development.
- **Exaction variation by use**. Housing and job impacts vary by the type of use and business type since the density and wage levels vary considerably across uses and industries. Consequently, some cities and counties have exaction rates that vary by use. The benefit of tailoring rates more closely to impacts is offset by other aspects of this policy, including its added complexity, potential disincentives for certain uses and how to

address a project's change in uses over time.

- **Exemptions.** Boston currently exempts the first 100,000 square feet of any project from exaction payments, which reduces the exactions paid by each project by $1.041 million under current rates.
- **Exaction payment schedule**. Boston allows housing exaction obligations to be paid over a seven year period, which slows the receipt of funds needed to build affordable housing. This extended payment schedule might be shortened to pay exactions more quickly and accelerate the supply of needed housing subsidy funds.
- **Present value payment.** Developers have the option to pay exactions in one lump sum, based on a calculation of the present value of the seven year stream of exaction payments. This option is not widely used and there may be value in providing incentives for greater use, to accelerate the available funds for both trusts. Another policy and administrative issue is how to set the appropriate discount rate used for these calculations.
- **Exaction rate adjustment over time.** Current policy allows a rate increase every three years based on CPI formulas and other changes only through legislative impact. Are there better options to alter rates over time to address inflation and changed impacts? This might include altering the inflation indexes used, allowing for more frequent changes, mandating regular nexus studies and review of changes based on development impacts, and gaining state authorization to adjust exaction rates for impacts and inflation.

In addition to these policy issues, there may be administrative changes that can improve or streamline how the exactions are calculated, monitored and collected.

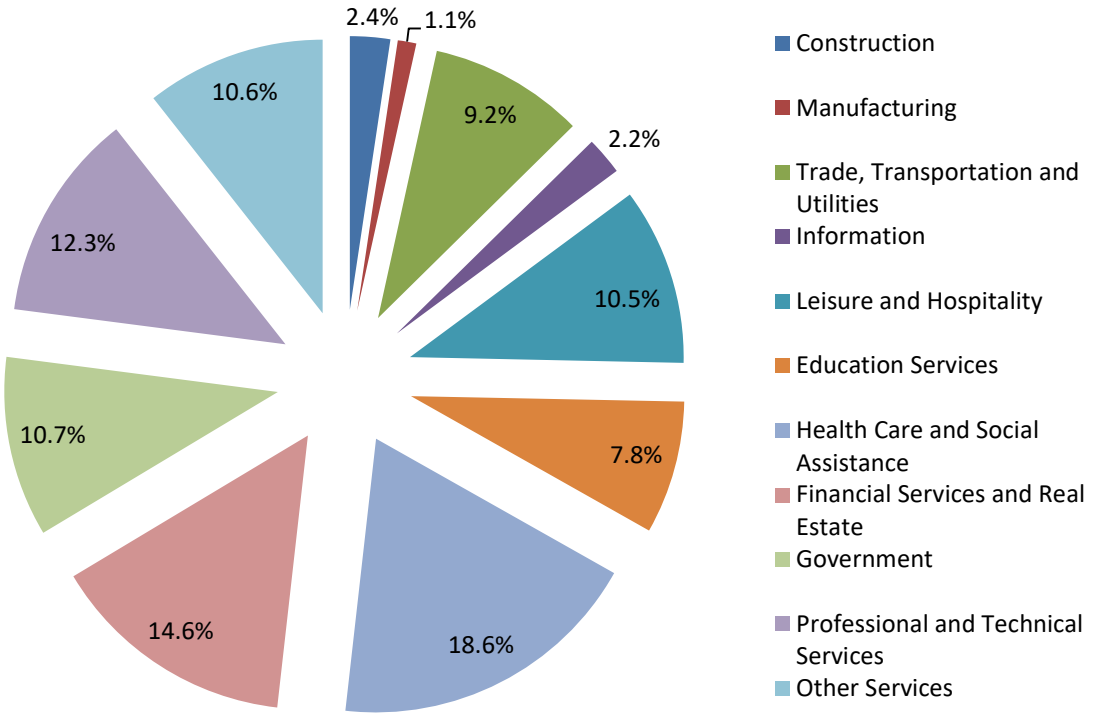
Boston Economic and Development Trends and Future Development

Boston's economy experienced considerable growth over the past decade, despite a decline during the great recession, with the growth generating significant new real estate development. This chapter summarizes the composition of the city's economy, including industry growth trends and how these trends have translated into new real estate development and leasing activity. Based on this analysis and other information, expected future real estate development is projected by use and industry along with its impact on new employment.

Existing Employment Base

As shown in Figure 3, Boston's employment in 2014 (the last year for which city employment data is available) was concentrated in Health Care and Social Assistance, Financial Services and Real Estate, Professional and Business Services, and Government, which combined to provide 56% of the city's 718,501 jobs. The next three largest sectors were Leisure and Hospitality, Trade, Transportation and Utilities, and Education Services at 10.5%, 9.2% and 7.8% of Boston's job base, respectively. This data includes both payroll employment and self-employed or contract workers, with formal payroll jobs accounting for 83% of total 2014 employment. Since established firms with payroll jobs are the most likely users in the large projects subject to Boston's DIP exactions, the following analysis emphasizes payroll employment.

Figure 3. Boston Employment by Sector, 2014



Source: BPDA Research Division

Employment is further concentrated within these sectors, reflecting Boston's role as a major health care and education center. Hospitals and Colleges and Universities, with 87,889 and 34,793 payroll jobs, respectively, each accounted for two-thirds of employment in their respective sectors (Health Care and Social Assistance and Education Services[3]). Within Leisure and Hospitality, eating and drinking establishments employed 46,023 workers, accounting for 69% of the sector's payroll jobs. The Finance and Real Estate and Professional and Technical Services sectors are more diversified with jobs distributed across several industries (see Table 3).

Table 3. Industry Mix of Payroll Employment
Finance and Professional and Technical Services Sectors, 2014

Sector and Industry	2014 Payroll Jobs	Percent of Sector Total
Finance and Real Estate		
Credit Intermediation & Related Activity	16,548	21.1%
Financial Investment & Related Activity	30,821	39.4%
Insurance Carriers & Related Activities	17,760	22.7%
Real Estate	9,716	12.4%
Rental and Leasing Services	2,363	3.0%
Other	1,091	1.4%
Total	78,299	100.0%
Professional and Technical Services		
Legal Services	14,531	20.4%
Accounting and Bookkeeping Services	9,340	13.1%
Architectural and Engineering Services	6,781	9.5%
Specialized Design Services	790	1.1%
Computer Systems Design and Related Services	11,903	16.7%
Management & Technical Consulting Services	13,688	19.2%
Scientific Research and Development Services	8,264	11.6%
Advertising and Related Services	4,732	6.6%
Other Professional & Technical Services	1,352	1.9%
Total	71,381	100.0%

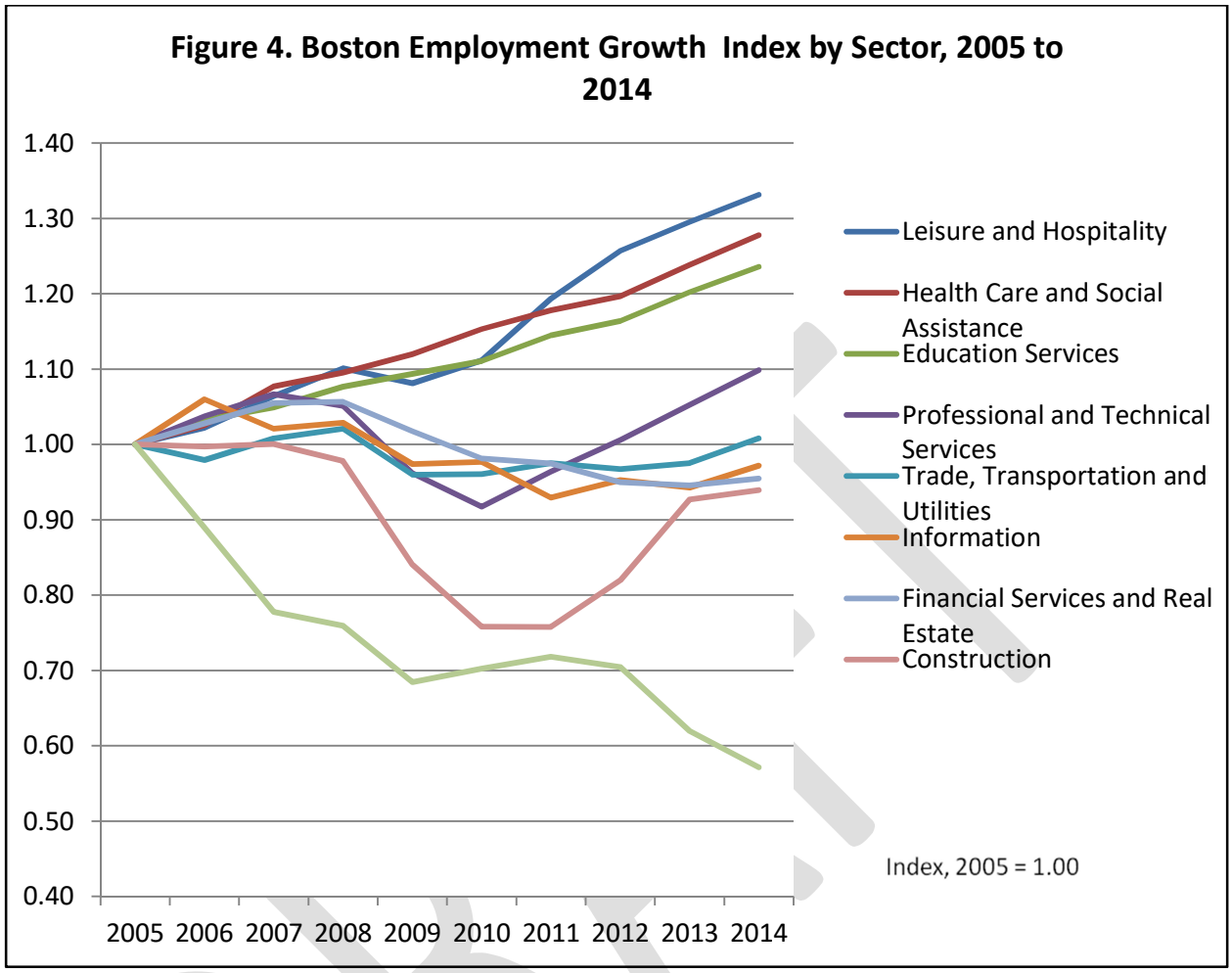
Source: Massachusetts Department of Labor and Workforce Development ES-202 Data Series

Employment Trends and Growth Industries

[3] This share is for 2014 payroll employment. For combined payroll and nonpayroll employment, Colleges and Universities were 85% of Education Services jobs. The hospital and eating and drinking establishment shares were similar across both data sets.

Boston's economy had solid job growth from 2005 to 2014, adding employment across multiple sectors and industries. Boston added 83,852 total jobs between 2005 and 2014, with employment expanding from 634,648 to 718,501, an 11.7% increase. Payroll positions grew by 10.5%, increasing by 56,742 jobs from 2005 to 2014. After losing over 10,000 jobs during the great recession (December 2007 to June 2009), the city's economy has rebounded strongly since 2010. Between 2010 and 2014, total employment grew by 60,807 jobs to exceed the pre-recession peak of 675,109, averaging 12,000 new jobs per year and an average annual growth rate of 1.8%. Growth in payroll employment was slightly slower: 46,142 formal payroll jobs were added between 2010 and 2014, averaging 9,228 in net new jobs and a 1.7% growth rate annually. Similarly, Boston's Gross City Product increased by 2.5% annually between 2009 and 2014, higher than Massachusetts' annual growth of 1.9%, reaching $103.1 billion.

Boston's recent employment growth provides a good indicator for the likely sector and industry composition of future development. An index that tracks payroll job growth by major sector from 2005 to 2014 is presented in Figure 4. Steady job growth occurred in three sectors: Leisure and Hospitality, Education Services and Health Care and Social Assistance. All other sectors experienced job losses during the recession with only Professional and Technical Services showing a strong rebound since 2010. Job losses were especially steep for construction and manufacturing with construction jobs rebounding to 94% of their 2005 level by 2014 while manufacturing has continued to shed jobs. Modest growth occurred in the remaining three sectors since 2010 with Information and Financial Services still below its 2005 employment and Trade Transportation and Utilities just exceeding its 2005 employment in 2014.



Source: Massachusetts Department of Labor and Workforce Development ES-202 Data Series

Since sector data combines patterns across many component industries, more detailed industry level data was examined to identify the industries with the largest payroll job gains from 2005 to 2014. Table 4 presents absolute job growth from 2005 to 2014 for expanding Boston industries that added at least 2,000 jobs during this period. Ten industries meet this criterion and combined to add 65,451 jobs. General Medical and Surgical Hospitals accounted for 19.2% of these new jobs, followed by Restaurants at 16.7% and Computer Systems Design and Related Services at 12.0%. Three Health Care and Social Assistance industries were also key sources of job growth: Individual and Family Services, Physician Offices and Other Hospitals, as each added several thousand jobs and collectively accounted for almost 22% of job growth. Thus, health care industries were a key driver of job growth, adding 26,821 new jobs and accounting for 41% of new jobs across the ten largest growth industries. Other large sources of job growth were Colleges and Universities (6,778), Other Financial Investment Activities (6,252) and Management and Technical Consulting (4,662).

Table 4. Payroll Job Growth from 2005 to 2014, Boston Industries

Industry	Job Growth	Percent of Total for 10 Industries
General Medical and Surgical Hospitals	12,594	19.2%
Restaurants & Other Eating Places	10,936	16.7%
Computer Systems Design and Related Services	7,883	12.0%
Other Financial Investment Activities	6,252	9.6%
Colleges and Universities	6,778	10.4%
Individual and Family Services	6,318	9.7%
Management & Technical Consulting Services	4,662	7.1%
Other Hospitals	4,734	7.2%
Offices of Physicians	3,175	4.9%
Electronic Shopping & Mail-Order Houses	2,119	3.2%
Total, 10 industries	65,451	100%

Source: Massachusetts Department of Labor and Workforce Development ES-202 Data Series

Six additional industries also were important sources of job growth, adding over 1,000 positions during this decade:

- Accounting and Bookkeeping Services
- Insurance Carriers
- Scientific Research and Development Services
- Home Health Care Services
- Social Advocacy Organizations
- Traveler Accommodations

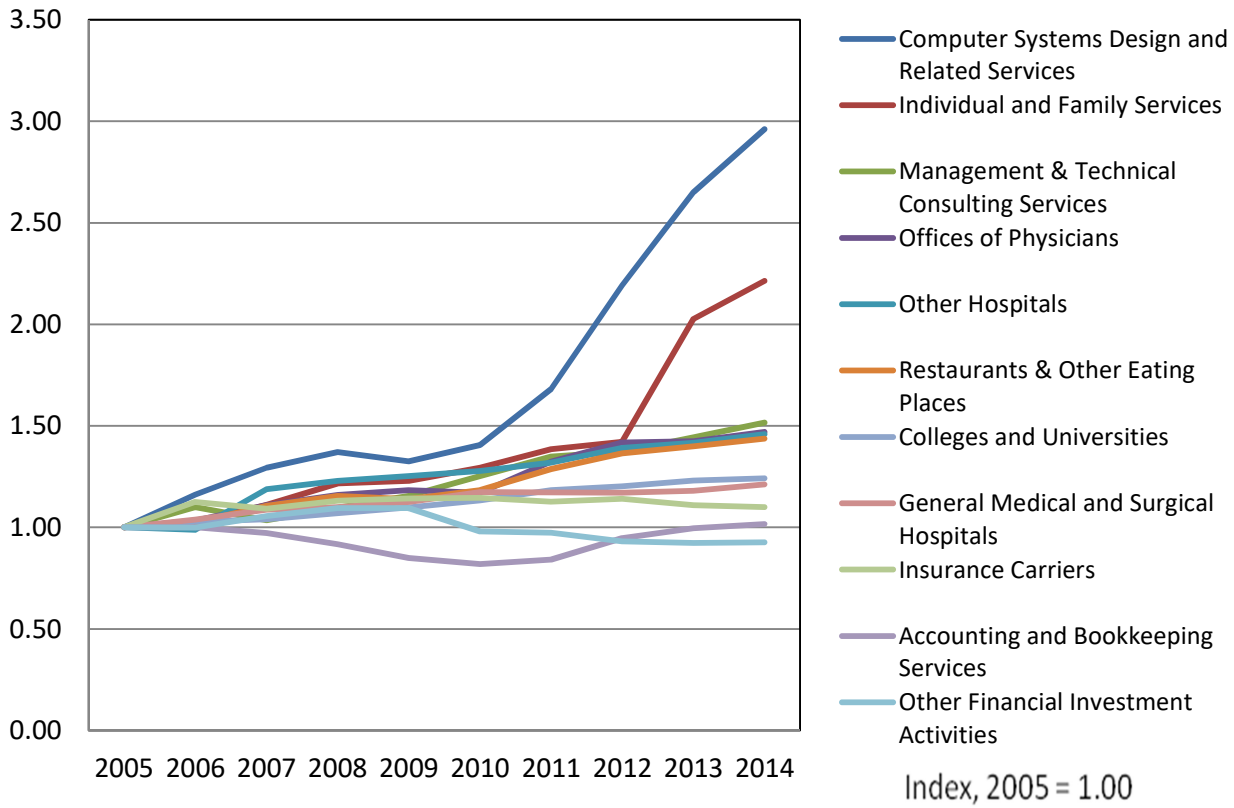
In the more recent post-recessionary period, a slightly different set of 17 industries added over 1,000 jobs from 2010 through 2014. All industries in Table 4 plus Accounting and Bookkeeping Services are in this group but six different industries replaced the other five bulleted above:

1. Special Food Services (2,614 jobs)
2. Employment Services (1,670 jobs)
3. Software Publishers (1,573 jobs)
4. Management of Companies and Enterprises (1,462 jobs)
5. Advertising and Related Services (1,225 jobs)
6. Architectural and Engineering Services (1,224 jobs)

Health care industries, and particularly hospitals, were less central to job growth for the 2010 to 2014 post-recession period. The four health care-related industries accounted for 24% of jobs in high growth industries in the later time frame versus 41% over the longer time period. This change is especially notable for General Medical and Surgical Hospitals, which added 2,267 jobs post-recession compared to 12,594 from 2005 to 2014. On the other hand, Restaurants, Computer Systems Design, Individual and Family Services and Accounting and Bookkeeping Services increased their share of job growth after the recession.

Figure 5 shows percentage, rather than absolute growth, for nine of Boston's ten largest growth industries[4] using an employment index. Computer Systems Design and Related Services had the fastest growth rate in all years (except for a dip during the recession), almost tripling its employment over the decade. Individual and Family Services also had rapid growth, especially in the past three years, and more than doubled in size from 2005 to 2014. Another group of four industries grew steadily over the decade with total job growth close to 50%: Restaurants, Other Hospitals, Offices of Physicians and Management and Technical Consulting Services.

Figure 5. Index of Employment for Boston's Major Growth Industries, 2005 to 2014



Boston Development Trends

Boston experienced considerable new development over the past decade, fueled by its growing economy, and is currently experiencing a boom in projects under construction. Table 5 summarizes Boston's development activity for DIP-eligible projects (i.e. non-residential and non-industrial projects with over 100,000 square feet of development impact uses) by type from

[4] Electronic Shopping & Mail-Order Houses was omitted since it is a large outlier with almost sevenfold growth due to low initial employment of 382 jobs in 2005

2010 through September 2016. This period was used to reflect the recent economic conditions and use the most accurate data available. Over these six and three-quarter years, completed DIP development averaged 1.286 million square feet with office development the largest component at 73% followed by retail and hotel, at 18% and 8%, respectively. These data demonstrate that Boston is experiencing strong development activity across all major non-residential uses.

Table 5. Average Annual Gross Floor Area
Boston Development Impact Projects, 2010 to 2016

Development Type	Average Annual Completed Gross Square Feet	Percentage
Retail	234,423	18.2%
Office	943,643	73.3%
Hotel	108,367	8.4%
Total	1,286,433	

Source: Boston Redevelopment Authority September 2016
Includes projects built under Institutional Master Plans (IMP) and Planned Development Areas (PDA)

Table 6. Boston Inventory of Class A and B Leased Office Space, 2005 to 2015

Year	Total Inventory/Supply (Square Feet)	Annual Change in Supply (Square Feet)
2005	59,049,000	----
2006	58,869,000	-180,000
2007	59,309,000	440,000
2008	59,750,000	441,000
2009	59,994,000	244,000
2010	61,258,000	1,264,000
2011	61,223,000	-35,000
2012	60,989,000	-234,000
2013	61,764,000	775,000
2014	63,032,000	1,268,000
2015	63,878,000	846,000
	Average, 2005 to 2015	436,000
	Average, 2010 to 2015	647,000

Source: Colliers International, Figures rounded to thousands

Colliers International, a real estate firm that tracks development activity and leasing in Boston, reports less new office development than BPDA records show Based on Colliers data, the supply of Boston office space increased by 2.7 million square feet from 2010 through 2015 (see Table 6), which represents an average annual increase of 647,000. This average is almost 297,000 square, or 31% less than the BPDA figures. This discrepancy may be due to new development of owner-occupied single tenant properties and office space in institutional projects, as these types of buildings are not tracked by the Colliers data, which addresses Class A and B leased office space. The Colliers data from 2005 to 2015, which includes the Great Recession,

addresses that new development over a longer time period that includes a recession may slower than the pace on new development during the 2010 to 2016 economic expansion.
With a growing economy, a strong commercial real estate market and a sizable pipeline of permitted projects, Boston is likely to continue to attract robust new development over the next decade. Based on the BPDA data, Boston has 12.1 million square feet of development permitted for construction that has not yet been built. Half of this amount is private office and commercial development with the other half divided between retail, hotel and institutional space.

Market Demand and Office Space Absorption

New employment and the resulting demand for housing will primarily depend on the actual absorption of new real estate space by new and expanding employers and the city's success in attracting business growth within the region. Within the Boston metropolitan area, Boston is the primary economic center and a highly desirable business location with strong market demand and premium rents, especially in the downtown financial district and Back Bay. With a large concentration of financial services and professional, technical and business services, Boston benefits from significant agglomeration economies, in which the nearby location of many firms in the same industry helps enhance productivity, attract workers and spur innovation. Additionally Boston is emerging as a growing center for computer and technology-based businesses—a role historically held by Cambridge and the Route 128 corridor. This change is seen in the rapid growth of the Computer Design Services industries as well as the expansion of software and scientific research and development firms over the past decade, supported by the branding and recognition of the Seaport district as Boston's innovation center.

Table 7. Office Real Estate Absorption, Supply and Rents in Boston 2005 to 2015

Market Indicator	Boston
Average Annual Net Absorption (SF) , Office Space 2005 to 2015	798,345
Average Annual Net Absorption, Office Space (SF) 2010 to 2015	1,036,697
Available Vacant and Sublease Office Space 2016 (SF), 1st Quarter 2016	5,728,333
Total Vacancy Rate, 1st Quarter 2016	9%
Average Direct Rent, Office Space per SF, 1st Quarter 2016	$53.41
Average Sublease Rent, Office Space per SF, 1st Quarter 2016	$43.35

Source: Colliers International

With strong market demand for office space, substantial permitted space and the capacity to support further development, market absorption of space in the recent past provides a reasonable basis for projecting new large scale office development and employment growth over the next decade. Table 7 summarizes average absorption and other market indicators for Boston Class A and B office space. Based on this data from Colliers International, the average annual net absorption of new commercial space was 798,345 square feet from 2005 to 2015. Net absorption has been higher following the recessions, averaging 1,036,697 square feet from 2010 through 2015.

A large supply of 5.73 million square feet of available space existed in early 2016. This inventory of available office space creates the potential for future development to slow until the market absorbs more space. However, this risk is mitigated by a growing economy, strong demand for new space and the fast pace at which space is being absorbed in recent years. Furthermore, Boston's office market is tight by recent standards. Vacancy rates were often 12% or higher during the past 15 years and the most recent 9% vacancy rate is among the lowest over the past 15 years.

National Trends and Future Development

Several important economic trends are likely to influence Boston's economy over the next decade and the scale and type of real estate development associated with that growth. Some of these trends are already evident and affecting the city's economic development while others are still evolving with uncertainty around their ultimate impact on development. The following four trends are highlighted based on their importance and potential impact on key segments of Boston's economy:

- **Growing importance of the innovation economy**. Economists have long emphasized the importance of innovation to economic growth and increased productivity. With increased globalization, the off-shoring of manufacturing and dissemination of established technologies, innovation and technology are increasingly important to spurring growth in advanced economies such as the United States[5]. Innovation and knowledge-intensive industries are also among the fastest growing and highest paying sectors of the economy. Moreover, a strong innovation economy is now recognized as a key driver of strong regional economies that contributes to employment growth and higher incomes across a metropolitan area's entire economy, not just the core innovation sectors, such as life science and information technology[6]. Boston already has a strong foundation in the innovation economy with its many universities, research hospitals, highly educated workforce, and supportive ecosystem for innovation and entrepreneurship. Boston is already benefiting from this trend, as seen by the high employment growth rates for computer design services, colleges and universities and management and technical services. This trend is likely to continue to benefit Boston as its strong innovation assets spur local growth and attract new firms to the city, as evidenced by General Electric's recent decision to move its headquarters to Boston.

- **Health care system changes**. Health care is a critical and growing sector in Boston but one that is facing significant changes with the implementation of the Affordable Care Act and its goals of expanding insurance coverage, managing health care costs and improving health outcomes[7]. The ACA is expanding health care insurance and services through the expansion of Medicaid, a health insurance mandate and subsidies, and preventing the

[5] National Economic Council and the Office of Science and Technology Policy, *A Strategy for American Innovation,*
[6] Enrico Moretti, *The New Geography of Jobs*
[7] Gruber, Jonathan. *The Impacts of the Affordable Care Act: How Reasonable Are the Projections?* National Bureau of Economic Research, 2011.

denial of insurance for existing conditions and health status. This growth in health insurance will expand the demand for health care services nationally and the associated facilities to deliver these services, although this impact is mitigated in Boston since Massachusetts already expanded coverage through its health care reform law passed in 2006. Other aspects of the ACA place more emphasis on preventive care and community-based services including expanded funding for community health centers. Another change will shift health care payments from a fee-for-service model to global payment systems that compensate a network of providers (Accountable Care Organizations) for entire patient groups based on their health status and outcomes. Other trends include: (1) the use of health information technology to better manage health records, achieve administrative efficiencies and improve patient care; and (2) improving health through addressing the social determinants, including nutrition, housing conditions, the physical environment and poverty. Many of these trends have the potential to reduce demand and financial support for in-patient hospital care, curbing growth in this key part of the city's economy. Other trends suggest some health care services will expand. An aging population and longer life expectancies will grow demand for health care services as health problems and care needs increase with age. Additionally, the changes under the ACA may support the expansion of community-based out-patient care, social services and health care-technology companies.

- **Health Care Research.** Boston is a major center for health-related research and development with much of this research occurring at the city's hospitals and universities supported by National Institute of Health funding. Boston has consistently been the city that received the most NIH funding for twenty-one straight years through 2015[8]. Boston institutions and companies secured over $1.5 billion in annual NIH funding every year since 2003[9]. Consequently, trends in NIH funding will impact the need for new research and development space. Increases in NIH and other federal health-related funding and growth in research areas that require new types of specialized laboratory space, or both, will increase development of health-related research space.

- **Growth in internet and non- store retailing.** The emergence of e-commerce and internet retailing has been a major economic and structural change in the past decade. E-commerce sales have been growing at double-digit rates (14.6% in 2015 compared to 1.6% for all retail sales[10]). Amazon has emerged as one of the nation's top ten retailers by sales while many smaller niche web-retailers, such as Esty and Rue La La, are being created and growing. Brick and mortar stores still dominate retail sales, with e-commerce accounting for 7.3% of total retail sales in 2015[11], and there are few pure internet retailers among the nation's top 100 retailers. Nonetheless, e-commerce and non-store retailing are likely to continue to grow and cut into brick and mortar sales, which is likely to slow the expansion of retail stores and development in Boston. Off-setting this trend is the

[8] Mary Sullivan Kelly, *Boston Marks 21 Years On Top of NIH Research Funding*
http://knowledge-leader.colliers.com/mary-kelly/boston-marks-21-years-on-top-of-nih-research-funding/
[9] Boston Redevelopment Authority, *2015 National Institutes of Health Grants*
[10] US Census Bureau, Quarterly Retail E-commerce Sales, 4th Quarter 2015
[11] US Census Bureau, Quarterly Retail E-commerce Sales, 4th Quarter 2015

growth of the electronic and mail-order shopping industry, which added over 2,100 jobs in Boston from 2005 to 2014. This trend will generate demand for office rather than retail space.

- **Increasing density of office space use.** There has been considerable reporting that firms are reducing the amount of office space per employee through the design of open collaborative workspaces, increased use of "hoteling" (when employees who are only in the office part-time share space) and a lower need for IT and computing space with increased "cloud"-based data storage and software[12]. Some news articles report that new leases are reducing the average space from 200 to 150 square feet per worker, well below past standards of 250 to 300 square feet. The implication of this trend is that less office space will be needed, leased and built as tenants become more efficient in their use of space. Thus, Boston would expect to see slower rates of new office development for any level of employment growth if this trend continues and becomes widespread. On the other hand, the expected housing and job development impacts per project will increase with higher employment densities. While this trend is occurring, several factors affect the amount of square feet used per employee, reducing the pace at which this trend takes hold and yielding varied impacts across different users and development projects. Important factors that affect space leased per employee include: the nature and stage of a firm; how fast the company is growing; the stage of the economic cycle; lease term and stage within the lease; and the type of office space (Class A, B, or C)[13]. For example, fast growing firms use more space per employee, as they need to accommodate adding employees, as do firms with longer lease terms and at later stages in the lease period. There is also evidence that space per employee has remained higher in Class A space, in which uses incorporate more amenities and common space, than in Class B and C space. Firms also tend to have considerably lower targets for space per employee than they achieve.

Future Institutional Development Plans

With a large base of hospitals and universities, institutional expansion is an important component of Boston's development and associated employment growth. Institutional development, however, may not reflect the city's overall economic growth and past patterns, since institution-specific needs, new research funding and partnerships and major gifts can influence new building projects. Consequently, the institutional master plans, including their recent amendments and updates, were reviewed and planning and real estate offices were contacted to gain current information on plans for future institutional development. Since the basis for housing and jobs exactions is the employment impact of new development, this research on institutional plans sought to identify the amount of new institutional development space that would expand activities and employment, and which component would replace or upgrade existing facilities

[12] Eric Jay Zoll, "Office Density Your Zoning Code Never Dreamed Of," *Planning Magazine*, November 2014**;** Adrian Ponsen, "Trends in Square Feet per Office Employee**,"** ***Development Magazine*****,** Spring 2015

[13] Norm G. Miller**, "**Workplace Trends in Office Space: Implications for Future Office Demand," *Journal of Corporate Real Estate***,** Vol. 16 (3): 159 – 181

without expanding Boston-based employment. The results of this research are summarized in Table 8.

Table 8. Summary of Expected Development, 10 Year Period

Institution	Expansion Space with Job Growth (Square Feet)	Estimated Total DIP Project Space (Square Feet)
Boston University	100,000	350,000
Harvard University	597,000	1,261,000
Northeastern	500,000	500,000
BU Medical Center	0	323,000
Brigham and Women's Hospital	312,000	760,000
Children's Hospital	885,000	885,000
Total	2,394,000	4,079,000

Source: Karl F. Seidman Consulting Services

Projected New Office, Retail and Hotel Development

Based on its strong market position and recent rates of new development and space absorption, Boston is projected to build 7,080,000 million square feet of new office space over the next decade. This amount reflects continued growth at the recent average rate of 943,000 square feet per year of DIP projects and allowing for two to three years of little or no development due to a recession. This scale is slightly below the average level of annual net space absorption in the last ten years (793,000), in light of potential efficiency in office space use. Retail and restaurant development is projected to add 1.76 million square feet of new DIP space, based on the recent average of 234,400 per year for seven and one-half years with a recession pausing development for two and one-half years. Finally, 810,000 square feet in new DIP hotel development is projected continuing the recent rate of over 108,000 square feet per year and accounting for a two-and-one-half years recessionary period without new development. Projected institutional development uses the estimates in Table 8 and is apportioned research space, hospital space and college/university space. These varied institutional uses are used to apply varied employee density and occupational profiles when estimating employment impacts detailed later in the report.

The components of projected new development in Boston over the next decade, as summarized in Table 9, include:

- 7.08 million square feet of office space;
- 577,500 square feet of institutional hospital space;
- 947,000 square feet of institutional research space;
- 870,000 ; square feet of college and university space;
- 1.76 million square feet of retail and restaurant space; and
- 810,000 square feet of new hotel development.

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An additional 1.685 million square feet DIP institutional space is projected to be built that expected to generate employment impacts that require mitigation through the housing and jobs exaction. This space will replace or upgrade existing facilities or relocate existing employees to Boston from other communities.

Table 9. Summary of Expected Development, 10 Year Period

Type of Use	Projected Square Feet of New Development
Office Development	7,080,000
Institutional Space-Hospitals *	577,500
Institutional Space-Colleges and Universities *	947,000
Institutional Research Lab Space*	870,000
Retail and Restaurant	1,760,000
Hotel	810,000
Total	12,044,500

* Includes only development space for expansion and with employment impacts

Expected Tenant Businesses

To determine the likely jobs and earnings from this new development, the industries likely to occupy newly built space must be projected. Given Boston's economic base and recent growth trends, new office tenants are likely to be less diversified than the city and region's overall industry mix and concentrated in software and computer services, health care offices and professional and technical services.

Since housing and job contributions under DIP exactions are tied to new development**,** the projections used for this analysis focus on new business and employment growth, which will differ from Boston's overall or net job growth. Boston has experienced decline in some parts of the economy, especially construction, manufacturing, and financial services, which offsets growth in other sectors to yield overall net employment changes. Since the growing sectors require different facilities, have different workforce needs and provide the basis for new development, it is Boston's growth industries and resulting employment that will generate new housing and labor demand and constitute the nexus for the housing and job exactions to address this demand.

Based on Boston's market position, economy and growth trends, the distribution of tenants for the estimated 8 million square feet of new office development over the next decade is expected to be:

- Computer Systems Design and Related Services 30%
- Management and Technical Consulting 10%
- Accounting and Bookkeeping Services 10%
- Advertising and Related Services 6%
- Architecture and Engineering Services 6%

- Electronic Shopping 6%
- Management of Companies and Enterprises 6%
- Software Publishers 6%
- Doctor's Offices 5%
- Employment Services 5%
- Insurance 5%
- Research and Development Services 5%

The first three are fast growing industries that are likely to continue expanding, support demand for new space and be willing to pay the higher rents associated with new development. Consequently, they are projected to account for 50% of new office space. The balance of absorption is divided among 9 industries, all of which have been growing in Boston. Although Doctor's Offices and Individual and Family Services accounted for almost 25% of the job growth among the city's high growth industries in recent years, they are not expected to be a large share of occupants for new DIP office development as they are more likely to be spread across the city and less likely to occupy new large buildings with higher rents. Furthermore, many Individual and Family Services tenants are small firms and non-profit organizations that are not able to afford the high rents in newly constructed large office buildings. Some space for child care services is projected under retail development as this use often occupies ground floor space.

Retail Tenants

Based on the fast growth in restaurants and mixed performance across types of retail stores, the projected growth in retail space is highly concentrated in restaurants (55% of space) with the balance occupied by growing retail sectors that include food and beverage stores, pharmacies and miscellaneous stores (e.g., florists, gift, office supply stores, etc.) along with day care centers and bank branches.

Table 10 summarizes the projected development by use, tenant type and employment over the next ten years. Employment projections are based on square feet per employee on parameters across different uses that the BPDA staff identified from a variety of sources. These projections will be used to estimate the occupations and wage levels for new employees working in the expected new buildings and the associated impact on housing and workforce training needs.

Table 10. Projected Large Project Development and Employment by Use and Tenant Industry, 2017 to 2026

Use/Tenant Type	Projected Square Feet	Square Feet per Employee	Estimated New Employment
Institutional: Hospital	577,500	385	1,500
Institutional: College & Universities	947,000	737	1,285
Institutional Research Space	870,000	350	2,486
Office: Computer Systems Design & Related Services	2,124,000	350	6,069
Office: Management & Technical Consulting	708,000	350	2,023
Office: Accounting & Bookkeeping Services	708,000	350	2,023
Office: Insurance	354,000	322	1,099
Office: Research & Development Services	354,000	350	1,011
Office: Employment Services	354,000	350	1,011
Office: Software Publishers	424,800	350	1,214
Office: Management of Companies & Enterprises	424,800	350	1,214
Office: Doctor's Offices	354,000	277	1,278
Office: Advertising & Related Services	424,800	350	1,214
Office: Electronic Shopping	424,800	350	1,214
Office: Architecture & Engineering Services	424,800	350	1,214
Retail: Grocery Store	220,000	1,000	220
Retail: Pharmacy	220,000	671	328
Retail: Specialty Food, Liquor & Convenience	88,000	671	131
Retail: Miscellaneous	88,000	671	131
Day Care Center	88,000	350	251
Bank branches	88,000	322	273
Restaurants	968,000	225	4,302
Hotel	810,000	1,000	810
Total	12,044,500		32,301

Boston Housing Market and Demographic Trends

To inform the nexus analysis and policy decisions related to Boston's DIP exactions, this section summarizes Boston's trends and housing market conditions.

Boston Population and Household Trends

Population Trends

Boston's population has grown in recent years, with a more recent acceleration in the rate of population growth. Between decennial Censuses in 2000 and 2010, the population grew from 589,141 to 617,594, an increase of 4.8%, as shown by data in Table 11. Between 2010 and 2014, the population increased another 6.2% to 656,051, according to the Census Bureau's American Community Survey (ACS), 1-Year estimates.[14] The population growth in Boston is outpacing that of the Boston region[15] and the Commonwealth as a whole.

Age

Boston's population is aging, yet it is still considerably younger than the Commonwealth and the regional population as a whole. Between 2010 and 2014, the median age of Boston's population increased from 30.2 years old to 31.7 years old, a 5.0% increase. The estimated population in most age ranges increased with the notable exception of those between 18 and 22 which declined 14.2% between 2010 and 2014 after a 22.4% increase between 2000 and 2010. Over the same period, there was a 12.5% increase in the population ages 23 to 34 years old and a 13.1% increase in the population over 55 years old (see Table 11). These two age groups typically seek smaller one or two-bedroom housing units because of their life stage. In the case of those ages 23 to 34 years old they are looking for starter homes, and in the case of those ages 55 years old and over they are looking to down size from larger family housing.

[14] For the purposes of this analysis, the ACS 2014 1-year estimates are used, rather than 5-year or 3-year estimates because they are more current. However, there is a larger margin of error due to a smaller sample size. It should be noted that the Census Bureau's official population estimates (PEP) pegged Boston's 2014 population at 660,278, less than 1% higher than the ACS, but outside of the range of the reported margin of error in the ACS 2014. However, the PEP estimates only report total population at the city level and so the comprehensive statistics in the ACS are used.

[15] Defined in this demographic analysis as the Boston Metropolitan Statistical Area (MSA).

Table 11
Population Trends and Selected Characteristics in the City of Boston, 2000 to 2014

	Boston			Percent Change,	Percent Change,	Boston MSA [1/]		Percent Change,	Massachusetts			Percent Change,
	2000	2010	2014	2000-2010	2010-2014	2010	2014	2010-2014	2000	2010	2014	2010-2014
Population	589,141	617,594	656,051	4.8%	6.2%	4,552,402	4,732,161	3.9%	6,349,097	6,547,629	6,745,408	3.0%
Households	239,528	252,699	253,749	5.5%	0.4%	1,760,584	1,777,817	1.0%	2,443,580	2,547,075	2,549,336	0.1%
Average Household Size	2.31	2.26	2.4	-2.2%	6.2%	2.50	2.57	2.8%	2.51	2.48	2.55	2.8%
Age Distribution												
Under 18	124,499	115,662	120,582	-7.1%	4.3%	994,214	995,647	0.1%	1,508,818	1,436,041	1,416,536	-1.4%
18-22	59,503	72,808	62,456	22.4%	-14.2%	327,383	331,514	1.3%	408,862	470,503	479,299	1.9%
23-34	152,796	163,336	183,694	6.9%	12.5%	754,218	823,081	9.1%	1,088,500	1,035,408	1,121,986	8.4%
35-55	149,974	147,501	155,484	-1.6%	5.4%	1,334,325	1,297,664	-2.7%	1,936,348	1,899,584	1,822,759	-4.0%
55 and over	102,370	118,288	133,834	15.5%	13.1%	1,142,262	1,284,256	12.4%	1,406,569	1,706,093	1,904,828	11.6%
Median Age	30.4	30.2	31.7	-0.7%	5.0%	38.5	38.7		36.5	39.1	39.4	
Age, Distribution Percent to Total												
Under 18	21.1%	18.7%	18.4%			21.8%	21.0%		23.8%	21.9%	21.0%	
18-22	10.1%	11.8%	9.5%			7.2%	7.0%		6.4%	7.2%	7.1%	
23-34	25.9%	26.4%	28.0%			16.6%	17.4%		17.1%	15.8%	16.6%	
35-55	25.5%	23.9%	23.7%			29.3%	27.4%		30.5%	29.0%	27.0%	
55 and over	17.4%	19.2%	20.4%			25.1%	27.1%		22.2%	26.1%	28.2%	
Race/Ethnicity, Percent to Total												
White	49.5%	47.0%	45.6%			74.9%	73.8%		81.9%	76.1%	73.8%	
Black/African American	23.8%	22.4%	22.3%			6.6%	7.2%		5.0%	6.0%	6.5%	
Hispanic	14.4%	17.5%	18.6%			9.0%	10.4%		6.8%	9.6%	10.8%	
Asian/Pacific Islander	7.5%	8.9%	9.7%			6.5%	7.5%		3.8%	5.3%	6.1%	
Other	4.7%	4.3%	3.7%			3.0%	2.8%		2.6%	3.0%	2.8%	
Foreign Born Population, Percent to Total												
Native	74.2%	72.8%	72.4%			82.5%	82.4%		87.8%	85.5%	84.3%	
Foreign-Born	25.8%	27.2%	27.6%			17.5%	17.6%		12.2%	14.5%	15.7%	

1/ MSA = Metropolitan Statistical Area. Data from the 2000 Census is not included because of a change in the definition of the Boston MSA in 2009.

Source: U.S. Census, 2000; U.S. Census, 2010; U.S. Census American Community Survey, 2010, 1-Year Estimates; U.S. Census American Community Survey, 2014, 1-Year Estimates; and ConsultEcon, Inc.

Race/Ethnicity

Boston is a "majority minority" city, with more non-white and Hispanic residents than white residents; a marked shift from past decades. In 2014, 45.6% of the population was non-Hispanic white, compared to 49.5% in 2000. The Black/African American population in the City declined between 2000 and 2014 also, and was 22.3% of the total population in 2014. The Hispanic and Asian populations have accounted for most of the growth in the minority population in the City and were 18.6% and 9.7%, respectively, in 2014.

Foreign Born

The foreign born population in Boston has grown faster than the native born population. In 2014, an estimated 27.6% of the population in Boston was foreign born. In 2000, the proportion of the population that was foreign born was 25.8%. Between 2000 and 2014 the foreign born population increased 13.9% to 172,949 persons, compared to the 6.7% increase in the native born population. The city has a higher proportion of foreign born population than the region and the Commonwealth as a whole.

Labor Force, Unemployment and Poverty

The size of the labor force in Boston grew faster than the rate of population growth between 2000 and 2010, but slower between 2010 and 2014, as shown by data in Table 12. In 2014, there were an estimated 337,369 employed persons in the labor force. The unemployment rate was 5.2% in 2014, which was lower than in 2010 but higher than in 2000. In 2014, 22.6% of the population lived below the poverty level in the past 12 months, over double the rate of poverty for the region and the Commonwealth as a whole.

Households

While Boston's population increased, data in Table 12 indicate that the number of households in the city increased at a slower rate between 2010 and 2014. In 2010, there were 252,699 households with an average of 2.26 persons. In 2014, there were 253,749 households, with an average size of 2.40 persons. The distribution of households by size changed during the period with the greatest increase in number of households with two persons. Smaller household sizes may indicate the need for smaller housing units in the city.

Table 12
Selected Household Characteristics and Employment Trends and in the City of Boston, 2000 to 2014

	Boston			Percent Change,	Percent Change,	Boston MSA [1/]		Percent Change,	Massachusetts			Percent Change,	Percent Change,
	2000	2010	2014	2000-2010	2010-2014	2010	2014	2010-2014	2000	2010	2014	2000-2010	2010-2014
Population	589,141	617,594	656,051	4.8%	6.2%	4,552,402	4,732,161	3.9%	6,349,097	6,547,629	6,745,408	3.1%	3.0%
Households	239,528	252,699	253,749	5.5%	0.4%	1,760,584	1,777,817	1.0%	2,443,580	2,547,075	2,549,336	4.2%	0.1%
Average Household Size	2.31	2.26	2.40	-2.2%	6.2%	2.50	2.57	2.8%	2.51	2.48	2.55	-1.2%	2.8%
Employment and Poverty [2/]													
Labor Force	301,014	338,699	356,050	12.5%	5.1%	2,538,561	2,610,686	2.8%	3,330,200	3,480,100	3,557,400	4.5%	2.2%
Employed	292,031	313,027	337,369	7.2%	7.8%	2,346,184	2,474,893	5.5%	3,240,200	3,190,800	3,353,100	-1.5%	5.1%
Unemployed	8,983	25,672	18,681	185.8%	-27.2%	192,377	135,793	-29.4%	89,900	289,300	204,200	221.8%	-29.4%
Unemployment Rate	3.0%	7.6%	5.2%			7.6%	5.2%		2.7%	8.3%	5.7%		
Population in past 12 Months Below Poverty Level	18.5%	21.2%	22.6%			8.6%	10.6%		9.0%	10.5%	11.6%		
Distribution of Households by Size													
1-person Household	89,030	93,701	93,633	5.2%	-0.1%	462,355	508,456	10.0%	684,478	732,263	739,307	7.0%	1.0%
2-person Household	70,797	77,971	80,692	10.1%	3.5%	499,098	572,457	14.7%	774,264	813,166	825,985	5.0%	1.6%
3-person Household	34,335	37,002	35,779	7.8%	-3.3%	261,213	293,340	12.3%	400,338	417,216	420,640	4.2%	0.8%
4-or-more-person Household	45,366	44,025	43,645	-3.0%	-0.9%	375,785	403,564	7.4%	584,500	584,430	563,403	0.0%	-3.6%
Distribution of Households by Size, Percent to Total													
1-person Household	37.2%	37.1%	36.9%			26.3%	28.60%		28.0%	28.7%	29.0%		
2-person Household	29.6%	30.9%	31.8%			28.3%	32.20%		31.7%	31.9%	32.4%		
3-person Household	14.3%	14.6%	14.1%			14.8%	16.50%		16.4%	16.4%	16.5%		
4-or-more-person Household	18.9%	17.4%	17.2%			21.3%	22.70%		23.9%	22.9%	22.1%		
Household type													
Families	48.1%	46.0%	47.5%			62.6%	62.9%		64.5%	63.0%	63.6%		
Non-Families	51.9%	54.0%	52.5%			37.4%	37.1%		35.5%	37.0%	36.4%		
Tenure													
Owner-Occupied	32.2%	33.9%	34.9%			61.5%	61.2%		61.7%	62.3%	61.6%		
Renter-Occupied	67.8%	66.1%	65.1%			38.5%	38.8%		38.3%	37.7%	38.4%		

1/ MSA = Metropolitan Statistical Area. Data from the 2000 Census is not included because of a change in the definition of the Boston MSA in 2009.

2/ Labor force and employment data are from the Massachusetts Executive Office of Labor and Workforce Development and reflect the average annual monthly employment, not seasonally adjusted.

Source: U.S. Census, 2000; U.S. Census, 2010; U.S. Census American Community Survey, 2010, 1-Year Estimates; U.S. Census American Community Survey, 2014, 1-Year Estimates; Massachusetts Executive Office of Labor and Workforce Development; and ConsultEcon, Inc.

Household Income

Boston's median household income increased 14.0% from $49,893 in 2010 to $56,902 in 2014, as shown by data in Table 13. The city's median household income is 33.0% less than that of the entire Boston MSA. Between 2010 and 2014, the proportion of households at the top of the income distribution has increased, reflecting increasing income disparity in Boston's households. The proportion of households with annual earning over $100,000 increased from 24.5% of all households in 2010 to 30.0% in 2014. Facilitating the provision of housing that is affordable to households across the entire range of income levels will be an important part of housing policies in the future, especially as the market increasingly provides housing to higher income households.

Table 13
Household Income Distribution in the City of Boston, 2010 and 2014

	Boston, 2010		Boston, 2014		Boston MSA, 2014 [1/]		Massachusetts, 2014	
	Households	% of Total	Households	% of Total	Households	% of Total	Households	% of Total
Less than $10,000	38,718	15.4%	30,452	12.0%	103,881	5.8%	160,875	6.3%
$10,000 to $14,999	15,509	6.2%	20,468	8.1%	77,045	4.3%	127,004	5.0%
$15,000 to $19,999	12,943	5.1%	11,706	4.6%	68,124	3.8%	110,674	4.3%
$20,000 to $24,999	11,031	4.4%	11,792	4.6%	70,220	3.9%	108,790	4.3%
$25,000 to $34,999	20,198	8.0%	18,643	7.3%	120,079	6.8%	194,737	7.6%
$35,000 to $49,999	27,593	11.0%	22,073	8.7%	167,873	9.4%	256,275	10.1%
$50,000 to $74,999	39,015	15.5%	37,268	14.7%	274,235	15.4%	399,608	15.7%
$75,000 to $99,999	25,057	10.0%	25,227	9.9%	215,690	12.1%	315,315	12.4%
$100,000 to $149,999	31,559	12.5%	35,940	14.2%	313,734	17.6%	432,435	17.0%
$150,000 or more	30,098	12.0%	40,180	15.8%	366,936	20.6%	443,623	17.4%
Total Households	**251,721**	**100.0%**	**253,749**	**100.0%**	**1,777,817**	**100.0%**	**2,549,336**	**100.0%**
Median Household Income	***$49,893***		***$56,902***		***$75,667***		***$69,160***	
Percent Change in Median Household Income, 2010 to 2014			***14.0%***					
Mean Household Income	***$75,308***		***$88,403***		***$104,657***		***$95,404***	
Percent Change in Median Household Income, 2010 to 2014			***17.4%***					
Households less than $25,000	78,201	31.1%	74,418	29.3%	319,270	18.0%	507,343	19.9%
Households more than $100,000	61,657	24.5%	76,120	30.0%	680,670	38.3%	876,058	34.4%

Note: Income levels are not adjusted for inflation.

1/ MSA = Metropolitan Statistical Area. Data from the 2000 Census is not included because of a change in the definition of the Boston MSA in 2009.
Source: U.S. Census American Community Survey, 2010, 1-Year Estimates; U.S. Census American Community Survey, 2014, 1-Year Estimates; and ConsultEcon, Inc.

Housing Supply and Market Conditions

Total Housing Units in Boston

In 2010, there were an estimated 272,481 housing units in the City of Boston, as shown by data in Table 14. According to the ACS, there were an estimated 274,459 housing units in 2014, an increase of 1,978 or less than 1%. However, there is evidence that the ACS is substantially underreporting the total number of housing units in the city. Data from the City of Boston indicate that housing development and production in Boston has gained steam in the past couple of years. According to data in Table 15, 7,004 housing units were completed between 2010 and 2014, indicating that the total number of units in Boston should be higher than the ACS estimate at a total of 279,482. An additional 5,881 housing units were completed in 2015 and in 2016 through August, bringing the total estimated supply of housing units to 285,363. An additional 7,208 housing units are in construction or have been permitted but not yet built.

Another indicator of growth in housing supply *is the number of housing permits issued by the City of Boston. Permits are issued before construction begins on a project. As shown by data in* Table 16, the number of housing permits issued has increased since the economic recession.

Between 2010 and June 2016, the City of Boston issued permits for a total of 14,017 housing units. Approximately 92% of these permitted units were in buildings with 5 or more units.

Table 14
Housing Units, Occupancy and Vacancy Status in the City of Boston, 2000, 2010 and 2014

	Boston						Boston MSA [1/]				Massachusetts					
	2000		2010		2014		2010		2014		2000		2010		2014	
Tenure	Number of Units	% of Total	Number of Units	% of Total	Number of Units	% of Total	Number of Units	% of Total	Number of Units	% of Total	Number of Units	% of Total	Number of Units	% of Total	Number of Units	% of Total
Owner-Occupied Housing Units	77,226	30.7%	85,791	31.5%	88,610	32.3%	1,082,688	57.5%	1,087,964	57.2%	1,508,248	57.5%	1,587,158	56.5%	1,570,332	55.5%
Renter-Occupied Housing Units	162,302	64.4%	166,908	61.3%	165,139	60.2%	677,896	36.0%	689,853	36.2%	935,332	35.7%	959,917	34.2%	979,004	34.6%
Vacant Housing Units	12,407	4.9%	19,782	7.3%	20,710	7.5%	122,622	6.5%	125,835	6.6%	178,409	6.8%	261,179	9.3%	278,390	9.8%
Total	**251,935**	**100.0%**	**272,481**	**100.0%**	**274,459**	**100.0%**	**1,883,206**	**100.0%**	**1,903,652**	**100.0%**	**2,621,989**	**100.0%**	**2,808,254**	**100.0%**	**2,827,726**	**100.0%**
Type of Unit (based on Occupancy and Vacancy Status)																
Ownership Units (including occupied, sold not occupied and for sale)	NC		88,286	33.3%	92,804	34.9%	1,102,933	60.4%	1,107,537	60.4%	NC		1,618,604	61.1%	1,603,261	60.8%
Rental Units (including occupied, rented not occuied and for rent)	NC		176,707	66.7%	173,445	65.1%	723,188	39.6%	724,664	39.6%	NC		1,030,412	38.9%	1,034,798	39.2%
Total Ownership and Rental Units	**NC**		**264,993**	**100.0%**	**266,249**	**100.0%**	**1,826,121**	**100.0%**	**1,832,201**	**100.0%**	**NC**		**2,649,016**	**100.0%**	**2,638,059**	**100.0%**
Homeowner Vacancy Rate [2/]	***1.0%***		***2.2%***		***0.8%***		***1.5%***		***0.9%***		***0.7%***		***1.5%***		***1.3%***	
Rental Vacancy Rate [3/]	***3.0%***		***5.2%***		***2.6%***		***5.9%***		***3.3%***		***3.5%***		***6.5%***		***4.0%***	
Vacancy Status																
For rent	5,013	40.4%	9,169	46.4%	4,491	21.7%	42,591	34.7%	24,116	19.5%	34,174	18.2%	66,673	25.5%	41,759	15.0%
Rented, not occupied [4/]			630	3.2%	3,815	18.4%	2,701	2.2%	10,695	8.7%	9,218		3,822	1.5%	14,035	5.0%
For sale only	775	6.2%	1,903	9.6%	712	3.4%	16,020	13.1%	10,271	8.3%	10,861	5.8%	25,038	9.6%	20,485	7.3%
Sold, not occupied [4/]		0.0%	592	3.0%	3,482	16.8%	4,225	3.4%	9,302	7.5%		0.0%	6,408	2.5%	12,444	4.5%
Rented or sold, not occupied [4/]	963	7.8%									9,218	4.9%				
For seasonal, recreational, or occasional use	1,568	12.6%	2,999	15.2%	3,238	15.6%	31,904	26.0%	31,731	25.7%	93,771	50.0%	115,630	44.3%	121,955	43.7%
For migrant workers	5	0.0%	3	0.0%	0	0.0%	48	0.0%	0	0.0%	194	0.1%	161	0.1%	188	0.1%
Other vacant	4,083	32.9%	4,486	22.7%	4,972	24.0%	25,133	20.5%	37,431	30.3%	30,191	16.1%	43,447	16.6%	68,390	24.5%
Total Vacant	**12,407**	**100.0%**	**19,782**	**100.0%**	**20,710**	**100.0%**	**122,622**	**100.0%**	**123,546**	**100.0%**	**187,627**	**100.0%**	**261,179**	**100.0%**	**279,256**	**100.0%**

1/ MSA = Metropolitan Statistical Area. Data from the 2000 Census is not included because of a change in the definition of the Boston MSA in 2009.

2/ The homeowner vacancy rate is the proportion of the homeowner inventory that is vacant "for sale." It is computed by dividing the total number of vacant units "for sale only" by the sum of owner-occupied units, vacant units that are "for sale only," and vacant units that have been sold but not yet occupied.

3/ The rental vacancy rate is the proportion of the rental inventory that is vacant "for rent." It is computed by dividing the total number of vacant units "for rent" by the sum of the renter-occupied units, vacant units that are "for rent," and vacant units that have been rented but not yet occupied.

4/ For the 2000 Census, there was only one category, "Rented or sold, not occupied," that included two categories, "Rented, not occupied" and "Sold, not occupied," in the 2010 Census and the American Community Survey.

Source: U.S. Census, 2000; U.S. Census, 2010; U.S. Census Bureau, American Community Survey, 2014, 1-year estimates; and ConsultEcon, Inc.

Table 15
Selected Characteristics of Housing Production in the City of Boston, by Project Status and Year Completed, 2010 through August, 2016

	Total Production	Project Status as of August, 2016		Completed Projects by Year Completed						
		Complete	Permitted / In Construction	2010	2011	2012	2013	2014	2015	2016
Market Rate Units	16,464	10,569	5,895	773	592	620	1,715	1,970	3,351	1,548
Less Conversion of Market Rate to Affordable Units	188	188	0	0	0	8	6	0	174	0
Net New Market Rate Units [1/]	**16,276**	**10,381**	**5,895**	**773**	**592**	**612**	**1,709**	**1,970**	**3,177**	**1,548**
New Affordable Units	3,817	2,504	1,313	325	199	258	351	215	966	190
Total Production	**20,093**	**12,885**	**7,208**	**1,098**	**791**	**870**	**2,060**	**2,185**	**4,143**	**1,738**
Percent to Total Production	***100.0%***	***64.1%***	***35.9%***	***5.5%***	***3.9%***	***4.3%***	***10.3%***	***10.9%***	***20.6%***	***8.6%***
Type of Units, Percent to Total										
Market Rate	81.0%	80.6%	81.8%	70.4%	74.8%	70.3%	83.0%	90.2%	76.7%	89.1%
Affordable	19.0%	19.4%	18.2%	29.6%	25.2%	29.7%	17.0%	9.8%	23.3%	10.9%
Market Rate Units by Tenure [2/]										
Ownership	5,350	3,492	1,858	510	425	371	549	334	641	662
Rental	10,723	6,893	3,830	264	167	243	1,160	1,636	2,536	887
Total	**16,073**	**10,385**	**5,688**	**774**	**592**	**614**	**1,709**	**1,970**	**3,177**	**1,549**
Market Rate Units by Tenure, Percent										
Ownership	33.3%	33.6%	32.7%	65.9%	71.8%	60.4%	32.1%	17.0%	20.2%	42.7%
Rental	66.7%	66.4%	67.3%	34.1%	28.2%	39.6%	67.9%	83.0%	79.8%	57.3%
Affordable Units by Tenure [2/]										
Ownership	436	229	207	101	24	8	11	5	72	8
Rental	3,370	2,271	1,099	224	175	248	340	210	894	180
Total	**3,806**	**2,500**	**1,306**	**325**	**199**	**256**	**351**	**215**	**966**	**188**
Affordable Units by Tenure, Percent										
Ownership	11.5%	9.2%	15.8%	31.1%	12.1%	3.1%	3.1%	2.3%	7.5%	4.3%
Rental	88.5%	90.8%	84.2%	68.9%	87.9%	96.9%	96.9%	97.7%	92.5%	95.7%
All Units by Unit Size 2/										
MICRO	96	0	96	0	0	0	0	0	0	0
0BR	2,579	1,825	754	65	152	51	127	291	919	220
1BR	6,877	4,899	1,978	108	264	324	594	963	1,978	668
2BR	5,888	4,166	1,722	313	313	332	917	704	1,056	531
3+BR	1,727	1,310	417	188	95	170	311	167	219	160
Total	**17,167**	**12,200**	**4,967**	**674**	**824**	**877**	**1,949**	**2,125**	**4,172**	**1,579**
Percent to All Units by Unit Size										
MICRO	0.8%	0.0%	1.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0BR	17.9%	15.0%	15.2%	9.6%	18.4%	5.8%	6.5%	13.7%	22.0%	13.9%
1BR	44.6%	40.2%	39.8%	16.0%	32.0%	36.9%	30.5%	45.3%	47.4%	42.3%
2BR	30.6%	34.1%	34.7%	46.4%	38.0%	37.9%	47.0%	33.1%	25.3%	33.6%
3+BR	6.2%	10.7%	8.4%	27.9%	11.5%	19.4%	16.0%	7.9%	5.2%	10.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Note: Includes all market rate and affordable housing projects in Boston tracked by the Department of Neighborhood Development.

NC = Not Calculated.

1/ Affordable Units that are converted from Market Rate Units are classified as Affordable Units.

2/ Tenure data is missing for some projects and therefore do not equal data shown elsewhere in table.

2/ Unit size data is missing for some projects. Data do not distinguish unit size between affordable and market rate units.

Source: City of Boston, Department of Neighborhood Development; and ConsultEcon, Inc.

Table 16
Trend in Housing Units Permitted by Size in the City of Boston, 2008 to 2015

Year	Permitted Units by Size: Single Family	2-4 Units	5+ Units	Total Permitted Units	Construction Cost	Average Cost per Unit
2010	23	64	264	351	$41,017,238	$116,858
2011	33	60	692	785	$171,603,271	$218,603
2012	40	165	1,571	1,776	$345,320,554	$194,437
2013	34	166	2,361	2,561	$1,115,144,679	$435,433
2014	48	194	2,599	2,841	$687,769,899	$242,087
2015	48	202	4,705	4,955	$1,164,407,173	$234,996
2016 through June	24	113	611	748	$268,526,440	$358,993
Total	**250**	**964**	**12,803**	**14,017**	**$3,793,789,254**	**$270,656**
Percent to Total Units	***1.8%***	***6.9%***	***91.3%***	***100.0%***		

Source: U.S. Census Building Permits and ConsultEcon, Inc.

Ownership and Rental Housing

Most housing units in Boston are rental units, but the number of ownership units has increased over time while rental units have declined, as shown by ACS data in Table 14. In 2010, two thirds of all housing units, or an estimated 176,707 units, were rental units, including units that were occupied, rented and not occupied, and for rent. Between 2010 and 2014, the number of rental units decreased by an estimated 3,262 units for a total of 173,626. Over the same period, the rental vacancy rate declined from 5.2% to 2.6%.

Despite an increase in the supply of ownership units, their vacancy rate is even lower than that for rental units. In 2010, one third of all housing units, or a total of 88,286, units were ownership units, including units that were occupied, sold and not occupied, and for sale. Between 2010 and 2014, the number of ownership units increased by an estimated 4,518 units for a total of 92,804. Over the same period, the ownership unit vacancy rate declined from 2.2% to 0.8%.

While there is a slight shift from rental to ownership units in the city's overall housing supply, the new housing produced since 2010, especially new affordable units, is weighted towards rental units, per data from the City of Boston. As shown by data in Table 15, two thirds of the completed market rate housing units were rental units and one third were ownership units. Affordable units were 91% rental units and 9% ownership units. The emphasis on new multi-family rental units is consistent with national trends, as noted below.

Condominium conversions from rental to ownership housing are likely a factor in the relative change in number of rental and ownership housing units, despite the majority of new construction being rental housing. Another factor may be a switch from renter occupied ownership units to owner occupied ownership units, when a condominium owner decides to occupy a unit rather than rent it out.

Housing Values and Prices

In 2014, the median reported value of owner-occupied housing units in Boston was $413,500, which is higher than the median values for the Boston MSA median value ($375,200) and the Massachusetts median ($338,900), as shown by data in Table 17. These values contrast with recent sales prices. Between 2014 and 2015, the median sales price of single family homes in the city increased 4.9% from $433,600 to $455,000. The 2015 sales volume of single family homes increased 17.6% over 2014 to 1,406 units. Between 2014 and 2015, the median condominium sales price increased 11.6% from $471,000 to $525,000. The volume of condominium sales was 5,723 units in 2015, a 17.1% increase from 2014.[16]

Figure 6 shows the long term trend in quarterly median housing sales prices for different housing types in 2015 inflation adjusted dollars. Housing prices have increased significantly since the precipitous declines experienced from 2006 through 2009.

The high price of housing in Boston translates to high monthly housing costs for households with a mortgage. However, homeowner monthly housing costs in 2014 were somewhat lower than in 2010 for occupied housing units with a mortgage at $2,179, which was a decline of 3.1% from that in 2010, as shown by data in Table 18. This may be due to lower interest rates or smaller mortgage amounts per housing unit.

Table 17
Value of Owner-Occupied Housing Units in the City of Boston, 2010 and 2014

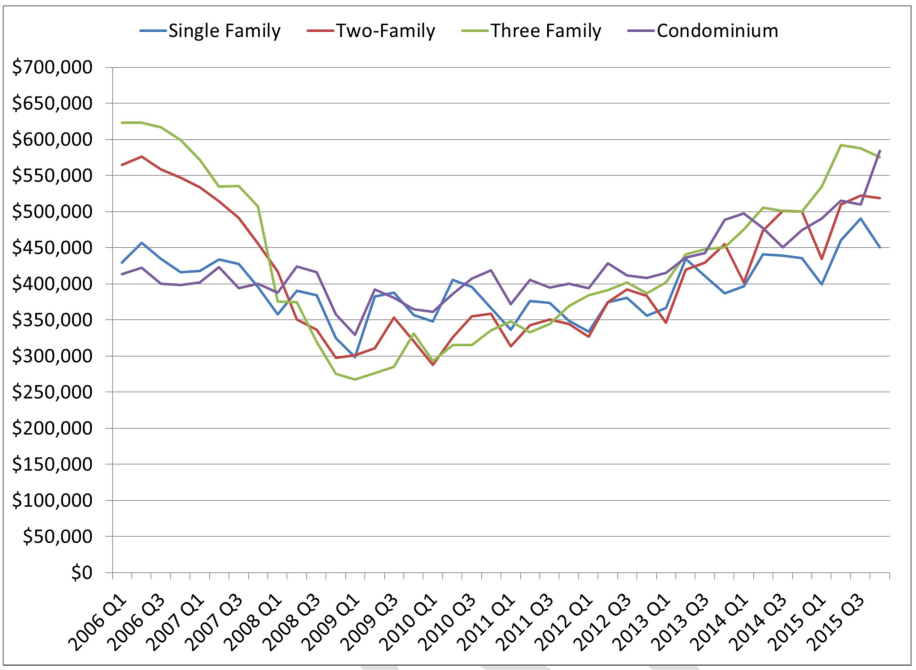
	Boston, 2010		Boston, 2014		Boston MSA, 2014		Massachusetts, 2014	
Home Value	Owner-Occupied Units	% of Total	Owner-Occupied Units	% of Total	Owner-Occupied Units	% of Total	Owner-Occupied Units	% of Total
Less than $50,000	712	0.9%	3,404	3.8%	38,159	3.5%	56,776	3.6%
$50,000 to $99,999	762	0.9%	536	0.6%	14,384	1.3%	25,478	1.6%
$100,000 to $149,999	980	1.2%	1,650	1.9%	30,230	2.8%	70,402	4.5%
$150,000 to $199,999	3,733	4.6%	2,764	3.1%	56,499	5.2%	141,237	9.0%
$200,000 to $299,999	18,277	22.4%	12,428	14.0%	216,402	19.9%	360,649	23.0%
$300,000 to $399,999	23,587	28.8%	21,336	24.1%	250,398	23.0%	336,103	21.4%
$400,000 to $499,999	11,382	13.9%	16,178	18.3%	169,696	15.6%	213,566	13.6%
$500,000 to $749,999	13,406	16.4%	18,534	20.9%	198,120	18.2%	233,782	14.9%
$750,000 to $999,999	3,689	4.5%	4,283	4.8%	58,028	5.3%	67,073	4.3%
$1,000,000 or More	5,242	6.4%	7,497	8.5%	56,048	5.2%	65,266	4.2%
Total	**81,770**	**100.0%**	**88,610**	**100.0%**	**1,087,964**	**100.0%**	**1,570,332**	**100.0%**
Median Value	***$369,600***		***$413,500***		***$375,200***		***$338,900***	
Percent Change in Value			***11.9%***					

Note: Housing values are not adjusted for inflation.

Source: U.S. Census American Community Survey, 2010, 1-Year Estimates; U.S. Census American Community Survey, 2014, 1-Year Estimates; and ConsultEcon, Inc.

[16] Source for sales price and volume data is the Department of Neighborhood Development, using Banker and Tradesman data, January 2016.

Figure 6
Long-Term Trend in Quarterly Median Sales Prices in the City of Boston, 2006 to 2015 (Adjusted for Inflation to the 2015 Value of the Dollar)



Source: City of Boston, Department of Neighborhood Development using Banker and Tradesman data, January 2016, and ConsultEcon, Inc.

Table 18
Monthly Housing Costs for Owner-Occupied Units with a Mortgage in the City of Boston, 2010 and 2014

	Boston, 2010		Boston, 2014		Boston MSA, 2014		Massachusetts, 2014	
Monthly Housing Costs	Owner Occupied Housing Units	% of Total	Owner Occupied Housing Units	% of Total	Owner Occupied Housing Units	% of Total	Owner Occupied Housing Units	% of Total
Less than $500	205	0.3%	510	0.8%	4,634	0.6%	10,222	0.9%
$500 to $999	2,345	3.8%	3,621	5.5%	39,678	5.2%	76,067	7.0%
$1,000 to $1,499	8,359	13.6%	9,172	13.9%	104,383	13.6%	192,282	17.6%
$1,500 to $1,999	13,974	22.7%	14,189	21.5%	167,424	21.8%	261,410	23.9%
$2,000 to $2,499	11,801	19.2%	15,300	23.2%	167,816	21.9%	224,476	20.6%
$2,500 to $2,999	10,414	16.9%	9,400	14.3%	118,475	15.5%	142,733	13.1%
$3,000 or more	14,361	23.4%	13,758	20.9%	164,337	21.4%	184,966	16.9%
Total	**61,459**	**100.0%**	**65,950**	**100.0%**	**766,747**	**100.0%**	**1,092,156**	**100.0%**
Median	***$2,248***		***$2,179***		***$2,200***		***$2,014***	
Percent Change in Median Costs			***-3.1%***					

Note: Housing costs are not adjusted for inflation.

Source: U.S. Census American Community Survey, 2010, 1-Year Estimates; U.S. Census American Community Survey, 2014, 1-Year Estimates; and ConsultEcon, Inc.

Gross Rents and Asking Rents

In 2014, the median gross rent for renter occupied housing units in Boston was $1,352, a 12.8% increase from the level in 2010, as shown by data in Table 19. The median gross rent in the city was 8.4% higher than that for Boston MSA ($1,247) and 22.2% above the statewide median gross rent ($1,107). Asking rents, as researched by the Department of Neighborhood Development, are substantially higher than the reported gross rents from the U.S. Census Bureau. Between 2014 and 2015, the median asking monthly rent for an apartment in Boston increased 7% from $2,008 to $2,147 month, as shown by data in Table 20. Median asking rents for studio and one bedroom apartments increased at higher rates than those for two and three bedroom apartments.

Table 19
Gross Rents for Renter Occupied Units in the City of Boston, 2010 and 2014

	Boston, 2010		Boston, 2014		Boston MSA, 2014		Massachusetts, 2014	
Gross Rent	Renter Occupied Housing Units	% of Total	Renter Occupied Housing Units	% of Total	Renter Occupied Housing Units	% of Total	Renter Occupied Housing Units	% of Total
Less than $200	7,184	4.2%	5,387	3.3%	12,567	1.8%	18,170	1.9%
$200 to $399	20,626	12.1%	21,212	12.8%	61,362	8.9%	95,993	9.8%
$400 to $599	7,563	4.5%	9,117	5.5%	37,837	5.5%	68,460	7.0%
$600 to $799	9,773	5.8%	8,668	5.2%	40,803	5.9%	96,491	9.9%
$800 to $999	14,964	8.8%	9,615	5.8%	68,559	9.9%	123,267	12.6%
$1,000 to $1,499	53,545	31.5%	39,124	23.7%	215,258	31.2%	292,557	29.9%
$1,500 to $1,999	31,806	18.7%	39,310	23.8%	140,015	20.3%	153,175	15.6%
$2,000 or more	21,571	12.7%	29,925	18.1%	91,450	13.3%	98,042	10.0%
No Cash Rent	2,919	1.7%	2,781	1.7%	22,002	3.2%	32,849	3.4%
Total	**169,951**	**100.0%**	**165,139**	**100.0%**	**689,853**	**100.0%**	**979,004**	**100.0%**
Median Gross Rent	***$1,199***		***$1,352***		***$1,247***		***$1,107***	
Percent Change in Median Rent			***12.8%***					

Note: Grosss rents are not adjusted for inflation.

Source: U.S. Census American Community Survey, 2010, 1-Year Estimates; U.S. Census American Community Survey, 2014, 1-Year Estimates; and ConsultEcon, Inc.

Table 20
Median Asking Rents by Unit Size in the City of Boston, 2014 and 2015

Unit Size	2014	2015	Percent Change, 2014 to 2015
Studio	$1,423	$1,743	22%
1 Bedroom	$1,864	$2,118	14%
2 Bedrooms	$2,140	$2,195	3%
3 Bedrooms	$2,272	$2,285	1%
ALL	**$2,008**	**$2,147**	**7%**

Source: Department of Neighborhood Development, based on Multiple Listing Service and Rental Beast data.

Housing Costs as a Percent of Household Income

Due to the high cost of housing, many Boston households devote a large portion of their incomes to housing. As shown by data in Table 21, 44.3% of all occupied housing units in 2014 were "cost burdened," which means the household was paying more than 30% of its income on housing costs. Housing is typically considered affordable if housing costs are no more than 30% of household incomes. In Boston, renters are more cost burdened than homeowners. Almost half of renter households are cost burdened, compared to 30.9% of home owners. Households with annual incomes less than $50,000 are especially impacted, including almost 4 out of 5 households with incomes below $20,000 and 3 out of 4 households with incomes between $20,000 and $34,999. Boston's share of households paying over 30% of their income for housing exceeded the ratio for the Boston MSA and Massachusetts, both at 36%.

Table 21
Housing Costs as a Percentage of Household Income in the Past 12 Months by Tenure in the City of Boston, 2010 and 2014

	Boston, 2010		Boston, 2014		Boston MSA, 2014		Massachusetts, 2014	
Percent of Income	Occupied Housing Units	% of Total	Occupied Housing Units	% of Total	Occupied Housing Units	% of Total	Occupied Housing Units	% of Total
Owner-Occupied								
Less than 20 Percent	32,215	39.4%	41,706	47.1%	503,921	46.3%	732,414	46.6%
20 to 29 Percent	19,488	23.8%	18,592	21.0%	265,535	24.4%	378,163	24.1%
30 Percent or More	29,592	36.2%	27,401	30.9%	311,724	28.7%	450,561	28.7%
Zero or Negative Income	475	0.6%	911	1.0%	6,784	0.6%	9,194	0.6%
Total	**81,770**	**100.0%**	**88,610**	**100.0%**	**1,087,964**	**100.0%**	**1,570,332**	**100.0%**
Renter-Occupied								
Less than 20 Percent	36,094	21.2%	37,851	22.9%	160,090	23.2%	229,484	23.4%
20 to 29 Percent	39,821	23.4%	36,238	21.9%	164,993	23.9%	229,116	23.4%
30 Percent or More	81,857	48.2%	81,601	49.4%	328,838	47.7%	467,735	47.8%
Zero or Negative Income	9,260	5.4%	6,668	4.0%	13,930	2.0%	19,820	2.0%
No Cash Rent	2,919	1.7%	2,781	1.7%	22,002	3.2%	32,849	3.4%
Total	**169,951**	**100.0%**	**165,139**	**100.0%**	**689,853**	**100.0%**	**979,004**	**100.0%**
Total								
Less than 20 Percent	68,309	27.1%	79,557	31.4%	664,011	37.3%	961,898	37.7%
20 to 29 Percent	59,309	23.6%	54,830	21.6%	430,528	24.2%	607,279	23.8%
30 Percent or More	111,449	44.3%	109,002	43.0%	640,562	36.0%	918,296	36.0%
Zero or Negative Income	9,735	3.9%	7,579	3.0%	20,714	1.2%	29,014	1.1%
No Cash Rent	2,919	1.2%	2,781	1.1%	22,002	1.2%	32,849	1.3%
Total	**251,721**	**100.0%**	**253,749**	**100.0%**	**1,777,817**	**100.0%**	**2,549,336**	**100.0%**
Households by Income Level Paying 30 Percent or More in Housing Costs								
Less than $20,000	42,495	16.9%	43,680	17.2%	186,498	10.5%	301,292	11.8%
$20,000 to $34,999	23,716	9.4%	22,231	8.8%	141,986	8.0%	216,384	8.5%
$35,000 to $49,999	17,569	7.0%	15,713	6.2%	100,799	5.7%	136,993	5.4%
$50,000 to $74,999	16,622	6.6%	16,724	6.6%	113,054	6.4%	145,764	5.7%
$75,000 or more	11,047	4.4%	10,654	4.2%	98,225	5.5%	117,863	4.6%
Total	**111,449**	**44.3%**	**109,002**	**43.0%**	**640,562**	**36.0%**	**918,296**	**36.0%**
Percent of Households by Income Level Paying 30 Percent or More of Income in Housing Costs								
Less than $20,000	75.9%		80.6%		84.7%		84.2%	
$20,000 to $34,999	77.1%		74.5%		76.2%		72.9%	
$35,000 to $49,999	64.7%		71.9%		60.9%		54.3%	
$50,000 to $74,999	42.7%		45.5%		41.6%		36.8%	
$75,000 or more	12.8%		10.6%		11.0%		9.9%	
Total	**44.3%**		**43.0%**		**36.0%**		**36.0%**	

Note: Income levels are not adjusted for inflation.

Source: U.S. Census American Community Survey, 2010, 1-Year Estimates; U.S. Census American Community Survey, 2014, 1-Year Estimates; and ConsultEcon, Inc.

Market Rate and Affordable Units

Based on data in Table 15, among the housing projects that were completed or permitted from 2011 through August, 2016 and are now in construction, market rate units are 81% of the total and affordable units represent 19%. Of the affordable units either completed or in the development pipeline, 89% were rental units and 11% were ownership units. Compared to market rate units, the mix of affordable rental and ownership housing is weighed more towards rental housing. Most units completed or in the development pipeline are either one or two bedroom units, with smaller numbers of studio or three bedroom units.

Data in Table 22 show the affordable housing units by level of affordability and the income limits to qualify for the affordable units across households of different sizes. Approximately 61% of the affordable housing units either completed or in the development pipeline are targeted to low-income households, defined in this report as income levels between 50% and 80% of area median income (AMI). These 2,324 low-income units are available to 2 person households earning a maximum of $62,800 per year. Very low-income households (up to 50% of AMI) received 27% of the total affordable units. Very low-income units are available to 2 person households earning a maximum of $39,250 per year.

A review of asking rents for a sample of market rate units completed in 2015 and 2016 indicates substantially higher asking rents than the citywide median asking rents shown in Table 20, especially in the city's core neighborhoods. The average asking rent for a studio apartment was $2,500 per month; a one bedroom apartment was $3,100 per month; and a two bedroom apartment was $4,500 per month. These rents are out of reach for most Boston households. Assuming that 30% of annual income is spent on rent, a studio apartment would require a $100,000 annual income, a one bedroom apartment would require a $124,000 annual income, and a two bedroom apartment would require an $180,000 annual income. Only 28% of the city's households earn more than $100,000 annually. Considering that many of these households are family households needing a unit larger than one or two bedrooms, most of the new market rate housing being produced is unaffordable for the vast majority of Boston households.

Table 22
Distribution of New Affordable Housing Units
(Completed, In Construction or Permitted in the City of Boston, 2010 to August 2016)
and Income Limits by Household Size to be Eligible for Affordable Housing

Affordability Levels	Units	Percent to Total	Income Limits for Affordable Units: 1 Person Household	2 Person Household	3 Person Household	4 Person Household
Very Low Income (30% AMI or less) New Units	691	18.1%	$20,600	$23,600	$26,500	$29,400
Low Income (31%-50% AMI) New Units	347	9.1%	$34,350	$39,250	$44,150	$49,050
HOME Income (51%-60% AMI) New Units	1,061	27.8%	$41,250	$47,100	$53,000	$58,900
IDP Rental Income (61%-70% AMI) New Units	830	21.7%	$51,550	$58,900	$66,250	$73,600
Moderate Income (71%-80%) New Units	433	11.3%	$54,950	$62,800	$70,650	$78,500
Lower-Middle Income (81%-100% AMI) New Units	185	4.8%	$68,700	$78,500	$88,300	$98,100
Middle Income (101%-120% AMI) New Units	137	3.6%	$82,450	$94,200	$105,950	$117,750
Higher-Middle Income (120%-150% AMI)	108	2.8%	$103,050	$117,750	$132,450	$141,300
150% - 165% AMI	25	0.7%	$113,400	$129,500	$145,700	$161,900
Total Affordable Units	**3,817**	**100.0%**				

Note: AMI = Area Median Income

Source: City of Boston, Department of Neighborhood Development; Boston Redevelopment Authority and ConsultEcon, Inc.

National and Regional Housing Trends

The regional and national trends summarized in this section provide additional context for Boston's housing market conditions and housing linkage policy decisions.

National Trends

According to *The State of the Nation's Housing, 2016*, the national housing market continues to rebound from the economic downturn, largely due to strength in the rental sector. Rental vacancy rates have fallen steadily since 2010, with rents increasing at twice the rate of inflation. Multi-family rental construction accounted for more than 30% of all housing starts, substantially more than the long term average. Capitalization rates for multi-family housing are lower than at the height of the housing boom a decade ago, reflecting the strength of the rental market and the low interest rate environment that has investors looking for a good return on their investment. However, most of the units constructed are at the upper end of the market, which is similar to the situation in Boston. The strength of the rental market has contributed to an increase in the number of renters that are cost burdened—those households that are paying more than 30% of their income on rent—especially among low and very low-income households.

Housing prices for owner occupied homes continue to increase but have not yet returned to previous levels before the economic downturn except in a few leading markets, like Boston. New home sales and new ownership housing construction are at historically low levels and low homeownership vacancy rates are contributing to increases in prices, despite an overall decline in

the homeownership rate nationally. The homeownership rate has declined due to a number of demographic and economic factors including the slowing of new household formation as people are delaying marriage and child birth, high levels of foreclosures, low levels of income growth, higher lending standards, and increasing student debt burdens. As the economic recovery continues to support employment and income growth, it is anticipated that household formation will increase and once again provide support for higher levels of homeownership.

Regional Trends

According to *Greater Boston Housing Report Card, 2014-2015*, Greater Boston's housing market is increasingly "out of sync." The region[17] has a housing supply mismatch that is unable to accommodate the changing demand for housing from the region's population. The core cities in the region, such as Boston, have an undersupply of multi-family housing that is desirable among the younger "millennials," born between 1980 and 2000, and aging "baby boomers," born between 1946 and 1964. Millennials have indicated a strong desire to locate in dense, walkable neighborhoods.[18] According to *Greater Boston Housing Report Card, 2014-2015,* Boston's suburbs conversely have a reported oversupply of single family homes that appeal to families with children because the "baby bust" generation, born between 1965 and 1980, is not large enough to absorb existing homes put on the market by aging baby boomers and the new homes being built.

Greater Boston's housing prices continue to increase, but with uneven changes across its communities. Sales in many traditionally desirable and high-priced communities are slowing while sales are increasing in more affordable communities, suggesting that there are limits to sustainable price increases due to affordability issues. Single family home prices are flattening in many communities while the prices for condominiums are surging, reflecting the uneven and evolving demand for different types of housing.

The report *Greater Boston Housing Report Card, 2015* addresses the "housing cost conundrum" that exists because the Boston region's supply of housing has not kept up with housing demand that has been driven by the increase in jobs in the region. Household growth in the region would have likely been higher had the amount of housing produced kept up with demand. The report found that supply has lagged because the cost of developing housing is too high to provide housing suitable for the region's working and middle-income households. Another large contributor to the high costs is restrictive zoning controls at the local level. Housing costs are so high that it is "virtually impossible for supply to match demand and therefore the vicious cycle of price appreciation and rent escalation in Greater Boston is fundamentally unmanageable under current economic and political conditions."[19] This indicates that the City of Boston is not alone in experiencing the high cost of housing production. Therefore, seeking out solutions at a state

[17] The region here is defined as Suffolk, Essex, Middlesex, Norfolk and Plymouth Counties.
[18] Lachman, M. Leanne, and Deborah L. Brett. *Gen Y and Housing: What They Want and Where They Want It.* Washington, D.C.: Urban Land Institute, 2015.
[19] Barry Bluestone et al., *The Greater Boston Housing Report Card 2015: The Housing Cost Conundrum*, Prepared by the Kitty and Michael Dukakis Center for Urban and Regional Policy, Northeastern University, Prepared for the Boston Foundation, Page 8.

and regional level that encourage housing production, including affordable units, outside of the city and lowering development costs overall will contribute to easing the pressure on housing demand and production in the city of Boston.

Summary of Boston Demographic and Housing Market Trends Analysis

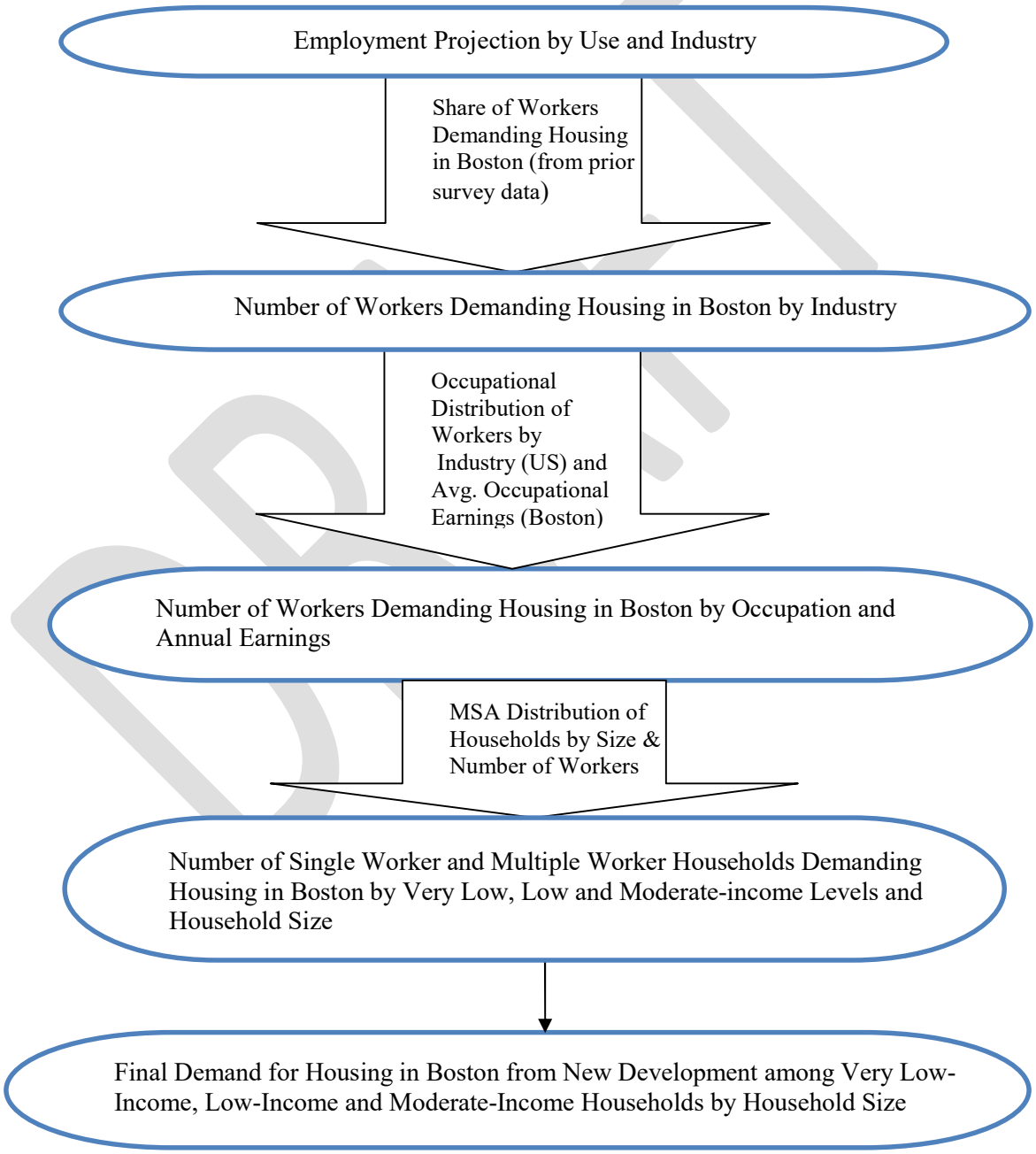
Boston has seen strong demand for housing as the region's primary employment center. Population growth has been fostered by strong employment growth, particularly in high wage sectors that are concentrated in Boston, such as financial services, business, technical, and professional services, and the emergence of computer and technology businesses. The increase in the number of housing units has not kept pace with housing demand. Despite the increase in the average size of households between 2010 and 2014, households in the region and in Boston have trended smaller over the longer term. Anecdotally, higher housing prices are causing more sharing of housing, and households with one income often cannot afford housing. Conversely, lack of affordability and the overall demographic trend toward smaller households also may be driving demand for smaller housing units. Changes in household income distribution, with anticipated increasing proportions of households at the top of the income scale, may change housing demand patterns as well. This trend may increase demand for higher end housing by affluent households. The availability of high-end housing seems in better balance with demand than the supply of affordable housing.

Demographic and housing trends indicate that housing demand is outstripping the supply of affordable housing in Boston and throughout the region. Continued employment and population growth and shifting consumer preferences for dense, walkable communities contribute to increased demand for housing in Boston. Without increased housing production, vacancy rates will continue to be low, driving up housing costs and putting increased pressure on household incomes, particularly for low-income and moderate-income households that spend a disproportionate share of their incomes on housing. Already there is unmet demand for housing in Boston, with people who cannot find or afford housing in the city commuting to Boston from outside of the city, or building their lives entirely outside the city. However, increasing the supply of housing is only one part of the equation to address. Another key factor is the high cost of housing development that impedes production of housing that is affordable to a majority of households in Boston. Additionally, subsidies are essential to address the gap between housing production costs and what low-income, moderate-income and middle-income households can afford to pay, and expand the supply of affordable housing. Boston's housing exactions represent an important source of funding for housing production subsidies.

Impact of Large Scale Development on Affordable Housing Demand

Using the 10-year development scenario and employment projections summarized in Table 10 of Section 2, this section forecasts the demand for affordable housing in Boston that will result from this development. Since several data sources and assumptions were used to prepare the forecast, a full explanation of the methodology is provided along with the results. Figure 7 provides an overview of the analytical steps and data sources for the housing demand projections.

Figure 7. Methodology and Data Sources for Housing Demand Analysis



Since demand for affordable housing is tied to household income, the first step projects the distribution of new jobs by earnings. Using 2014 national data for each industry's occupational distribution, the number of new jobs in 22 occupational categories was calculated for each industry. Earnings were then estimated for these occupations for each of the 22 industries expected to occupy new development. These earnings were based on the median annual earnings for the respective occupation in May 2015 for the Boston Workforce Development Area adjusted for one year of inflation to reflect May 2016 dollars[20]. These calculations yielded the projected number of jobs at different annual earning levels by industry.

Since new employees will live in a variety of communities, it is necessary to determine the share that will demand housing in Boston. To estimate the percentage of new employees who will demand housing within the city, the study adapted results from a 2014 survey of Cambridge workers on the extent to which they moved to Cambridge as a result of obtaining a job in the city. Cambridge provided a reasonable proxy for Boston given its large employment base among educational institutions, technology firms and professional and technical service businesses. The survey results, in which 17.1% of Cambridge workers either moved to the city or sought housing in Cambridge but did not move there due to its high cost, were adjusted for differences in Boston's ratio of jobs to workers, reflecting the relative availability of jobs in Boston, and the share of city residents who work in Boston, to capture the higher propensity to both live and work in the city[21]. With these adjustments, the share of Boston workers who are expected to demand housing in Boston as a result of being hired for a new job at a DIP project is 23.8%[22]. This percentage was multiplied by the gross number of new jobs in each industry to estimate the number of new workers who will demand housing in Boston.

The occupational distribution for each industry was then applied to the number of workers in that industry who are expected to seek Boston housing to estimate their earnings distribution. To provide a picture of the resulting earning distribution, Table 23 summarizes this data by income category based on a single person household. While these figures show the earning distribution among projected new jobs in DIP projects, they are not the same as the number of households that will demand housing in each income category for two reasons: (1) many households will be larger and thus a higher income threshold will determine if they are very low-income, low-income or moderate-income; and (2) households with two workers will have higher incomes that reflect the earnings of both workers.

[20] The Boston Urban Wage Earner CPI was used for this inflation adjustment.

[21] These adjustments were made to capture differences that are likely to affect the percent of new workers who demand housing in Boston. Cambridge has more jobs relative to its workforce (1.86 compared to 1.78 in Boston), which indicates a higher density of employment that may make it easier for workers to find jobs and housing in close proximity. Boston has a higher share of Boston residents who work in their city of residence compared to Cambridge (66.5% versus 45.8%). Boston may attract more workers who want to live in an urban community and thus seek housing in the city and the large size and range of housing options may also contribute to this pattern. For these reasons, Boston appears different than Cambridge in the relationship of employment to housing demand that warrants some adjustment to the Cambridge survey results.

[22] The specific calculations to arrive at 23.8% was 17.1%* (1.78/1896)* (.665/.458) =23.8%.

Table 23. Distribution of Annual Earnings for Expected Jobs among New Employees Demanding Housing in Boston from New Development by Use and Earnings Level

Tenant Use/Industry	Gross New Jobs	Number Demanding Boston Housing	Number. with Earnings below 50% of AMI* (Very Low-income)	Number with Earnings 50 to 80% of AMI* (Low-income)	Number with Earnings 80% to 120% of AMI*	Total with Earnings Below 120% AMI* (Moderate-income)
Research and Development (Hospitals and Private Firms)	3,497	829	5	129	463	597
Office—IT Related	7,283	1,728	0	302	258	560
Office-Other	11,012	2,608	13	1,148	983	2,144
Colleges and Universities	1,285	307	11	87	171	269
Hospitals and Medical Offices	2,778	661	11	275	22	308
Retail and Personal Services	1,334	313	39	180	41	260
Restaurants	4,302	1,024	933	66	2	1,001
Hotel	810	192	62	109	13	184
Total	32,301	7,662	1,074	2,296	1,953	5,323

*Income level for annual earnings from one employee

The next step to project demand for affordable housing units among the 7,662 employees who are expected to seek housing in Boston requires considering the number of wage-earners and size of these workers' households. The most recent (2010 to 2014) American Community Survey data for Boston on the distribution of households by number of earners and household size were used to estimate the type of households for these employees. Workers in each occupation seeking housing in Boston were first divided into one-, two-, three- and four or more-person households based on the city's distribution[23]. Then each household size group was divided into one-, two- and three worker households, using the American Community Survey percentages (see Table 24).

[23] From the 2010 to 2014 ACS, the ratios for Boston are: 37.4% one-person, 31.5% two-person 14.6% three person and 16.5% four or more.

Table 24. Household Size by Number of Wage-Earners, City of Boston

Household Size	One Worker	Two Workers	Three Workers	Total
One Person Household	100.0%	0.0%	0.0%	100.0%
Two Person Household	41.8%	58.2%	0.0%	100.0%
Three Person Household	38.6%	40.1%	21.4%	100.0%
Four or More Person Household	30.0%	39.1%	30.9%	100.0%

Source: US Census 2010 to 2014 American Community Survey

For the single earner households, the average wage for the occupation was used to estimate their household income and determine if they fell below the very low-income, low--income and moderate-income thresholds for their respective household size. Among the single earner households who are expected to demand Boston housing, 951 are estimated to be very low-income (less than 50% of area median income), 1,241 are projected to be low-income (between 50% and 80% of area median income) and 1,475 are estimated as moderate-income (80% to 120% of area median income) for a total demand of 3,667 affordable housing units. Projecting affordable housing demand among multiple-earner households required estimating the earnings from other wage earners. To simplify this analysis, it was assumed that the second worker's earnings equaled the median wage for all occupations in Boston, which was $55,917 in May, 2016 dollars. This resulted in an additional 719 dual worker households from new development that will demand housing in Boston, all in the moderate-income category. No three worker households fall within the very low-, low- or moderate-income ranges.

Across all household sizes and income groups, the total number of affordable and middle-income housing units needed to meet the demand generated by new DIP development is 4,386 units. Table 25 summarizes the total projected demand for new housing by household size and among low-income, moderate-income and middle-income households.

Table 25. New Affordable Housing Demand in Boston from New Large Developments by Income Type and Household Size, 2017 to 2026

Income Group	One-Person Households	Two-Person Households	Three-Person Households	Four-Person Households	Total
Very Low-income	401	267	117	166	951
Low-income	860	244	101	36	1,241
Moderate-income	735	706	375	378	2,194
Total	1,996	1,217	593	580	4,386

Table 26. Boston Income Thresholds for Very-Low-income, Low-income and Moderate-income Households by Household Size

Income Group	One-Person Households	Two-Person Households	Three-Person Households	Four-Person Households
Very Low-income (50 % of Area Median Income)	$34,350	$39,250	$44,150	$49,050
Low-income (80% of Area Median Income)	$54,950	$62,800	$70,350	$78,500
Moderate-income (120% of Area Median Income)	$82,450	$94,200	$105,950	$117,150

Source: Boston Planning and Redevelopment Agency

Financing Gap Required to Mitigate Impact of Large Scale Development

This section builds upon the framework established in the affordable housing demand analysis to project the total financing gap required to mitigate the projected increased demand for affordable housing generated by large-scale developments in Boston. Housing affordability is a function of household income and the cost of available rental and for-sale housing units in a given real estate market. The City of Boston and the entire Metropolitan Boston region suffer from a well-known and demonstrated lack of sufficient affordable housing. This section calculates the financing gap required to create new affordable housing that satisfies the demand for it by new workers in new commercial and institutional development by comparing the total development cost of new affordable housing units to the housing prices that can be supported by very low, low, and moderate-income households. The basis for imposing a housing exaction on new non-residential development is that there is a nexus between job-creating development and the increased demand for affordable housing.

Methodology

Following is a summary of data and analyses used in calculating the projected total per square foot financing gap required from new non-residential development to support development of new affordable housing for workers. The financing gap would be for very low, low, and moderate-income households whose jobs would be located in Boston's new DIP buildings over the next 10 years.

The analyses establish that affordable rents and affordable sales prices do not currently support development of affordable housing, due to high development costs. Therefore, a financing gap exists that must be filled to stimulate affordable housing development. This analysis estimates the amount of this financing gap to be filled by the housing exaction collected from DIP projects. The estimated total required financing gap is the difference between the total development costs of producing new affordable housing units and the capitalized value of affordable rent and unit sale proceeds. The required financing gap is presented as a per square foot cost for projected non-residential development.

The previous section projected demand for new housing among 4,386 very low, low, and moderate-income households ranging in size from one person to four or more persons. This section determines the projected financing gap required to construct housing that will satisfy projected ten-year affordable housing demand generated by worker households in new development non-residential buildings, using a modified demand estimate of 4,390.[24] Following is a review of the methodology used to calculate the total financing gap required:

- Estimate the number of low-income, moderate-income and middle-income households that would be generated by the new development. Specify demand by number of persons in the household, number of bedrooms, and by tenure (i.e. renter occupied units and owner occupied units).
- Estimate the total development costs of affordable units to satisfy the demand created based on recent unit costs of new affordable housing developments recently completed or currently under construction.
- Estimate the potential capitalized revenue due to annual rents and sales proceeds of affordable units segmented by moderate-income, low-income and very low-income households.
- Calculate the difference between the total development costs and the capitalized revenue that is internally generated by renters and owners. This amount is the total financing gap required to produce the targeted new affordable units created by demand from new workers in new non-residential developments.
- Divide the total financing gap amount by the total non-residential square feet subject to calculate the housing exaction, based on the current policy for exempt square feet. This is the fee level required to generate the full financing gap needed to produce the new affordable units created by demand from new workers in new non-residential developments.

The majority of state and federal funding programs for affordable housing are targeted to low-income households. Federal and state tax credits prioritize creation of units for households below 50% AMI and 60% AMI. Therefore, because of the targeting of available funding sources, it is likely that much of the new affordable housing created in Boston will be targeted to these income levels. As the following analysis shows, the amount of the financing gap required to create housing for very low, low-income and moderate-income households is substantial. Yet moderate-income households are also increasingly finding housing to be unaffordable in Boston's housing market. Focusing on very low-income, low-income and moderate-income households will expand access to a broader range of funding sources to address the financing gap, enhancing development feasibility.

The following key assumptions were made to calculate the required housing financing gap.

[24] Due to the division of the 4,386 units among multiple categories of household size, rental units and ownership units, fractional units can result. Rounding is used to insure the analysis occurs for whole numbers of units, rather than partial housing units. Due to rounding results after the distribution of the 4,386 units across household size and rental versus ownership units, the total number of units demanded increased by four to maintain consistency and clarity of analysis by only used rounded whole numbers of rental and ownership units. The total number of units is four units higher than the housing unit demand presented earlier.

Mix of Rental and Ownership Units

New affordable housing has primarily been supplied through rental housing, due to the available financing from federal and state sources. This analysis assumes that the affordable housing to be demanded will be a mix of rental and ownership units. The estimated financing gap in this analysis assumes that:

- 50% of units for moderate-income households will be ownership units; and the remaining 50% will be rental.
- 10% of units for low-income households will be ownership units; and the remaining 90% will be rental.
- All of the units for very low-income households will be rental units.

Data in Table 27 show the distribution of rental and home ownership housing units by size and income level.

Table 27. New Affordable Housing Demand in Boston by Rental and Ownership Units

	Households by Size					
	One Person	Two Person	Three Person	Four Person	Total	Percent to Total
Distribution of Units						
Very Low-Income	401	267	117	166	951	22%
Low-Income	862	244	101	36	1,243	28%
Moderate-Income	736	706	376	378	2,196	50%
Total Units	**1,999**	**1,217**	**594**	**580**	**4,390**	**100%**
Percent of Households Demanding Rental Housing [1/]						
Very Low-Income	100%	100%	100%	100%		
Low-Income	90%	90%	90%	90%		
Moderate-Income	50%	50%	50%	50%		
Number of Rental Units [2/]						
Very Low-Income	401	267	117	166	951	30%
Low-Income	776	220	91	32	1,119	35%
Moderate-Income	368	353	188	189	1,098	35%
Total	**1,545**	**840**	**396**	**387**	**3,168**	**100%**
Percent of Households Demanding Ownership Housing [1/]						
Very Low-Income	0%	0%	0%	0%		
Low-Income	10%	10%	10%	10%		
Moderate-Income	50%	50%	50%	50%		
Number of Ownership Units [2/]						
Very Low-Income	0	0	0	0	0	0%
Low-Income	86	24	10	4	124	10%
Moderate-Income	368	353	188	189	1,098	90%
Total	**454**	**377**	**198**	**193**	**1,222**	**100%**
Units by Tenure (rounded)						
Rental	1,545	840	396	387	3,168	72%
Ownership	454	377	198	193	1,222	28%
Total [2/]	**1,999**	**1,217**	**594**	**580**	**4,390**	**100%**

1/ Source: City of Boston.

2/ Rounding affects totals and the total number of units demanded is increased by four in this table to maintain consistency and clarity of analysis focused on whole numbers of rental and ownership units. The total number of units is four units higher than the housing unit demand presented prior.

Note: Rounding may affect totals.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Unit Distribution for New Affordable Housing

The distribution of households by number of persons and income levels was derived prior. The households range in size from one to four or more persons. One-person households are assumed to be 75% studios and 25% one-bedroom units. Two-person households are allocated as 20% to one-bedroom units and 80% to two-bedroom units. Three-person households are allocated 80% to two-bedroom units and 20% to three-bedroom units. Four or more person households are allocated to three bedroom units. For the purposes of this analysis, the allocation of households by units by number of bedrooms is assumed to be the same for rental units and ownership units. Data in Table 28 show the estimated distribution of rental housing units by size and income levels (very low-income, low-income and moderate-income). Data in Table 29 show the mix of ownership units, including low-income and moderate-income households.

Table 28. Rental Units by Number of Persons and Number of Bedrooms for Low-Income and Moderate-income Households

	Households by Size				
	One Person	Two Person	Three Person	Four Person	Total
Number of Rental Units (rounded) [1/]					
Very Low-Income	401	267	117	166	951
Low-Income	776	220	91	32	1,119
Moderate-Income	368	353	188	189	1,098
Total	**1,545**	**840**	**396**	**387**	**3,168**
Distribution of Units by Number of Bedrooms					
Studio	75%	0%	0%	0%	37%
One Bedroom	25%	20%	0%	0%	17%
Two Bedrooms	0%	80%	80%	0%	31%
Three Bedrooms	0%	0%	20%	100%	15%
Total	**100%**	**100%**	**100%**	**100%**	**100%**
Distribution of Very Low-Income Rental Units					
Studio	301	0	0	0	301
One Bedroom	100	53	0	0	153
Two Bedrooms	0	214	94	0	308
Three Bedrooms	0	0	23	166	189
Total	**401**	**267**	**117**	**166**	**951**
Distribution of Low-Income Rental Units					
Studio	582	0	0	0	582
One Bedroom	194	44	0	0	238
Two Bedrooms	0	176	73	0	249
Three Bedrooms	0	0	18	32	50
Total	**776**	**220**	**91**	**32**	**1,119**
Distribution of Moderate-Income Rental Units					
Studio	276	0	0	0	276
One Bedroom	92	71	0	0	163
Two Bedrooms	0	282	150	0	432
Three Bedrooms	0	0	38	189	227
Total	**368**	**353**	**188**	**189**	**1,098**
Total Rental Units by Number of Bedrooms					
Studio	1,159	0	0	0	1,159
One Bedroom	386	168	0	0	554
Two Bedrooms	0	672	317	0	989
Three Bedrooms	0	0	79	387	466
Total Ownership	**1,545**	**840**	**396**	**387**	**3,168**

1/ See Table 27.

Note: Rounding may affect totals.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Table 29. Ownership Units by Number of Persons and Number of Bedrooms for Low-Income and Moderate-income Households

	Households by Size				
	One Person	Two Person	Three Person	Four Person	Total
Number of Ownership Units (rounded) [1/]					
Very Low-Income	0	0	0	0	0
Low-Income	86	24	10	4	124
Moderate-Income	368	353	188	189	1,098
Total	**454**	**377**	**198**	**193**	**1,222**
Distribution of Units by Number of Bedrooms					
Studio	75%	0%	0%	0%	28%
One Bedroom	25%	20%	0%	0%	15%
Two Bedrooms	0%	80%	80%	0%	38%
Three Bedrooms	0%	0%	20%	100%	19%
Total	**100%**	**100%**	**100%**	**100%**	**100%**
Distribution of Low-Income Ownership Units					
Studio	65	0	0	0	65
One Bedroom	21	5	0	0	26
Two Bedrooms	0	19	8	0	27
Three Bedrooms	0	0	2	4	6
Total	**86**	**24**	**10**	**4**	**124**
Distribution of Moderate-Income Ownership Units					
Studio	276	0	0	0	276
One Bedroom	92	71	0	0	163
Two Bedrooms	0	282	150	0	432
Three Bedrooms	0	0	38	189	227
Total	**368**	**353**	**188**	**189**	**1,098**
Total Ownership Units by Number of Bedrooms					
Studio	341	0	0	0	341
One Bedroom	113	76	0	0	189
Two Bedrooms	0	301	158	0	459
Three Bedrooms	0	0	40	193	233
Total Ownership	**454**	**377**	**198**	**193**	**1,222**

1/ See Table 27.

Note: Rounding may affect totals.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Historic Unit Costs

The costs metrics used to calculate the Total Development Cost are based on an inventory of 35 Boston housing projects with a total of 1,864 new units recently completed, under construction or in pre-development as of July 2016. Data in Table 30 show the average costs for the housing projects in Boston.

Table 30. Summary Development Costs by Project Type
Selected Housing Projects in the City of Boston

	Type of Project [1/]			All Project Total	All Project Average	Percent to Total
	High Rise	Mid Rise	Substantial Renovation			
Projects	5	20	10	35		
Total Units	575	972	317	1,864		
Average Units per Project	115	49	32		53	
Total SF	376,407	962,659	287,844	1,626,911		
Weighted Average SF per Unit	655	990	908		873	
	Average Development Costs Per Project					
Soft Costs	$5,797,479	$4,747,558	$3,572,888		$4,705,975	22.7%
Construction + Contingency	23,836,532	13,642,512	9,217,732		$15,565,592	75.2%
Acquisition Costs (Land and Buildings)	0	531,591	744,561		$425,384	2.1%
Total Development Costs	**$29,634,011**	**$18,921,660**	**$13,535,181**		**$20,696,951**	**100.0%**
	Average Development Costs per Unit					
Soft Costs	$50,413	$97,686	$112,709		$86,936	24.3%
Construction + Contingency	207,274	280,710	290,780		259,588	72.5%
Acquisition Costs (Land and Buildings)	0	10,938	23,488		11,475	3.2%
Total Development Costs	**$257,687**	**$389,335**	**$426,977**		**$358,000**	**100.0%**
	Average Development Costs per SF					
Soft Costs	$80	$101	$129		$103	24.1%
Construction + Contingency	319	288	329		$312	72.9%
Acquisition Costs (Land and Buildings)	0	11	28		$13	3.0%
Total Development Costs	**$399**	**$400**	**$486**		**$428**	**100.0%**

1/ High rise projects are over 6 stories, new construction buildings. Mid-rise projects are 3 to 4 stories, new construction buildings. Substantial renovations are gut rehabilitations of existing buildings.

Source: Boston Development and Planning Agency and ConsultEcon, Inc.

Calculation of Financing Gap Required

The following presents the analysis of estimated total development costs, supportable financing, and required financing gap for affordable housing units that need to be created in order to satisfy the new demand created by workers in new commercial developments in Boston over the next ten years. The analysis only presents selected tables that summarize the calculation of the required financing gap. Additional tables in Appendix B detail all assumptions and intermediate calculations that underlie the required calculations.

Development Project Costs

The average costs of housing development projects supplied by the Boston Planning and Redevelopment Agency (BPDA) are used as the basis for calculating the costs of new affordable housing in Boston over the next ten years. It is likely, however, that housing development costs will vary considerably according to the particulars of individual projects and may change over time.

In the past, large development projects have benefited from low or no acquisition costs. According to the BPDA and Department of Neighborhood Development, there are few large city owned land parcels that can support development of thousands of housing units and so the cost of land and building acquisition may be higher in the future thus increasing the cost to provide affordable housing.

Rental Housing

Data in Table 31 summarize total development costs (TDC) of developing affordable rental units in Boston.

Table 31. Calculation of Total Development Costs of Affordable Rental Housing Units in Boston

Project and Cost Assumptions		
Number of Units	3,168	
Average Unit Size GSF [1/]	897.4	
Total Project GSF	2,843,000	
Cost Assumptions [2/]		
Soft Costs, including Design, Permitting, Overhead, Profit, and Contingency, as a Percent of Construction Cost	30.2%	
Construction Cost and Construction Contingency per SF	$312	
Land/Acquisition per Unit Costs	$11,475	
Development Costs	**Amount**	**Percent to Total**
Soft Costs, including Design, Permitting, Overhead, and Developer's Fee, and Project Contingency	$268,233,721	22.5%
Construction Cost and Construction Contingency	887,216,111	74.4%
Land/Acquisition	36,353,677	3.1%
Total Development Costs (TDC)	**$1,191,803,508**	**100.0%**
TDC per Unit	***$376,201***	
TDC per GSF	***$419***	

1/ See Table C-1 in Appendix for mix of units by size.

2/ Development cost assumptions are based on average costs for recent experience of selected housing projects in Boston, including high-rise and mid-rise new construction projects and substantial and moderate renovation projects. Due to the variation in the size of the units demanded, construction costs are based on project size in square foot costs, with percentage increase for soft costs and per unit aquisition costs for land and buildings.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Ownership Housing

Data in Table 32 summarize TDC of developing affordable ownership units in Boston. The development cost factors used for ownership housing is the same as rental housing due to the small number of ownership projects included in the available housing data supplied by the BPDA. Further, the cost of rental housing on a per square foot basis is considered representative of the costs for multi-family ownership housing. Total development costs per unit are higher for ownership units than for rental units because they are expected to house large households on average and thus have a larger average unit size.

Table 32. Calculation of Total Development Costs of Affordable Ownership Housing Units in Boston over a 10-Year Period

Project Assumptions		
Number of Units	1,222	
Average Unit Size GSF [1/]	958.3	
Total Project GSF	1,171,000	
Cost Assumptions [2/]		
Soft Costs, including Design, Permitting, Overhead, Profit, and Contingency, as a Percent of Construction Cost	30.2%	
Construction Cost and Construction Contingency per SF	$312	
Land/Acquisition per Unit Costs	$11,475	
Development Costs	**Amount**	**Percent to Total**
Soft Costs, including Design, Permitting, Overhead, and Developer's Fee, and Project Contingency	$110,482,479	22.6%
Construction Cost and Construction Contingency	365,434,423	74.6%
Land/Acquisition	14,022,788	2.9%
Total Development Costs (TDC)	**$489,939,690**	**100.0%**
TDC per Unit	***$400,933***	
TDC per GSF	***$418***	

1/ See Table C-2 in Appendix for mix of units by size.

2/ Development cost assumptions are based on average costs for recent experience of selected housing projects in Boston, including high-rise and mid-rise new construction projects and substantial and moderate renovation projects. Due to the variation in the size of the units demanded, construction costs are based on project size in square foot costs, with percentage increase for soft costs and per unit aquisition costs for land and buildings.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Rental Housing Development Project Revenue

An important step in calculating the financing gap required to create new affordable housing units is to define the development project's revenue that will be used to support the development and operations of new affordable housing. This analysis assumes that the new rental housing will solely be supported by rental income from tenant households and ownership housing will be supported by the sales of affordable units. Affordable rents and sales prices are based on household income. In prior sections of this report, annual occupational wages were the input for establishing the household income and resulting demand for affordable housing by low, moderate and middle-income households of new workers in new commercial and institutional development in Boston. The weighted average gross income for each income level, as shown by the data in Table 33, is the basis for calculating affordable rents and sales prices that in turn support the development of affordable housing.

Table 33. Weighted Average Income by Income Group and Household Size, Households of Workers in Projected Non-Residential Development

	Households by Number of Persons			
	One Person	Two Person	Three Person	Four Person
Distribution of Weighted Average Income				
Very Low-Income	$26,616	$31,507	$31,734	$33,919
Low-Income	$41,672	$49,354	$50,456	$63,935
Moderate-Income	$73,690	$84,876	$84,876	$85,774

Source: Bureau of Labor Statistics, Karl F. Seidman Consulting Services; and, ConsultEcon, Inc.

The financing gap for new affordable rental housing is calculated first, followed by the calculation of the required financing gap for affordable ownership housing.

Affordable Rent Levels

The affordable rents for rental units are based on the estimated annual income of workers in the new commercial developments in Boston. Construction of the rental affordable housing units projected in this analysis are supported by rental revenue from tenants with additional funding sources used to fill the gap between rental revenue and the cost of developing the housing. In general, the federal department of Housing and Urban Development (HUD) is a source of much of the funding for affordable housing. HUD defines housing costs as affordable to a household when the total cost of shelter consumes no more than 30% of gross (total) income. For this analysis, households are assumed to pay 30% of household income in rent. Data in Table 34 detail the assumed income levels of households to derive the total gross rental revenue for the units, based on the distribution of households by size and income. Total annual gross rental revenue for the units is estimated at $50.3 million.

Table 34. Annual Rental Revenue by Household Income and Size of Household

Household Size	Annual Income [1/]	Applicable Monthly Rent [2/]	Number of Households	Total Annual Rent
Very Low-Income Households				
1 Person	$26,616	$665	401	$3,199,980
2 Persons	$31,507	$788	267	$2,524,752
3 Persons	$31,734	$793	117	$1,113,372
4 Persons	$33,919	$848	166	$1,689,216
Low-Income				
1 Person	$41,672	$1,042	776	$9,703,104
2 Persons	$49,354	$1,234	220	$3,257,760
3 Persons	$50,456	$1,261	91	$1,377,012
4 Persons	$63,935	$1,598	32	$613,632
Moderate-Income Households				
1 Person	$73,690	$1,842	368	$8,134,272
2 Persons	$84,876	$2,122	353	$8,988,792
3 Persons	$84,876	$2,122	188	$4,787,232
4 Persons	$85,774	$2,144	189	$4,862,592
Total Households / Housing Units			**3,168**	
Total Annual Rent				**$50,251,716**

Aggregate Annual Rent by Income Level	Number of Units	Total Annual Rent (Rounded)	Percent of Total Rent	Average Monthly Rent
Very Low-Income	951	$8,527,320	17.0%	$747
Low-Income	1,119	$14,951,508	29.8%	$1,113
Moderate-Income	1,098	$26,772,888	53.3%	$2,032
Total	**3,168**	**$50,251,716**	**100.0%**	**$1,322**

1/ Weighted average annual earnings based on anticipated mix of occupations and wages in new non-residential development in Boston.

2/ Assumed at 30% of monthly income. Rents are rounded to nearest $1.

Note: Rounding may affect totals.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

To calculate the rental revenue available to support the total development costs described above, the gross rents must be adjusted to reflect lost revenue due to periodic vacancies and the operating costs of maintaining and managing housing. As shown by data in Table 35, vacancy is assumed at 4% of gross rental revenue. Operating costs typically include such items as building management, janitorial services, trash removal, building maintenance, landscaping, and marketing and other administrative costs. For this analysis, the full cost of utilities is also included. Based on estimates from the City of Boston, total operating costs were calculated as

$7,750 per unit. Net rental income after deducting vacancy and operating costs is estimated at $23.7 million.

Table 35. Summary of Financing Gap for Affordable Housing Rental Units

			By Household Type		
		All Units	Very Low Income	Low Income	Moderate Income
Potential Development Costs					
Number of Units		3,168	951	1,119	1,098
Percent to Total			*30.0%*	*35.3%*	*34.7%*
TDC per Unit		$376,201	$394,954	$326,887	$410,215
TDC per GSF		$419	$419	$419	$419
Total Gross Square Footage (GSF)		2,843,000	896,000	873,000	1,074,000
Total Development Costs (TDC) (Rounded)		**$1,191,804,000**	**$375,601,000**	**$365,787,000**	**$450,416,000**
Net Rental Income	**Unit Factor**	**Amount**	**Amount**	**Amount**	**Amount**
Gross Annual Rent [1/]		$50,251,716	$8,527,320	$14,951,508	$26,772,888
Less Vacancies [2/]	4% of Gross Rent	($2,010,069)	($341,093)	($598,060)	($1,070,916)
Less Total Operating Costs [2/]	$7,750 per Unit	($24,552,000)	($7,370,250)	($8,672,250)	($8,509,500)
Net Operating Income (NOI)		**$23,689,647**	**$815,977**	**$5,681,198**	**$17,192,472**
Mortgage / Supportable Debt Calculation		**Amount**	**Amount**	**Amount**	**Amount**
Net Operating Income (NOI)		$23,689,647	$815,977	$5,681,198	$17,192,472
Debt Coverage Ratio [3/]		1.1	1.1	1.1	1.1
Available for Debt Service		$21,536,043	$741,797	$5,164,725	$15,629,520
Mortgage Constant [3/]		6.094%	6.094%	6.094%	6.094%
Permanent Mortgage / Supportable Debt (Rounded)		**$353,369,000**	**$12,172,000**	**$84,744,000**	**$256,453,000**
Supportable Equity Calculation		**Amount**	**Amount**	**Amount**	**Amount**
Required Return on Equity		8.0%	8.0%	8.0%	8.0%
Revenue Available for Return to Equity		$2,368,965	$81,598	$568,120	$1,719,247
Supportable Equity Investment (Rounded)		**$29,612,000**	**$1,020,000**	**$7,101,000**	**$21,491,000**
Financing Gap Calculation		**Amount**	**Amount**	**Amount**	**Amount**
Total Development Costs		$1,191,804,000	$375,601,000	$365,787,000	$450,416,000
Less Permanent Mortgage / Supportable Debt		($353,369,000)	($12,172,000)	($84,744,000)	($256,453,000)
Less Supportable Equity		($29,612,000)	($1,020,000)	($7,101,000)	($21,491,000)
Financing Gap (TDC-Mortgage-Equity)		**$808,823,000**	**$362,409,000**	**$273,942,000**	**$172,472,000**
Financing Gap as a Percent of TDC		*67.9%*	*96.5%*	*74.9%*	*38.3%*

1/ See Table 34.

2/ Source: City of Boston, Boston Planning and Development Agency and Department of Neighborhood Development staff input.

3/ Source: ConsultEcon calculation of mortgage constant based on interest rates from the Massachusetts Housing Partnership.

Note: Rounding may affect totals.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Rental Affordability Gap & Required Financing Gap

The next step is to find the gap in project finance between the permanent mortgage and developer equity that the net rental income can support and the total development costs of the rental units. In general, the amount of loan that lenders will approve is based on the income stream from the project. In this case, the annual net income from rents is $23.7 million. However, lenders prefer to build into their mortgage calculations a cushion between projected net income from rents and the annual debt service needed to pay down the loan. The debt coverage ratio (ratio of net income to allowable debt) reduces the effective amount of net income that can be used to support a mortgage. This analysis assumes a debt coverage ratio of 1.1, based on permanent financing programs offered by the Massachusetts Housing Partnership. After adjusting the net income by the debt coverage ratio, the project has $21.5 in annual net income with which to pay the debt service on a permanent mortgage.

The total allowable permanent loan is calculated by dividing the net income by the mortgage constant, based on a 6.094% mortgage constant, (assuming the available current Massachusetts Housing Partnership financing rate amortized over a 30 year period). The permanent loan that could be supported by the resident households is $353.4 million. The annual revenue not required for the mortgage is then available to support equity investment. Based on a required return of 8.0%, this revenue would support $29.6 million in equity investment. Given the total development costs of $1,191.8 million, the financing gap required to create 3,168 new affordable rental housing units is $808.8 million, approximately 68% of the total development cost (TDC).

Ownership Housing Development Project Revenue

The average sales price of affordable units sold in Boston is the basis for estimating the sales proceeds available to support the creation of affordable ownership units in Boston. As shown by analysis in Table 36, the "affordable" sales price is derived based on 30% of gross income spent on housing and estimates of housing costs, the same as rental housing. Housing costs for ownership units include mortgage payments based on assumed down payment on the home, private mortgage insurance, real estate taxes and condo fees. It is assumed that very low-income units are all rental units, so estimates of sales prices based on very low- income earnings was not prepared.

Table 36. Aggregate Affordable Ownership Unit Sales by Household Income and Size of Unit

Household Size	Annual Income [1/]	Monthly Housing Costs [2/]	Number of Households [3/]	Supportable Sales Price [4/]	Total Sales
Low Income					
Studio	$41,351	$1,034	65	$173,488	$11,276,720
One bedroom	$43,571	$1,089	26	$185,034	$4,810,884
Two bedrooms	$50,046	$1,251	27	$216,505	$5,845,635
Three bedrooms	$59,442	$1,486	6	$262,158	$1,572,948
Moderate Income Households					
Studio	$73,690	$1,842	276	$320,859	$88,557,084
One bedroom	$78,354	$1,959	163	$342,871	$55,887,973
Two bedrooms	$85,033	$2,126	432	$374,290	$161,693,280
Three bedrooms	$85,474	$2,137	227	$376,360	$85,433,720
Total Households / Housing Units			**1,222**		
Total Sales					**$415,078,244**

Aggregate Sales by Income Level	Number of Units	Total Sales	Percent of Total	Average Sales Price
Low Income	124	$23,506,187	5.7%	$189,566
Moderate Income	1,098	$391,572,057	94.3%	$356,623
Total	**1,222**	**$415,078,244**	**100.0%**	**$339,671**

1/ See Appendix Table C-3.

2/ Assumed at 30% of monthly income. Rounded to nearest $1.

4/ See sales price analysis in Appendix C-4. Rounded to nearest $1.

Note: Rounding may affect totals.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Ownership Housing Required Financing Gap

The affordability gap in project financing of ownership units is the difference between the TDC and the proceeds from the sale of the estimated required 1,222 ownership units. Based on the mix of units and the assumed sales prices, the total estimated sales proceeds are $415.1 million. Assuming TDC of $489.9 million, the estimated financing gap for 1,222 affordable home ownership units is $74.9 million, approximately 15% of the TDC. Data in Table 37 summarize the financing gap required for ownership units.

Table 37. Summary of Financing Gap Required for Affordable Ownership Housing

				By Household Type	
			All Units	Low Income	Moderate Income
Potential Development Costs					
Number of Units			1,222	124	1,098
Percent to Total				*10.1%*	*89.9%*
TDC per Unit			$400,933	$326,250	$409,367
TDC per GSF			$418	$418	$418
Total Gross Square Footage (GSF)			1,171,000	97,000	1,074,000
Total Development Costs (TDC) (Rounded)			**$489,940,000**	**$40,455,000**	**$449,485,000**
Aggregate Unit Sales Proceeds	**Units**	**Average Price**	**Sales Proceeds**	**Sales Proceeds**	**Sales Proceeds**
Low Income	124	$189,566	$23,506,187	$23,506,187	$0
Moderate Income	1,098	$356,623	$391,572,057	$0	$391,572,057
Total Sales Proceeds (Rounded)	**1,222**	**$339,671**	**$415,078,000**	**$23,506,000**	**$391,572,000**
Financing Gap Calculation			**Amount**	**Amount**	**Amount**
Total Development Costs			$489,940,000	$40,455,000	$449,485,000
Less Sales Proceeds			($415,078,000)	($23,506,000)	($391,572,000)
Financing Gap (TDC-Sales Proceeds)			**$74,862,000**	**$16,949,000**	**$57,913,000**
Financing Gap as a Percent of TDC			*15.3%*	*41.9%*	*12.9%*

Note: Rounding may affect totals.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Required to Satisfy Ten-Year Affordable Housing Demand

The total development costs for rental and ownership units in Boston that satisfy the demand for new affordable housing due to worker in new non-residential developments is $1.7 billion. The total financing gap required for the rental and ownership units is $883.7 million, approximately 53% of the TDC. The total financing gap is then divided by the total estimated commercial and institutional development building area that is non-exempt from the housing exaction, as shown by data in Table 38. Of the total 13.7 million square feet of commercial space an estimated 10.3 million square feet is not exempt, 75% of the projected total, based on current policy and an average project size of 400,000 square feet. Therefore, the total financing gap required is estimated at $85.55 per square foot of non-residential development.

Table 38. Unadjusted Calculation of Financing Gap Required for New Affordable Rental and Ownership Units per Square Foot of Projected Non-Residential Development

	All Units	Very Low Income	Low Income	Moderate Income
Total Development Cost [1/]	$1,681,744,000	$375,601,000	$406,242,000	$899,901,000
Total Financing Gap Required [1/]	$883,685,000	$362,409,000	$290,891,000	$230,385,000
Percent TDC that is the Financing Gap	52.5%	96.5%	71.6%	25.6%
Derivation of Commercial Square Footage Subject to Housing Exaction				
Total Commercial Square Footage [2/]	13,729,500	13,729,500	13,729,500	13,729,500
Square Footage Exempt from the Housing Exaction under Current Policy [3/]	3,400,000	3,400,000	3,400,000	3,400,000
Commercial Square Footage Subject to the Housing Exaction	10,329,500	10,329,500	10,329,500	10,329,500
Financing Gap per Square Foot of New Commercial Development [4/]	**$85.55**	**$35.08**	**$28.16**	**$22.30**

1/ See Table 35 and Table 37 for detail on breakdown by rental and ownership units.

2/ See Section 2 for information on estimates of total commercial square footage.

3/ Per the City of Boston Incentive Zoning Ordinance, the first 100,000 SF of non-residential building area is exempt from the Housing Exaction. It is assumed that non-residential projects in the future average approximately 400,000 GSF, for a total of 34 projects. Across all projects, 3.4 million SF is assumed to be exempt from the Housing Exaction, per the current ordinance.

4/ Total Financing Gap divided by the total Commercial Square Footage Subject to the Housing Exaction.

Note: Rounding may affect totals.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Modified Financing Gap Required Based on Other Funding Sources

This analysis calculates the full cost of the financing gap due to the housing demand generated by workers of households in projected large-scale developments in the City of Boston. Boston has relatively high affordable housing development costs, given the scarcity of vacant land, and high costs. The purpose of affordable housing is to limit the rental or mortgage payments of low-income households to 30% which is considered "affordable"; this creates a limited revenue stream to finance development costs. Therefore, the City and developers are challenged to find additional sources of funding to fill the gap between the rents and sales proceeds that very low, low, and moderate-income families can afford and the development financing that would be incurred by affordable housing developers. Since most affordable housing developers layer multiple funding sources to support the construction of new housing units, the housing exaction will work in conjunction with other financing sources to fill the $883.7 million financing gap.

The housing exaction due to new commercial development is contributed to the Neighborhood Housing Trust (NHT). Because there are other sources of funding available for development of new affordable housing in Boston, the housing exaction to the NHT does not have to provide all the gap funds needed to build affordable housing. On average, NHT funds have represented 5.2% of the total financing gap used in NHT funded affordable rental housing projects and 11.2% of NHT funded affordable ownership housing projects permitted since 2011 in Boston, as shown by data in Table 39. Overall, the total City funds including NHT and other funds accounted for 12.2% of rental projects, and 100% of ownership projects (of which there was only one in the sample). It should be noted that most of the funds for affordable housing are available only to projects targeting very low and low-income households.

Table 39. Sources of Funds for NHT Funded Affordable Housing Projects in Boston Permitted Since 2011 (in Nominal Dollars)

	Rental Projects (20) [1/]		Ownership Projects (1) [1/]	
	Residential TDC	Percent to City Sources	Residential TDC	Percent to City Sources
City Affordable Housing Funding Sources				
Neighborhood Housing Trust (NHT)	$16,213,912	42.7%	$750,000	11.2%
CityHOME	13,900,951	36.6%	0	0.0%
City Budget (LTW/2030)	2,714,073	7.1%	0	0.0%
Inclusionary Dev Funds	3,153,958	8.3%	5,921,771	88.8%
Community Development Block Grant (CDBG)	0	0.0%	0	0.0%
Other City	1,715,000	4.5%	0	0.0%
Boston Redevelopment Authority	276,000	0.7%	0	0.0%
City Funding Sources	**$37,973,894**	**100.0%**	**$6,671,771**	**100.0%**
All Sources of Funds for Affordable Housing	Residential TDC	Percent to Total Sources	Residential TDC	Percent to Total Sources
Affordable Housing Financing Gap Funds				
City NHT	$16,213,912	4.7%	$750,000	3.6%
City Other	21,759,982	6.3%	5,921,771	28.5%
Commonwealth Grant and Debt Programs	77,433,271	22.4%	0	0.0%
Tax Credits/Federal Funds	194,798,584	56.4%	0	0.0%
Total Financing Gap Funds	**$310,205,749**	**89.8%**	**$6,671,771**	**32.1%**
Debt/Equity	35,118,353	10.2%	14,113,574	67.9%
Total Sources of Funds	**$345,324,102**	**100.0%**	**$20,785,345**	**100.0%**
Total Financing Gap Funds (NHT + Other Sources of Financing Gap Funds)	**$310,205,749**		**$6,671,771**	
NHT Percent of Total Financing Gap Funds [3/]	***5.2%***		***11.2%***	
NHT "Leverage" Ratio, NHT to Other Financing Gap Funds [4/]	***18.13***		***7.90***	
City Percent of Total Financing Gap Funds [3/]	***12.2%***		***100.0%***	
City "Leverage" Ratio, City Funds to Other Financing Gap Funds [4/]	***7.17***		***0.00***	

1/ Source: City of Boston. Based on NHT funded projects, including 20 rental projects and 1 ownership project.

2/ CDBG = Community Development Block Grant. HOME funds are another federal program that supports housing.

3/ NHT or total City contribution divided by the Total Financing Gap Funds.

4/ The leverage ratio is equal to the Other Sources of Financing Gap Funds divided by NHT or total City contribution.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Housing Exaction Level Scenarios

Data in Table 40 show housing exaction level scenarios including scenarios that model various percentages of the full financing gap required, including 10%, 25%, 50% and 100% of the full financing gap, as well as applying the historic ratio of NHT and total City funds to total funds needed to fill the full financing gap. Increasing NHT's share of the required financing gap to leverage more state funds and counteract the decline in federal funds may be required in order to produce the level affordable housing required to satisfy the new demand from commercial development. According to the Department of Neighborhood Development, funds from the Commonwealth have been relatively stable, while federal funds have been declining over time. There is a new Federal Program, the National Housing Trust that is funded from Fannie and Freddie profits that is targeted to very low-income, but it does not represent a large fund -- all of Massachusetts received $3 million in the most recent year. NHT funding is an important component of the City's affordable housing production and has a substantial impact because the Commonwealth requires the City to provide matching funding as a way of investing in its own affordable housing projects. Without City generated sources like NHT and IDP, the City would not have the primary sources of funding to leverage state funds effectively.

Table 40. Housing Exaction Scenarios for the City

	Factor	Linkgage Fee Scenarios
Total Financing Gap per Square Foot of Commercial Development		$85.55
Housing Exaction Scenarios		
Current NHT Share of Existing Affordable Housing Funds to Fill the Financing Gap [1/]	5.7%	$4.91
Current Total City Share of Existing Affordable Housing Funds to Fill the Financing Gap [1/]	19.7%	$16.83
10% of the Full Financing Gap	10.0%	$8.55
25% of the Full Financing Gap	25.0%	$21.39
50% of the Full Financing Gap	50.0%	$42.77
Full Financing Gap	100.0%	$85.55

1/ The factors used in this analysis are weighted based on the mix of rental and owner units in the calculation of the financing gap of affordable housing demand due to commercial development. For 20 NHT rental projects in the past, the NHT accounted for 5.2% of financing gap funds and total City sources accounted for 12.2% of financing gap funds. For 1 NHT ownership project in the past, the NHT accounted for 11.2% of financing gap funds and total City sources accounted for 100% of financing gap funds.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

New Development, Resident Employment and Jobs Exaction

New large scale development projects in Boston will create new jobs with the potential to benefit Boston residents, and especially improve employment and earnings for low-income residents. The job exaction fee is warranted to address specialized employment and training services that are needed to allow Boston residents to gain access to the employment opportunities and share in the benefits from new large scale development. Such services may be needed either if there is a lack of available Boston workers with the specific occupational skills demanded by employers in new development or if workers have more general gaps in education, skills or experience that pose barriers to their employment. Occupational and job specific training services are warranted to address the first situation while basic education and job readiness programs address the latter need. Both services may be needed, and in many cases combined into an integrated skills training program, to ensure that Boston's unemployed and low-income residents have equitable access to jobs created by new development.

A three part methodology was used to analyze the need for employment and job training services to link Boston residents to the jobs created by the expected new development. First, an analysis of the potential occupation supply gaps for jobs in DIP projects over the next ten years was completed. This analysis used the occupational composition of projected industries expected to occupy new DIP projects to estimate the expected number of new jobs in different occupations. This data was then compared to the occupational composition of Boston's workforce to identify occupations for which the supply of existing residents may be insufficient to meet this new demand. Information on the capacity of existing job training programs to supply new workers was then considered in estimating the occupational supply gap. Recent research and labor reports related to occupational supply gaps also were reviewed to provide further context and information on this aspect of needed workforce development services. Some studies focused on Massachusetts or the greater Boston region but are still relevant since they address industries, occupations and labor force segments typical for Boston. The second part of the analysis considers employment barriers faced by Boston residents beyond occupational skills that can impact their access to employment across occupations, drawing on ACS data, interviews with workforce agencies and labor market reports. Finally, the analysis draws on the broader understanding of labor market trends, occupational supply needs, and the demand for education and training services gained from interviews with workforce development practitioners.

Labor Supply Gaps

Table 41 compares the expected number of jobs in major occupational categories to ACS data from 2011 to 2013 on the number of Boston workers in these occupations. For nine occupational groups, the number of new jobs is a small share of the current workforce at less than 5%. Consequently, there is likely to be a good supply of Boston residents within these occupations to address employer needs, although mismatches may exist based on unique employer needs or more specialized occupations. In another eight occupations, new employment in DIP projects falls between 5% and 10% of Boston's workforce, which may make it more difficult to locate city residents for these jobs. Moreover, 55% of these jobs are in high skill and high wage

management and health care practitioner occupations that are less likely to benefit low-income residents. For a final set of six occupational groups, projected new DIP jobs account for a large share of the current workforce, ranging from 12.9% (Administrative Support Occupations) to 43.6% (Computer and Math Occupations). Two of these occupational groups, Food Preparation and Serving Occupations and Office and Administrative Support Occupations are sources of entry level jobs for low-income and less educated workers and account for over half of the jobs in these "tight demand" occupations. Although the remaining four "tight demand" occupational groups are dominated by high skill jobs that require college or advanced degrees, some include technician and support occupations that are accessible with a two-year college degree or certificate program.

Table 41. Comparison of Expected Occupational Demand and Boston Workforce by Major Occupational Groups

Occupational Group	Estimated New Jobs in DIP Projects	Number of Boston Residents in Occupation	New Jobs as Percentage of Boston Residents in Occupation
Management Occupations	2,517	35,218	7.1%
Business and Financial Operations Occupations	3,698	26,633	13.9%
Computer and Mathematical Occupations	5,400	12,384	43.6%
Architecture and Engineering Occupations	1,513	5,268	28.7%
Life, Physical, and Social Science Occupations	1,197	8,871	13.5%
Community and Social Service Occupations	101	7,883	1.3%
Legal Occupations	84	7,253	1.2%
Education, Training, and Library Occupations	712	24,129	3.0%
Arts, Design, Entertainment, Sports, and Media Occupations	666	10,273	6.5%
Healthcare Practitioners and Technical Occupations	1,830	19,768	9.3%
Healthcare Support Occupations	485	9,895	4.9%
Protective Service Occupations	119	8,417	1.4%
Food Preparation and Serving Related Occupations	4,288	23,380	18.3%
Building, Grounds Cleaning and Maintenance Occupations	452	14,804	3.1%
Personal Care and Service Occupations	219	14,120	1.6%
Sales and Related Occupations	1,905	29,376	6.5%
Office and Administrative Support Occupations	5,417	41,990	12.9%
Farming, Fishing, and Forestry Occupations	8	378	2.1%
Construction and Extraction Occupations	177	9,163	1.9%
Installation, Maintenance, and Repair Occupations	308	4,087	7.5%
Production Occupations	573	8,428	6.8%
Transportation and Material Moving Occupations	632	12,513	5.1%
Total, All Occupations	32,301	334,231	9.7%

Source: Karl F. Seidman Consulting and American Community Survey 2010-2014 5- year estimates

Additional analysis was conducted on three mid-level jobs in occupational groups with "tight demand" that are more accessible to low-income and non-college educated workers. These include: computer support specialists, life, physical and social science technicians, and drafters, engineering, and mapping technicians. The results of this analysis are shown in Table 42 and indicate that demand in all three of these occupations will likely be tight, as the projected demand ranges from 17.1% to 36% of the supply among Boston's workforce. Potential supply gaps appear particularly high for two of these occupations: for Computer Support Specialists and Drafters, Engineering, and Mapping Technicians, projected demand equals 36% and 31.4% of Boston's workforce, respectively.

Table 42. Comparison of Expected New Demand and Boston Workforce for Three Targeted Technology Related Occupations

Occupation	Projected New Jobs*	Number of Boston Workers	New Jobs as Percentage of Boston Workers
Computer support specialists	773	2,147	36.0%
Drafters, engineering, and mapping technicians	326	1,038	31.4%
Life, physical, and social science technicians	371	2,166	17.1%

Source: Karl F. Seidman Consulting and American Community Survey 2011-2013 3 year estimates
*Based on 13 industries with demand for these occupations

Overall, the City of Boston has a tight labor market with strong employment growth and low unemployment rates. Boston's unemployment rate was 4% in July 2016, and it varied between 3.9 and 5% over the prior twelve months. The *2014 Massachusetts Economic and Labor Market Review* characterized Boston as one of three tight labor markets in Massachusetts and with an unemployment rate of 5.3% in 2014, a 6.2% wage growth rate and a .50% ratio of unemployed workers to job openings. By the last two measures Boston was Massachusetts' tightest labor market. Since 2014, Boston's labor market has likely grown tighter as the economy has continued to grow and the number of unemployed workers has declined by 20%. These overall tight labor market conditions indicate that employers may have difficulty finding workers and face increased employee turnovers as workers have more opportunities for career advancement and are less concerned about the risk of job loss.

In the context of Boston's Jobs Exaction Policy, it is important to understand specific occupational and skills gaps and their relationship to projected employment demand from DIP projects. A 2015 report by Northeastern University's Dukakis Center[25] projected future occupation demand for Massachusetts and its Workforce Investment Areas and analyzed the capacity of the existing vocational education system to address this expected demand. This study found that the majority of job openings in Massachusetts through 2022 will not require a

[25] *Meeting the Commonwealth's Workforce Need: Occupation Projections and Vocational Education*, Northeastern University Kitty and Michael Dukakis Center for Urban and Regional Policy, October, 2015.

college degree and can be met through no more than a vocational education or associate's degree. The four occupational groups with the highest projected job openings are:

- Food Preparation and Serving Related Occupations;
- Office and Administrative Support Occupations;
- Sales and Related Occupations; and
- Healthcare Practitioners and Technical Occupations.

These four categories combine to account for 43% of the state's expected job openings between 2012 and 2022.

The report also found that the state's existing vocational education system only has the capacity to fill a small share of the projected job openings through 2020 in positions that do not require a college degree. Statewide, high school and community college programs can fill close to 15.7% of future jobs requiring a high school degree or less, 11% of job openings requiring some college; and 23% of job openings requiring an associate's degree. The gap in high school and community vocational education capacity is much greater for Boston, which has only two vocational high schools. Based on the study's analysis of current graduation rates only 7.1% of future jobs requiring a high school degree or less, 3.1% of job openings requiring some college; and 5.8% of job openings requiring an associate's degree will be filled through the city's vocational high schools and community colleges. However, this capacity varies considerably across occupational groups, as shown in Table 43. Boston has the highest capacity to meet expected job openings for Arts, Design, Entertainment, Sports, and Media occupations, Architectural and Engineering Occupations and Computer and Mathematical Occupations, 19.6%, 16% and 11.3%. For these three categories, capacity is especially strong for jobs requiring only a high school degree—supplying two-thirds to over 100% of expected demand. Capacity to fill jobs requiring an associate's degree is also relatively strong, at close to one-third, for the Architectural and Engineering and Arts, Design, Entertainment, Sports, and Media occupations.

Based on the Northeastern Report, the vocational education supply capacity is especially low for three occupational areas in which DIP projects are expected to generate large numbers of new jobs:

- Food Preparation and Serving Related Occupations: 1.1% of expected job openings with an average annual wage of $29,850[26];
- Office and Administrative Support Occupations: 0.8% of expected job openings with an average annual wage of $44,774; and
- Sales and Related Occupations: 2.7% of expected job openings with annual average wage of $38,750.

[26] Annual wage figures are from the May 2015 US Bureau of Labor Statistics Occupational Employment and Wage Statistics.

These findings highlight the importance of Boston's non-profit community-based training providers in meeting future workforce needs and the need for expanded investment in Boston's vocational and job training systems to prepare Boston residents and workers for future jobs. Moreover, expanded training capacity appears particularly important to address the type of jobs that will arise from business and employment growth at DIP projects.

Table 43. Supply of Annual New Graduates from College and Vocational Education System
Boston Workforce Investment Area

Occupational Group	Supply Share of Openings By Educational Level:				
	HS Graduate	Some College	Associate's Degree	BA	Total
Management Occupations	12.5%	3.0%	5.1%	2.0%	4.1%
Business and Financial Operations Occupations	14.8%	2.2%	2.5%	1.1%	2.4%
Computer and Mathematical Occupations	65.8%	10.9%	14.5%	5.1%	11.3%
Architecture and Engineering Occupations	102.3%	25.1%	39.4%	4.3%	16.0%
Life, Physical, and Social Science Occupations	1.4%	0.6%	0.5%	0.1%	0.4%
Community and Social Service Occupations	2.8%	1.2%	1.0%	0.3%	0.9%
Legal Occupations	0.0%	0.0%	0.0%	0.0%	0.0%
Education, Training, and Library Occupations	14.7%	3.3%	3.8%	3.9%	5.3%
Arts, Design, Entertainment, Sports, and Media Occupations	85.1%	16.6%	32.1%	8.7%	19.6%
Healthcare Practitioners and Technical Occupations	14.1%	3.9%	6.2%	1.9%	4.4%
Healthcare Support Occupations	10.1%	6.6%	11.3%	3.8%	8.2%
Protective Service Occupations	0.0%	0.0%	0.0%	0.0%	0.0%
Food Preparation and Serving Related Occupations	1.4%	0.8%	1.7%	0.4%	1.1%
Building and Grounds Cleaning and Maintenance Occupations	2.3%	2.1%	3.1%	0.5%	2.1%
Personal Care and Service Occupations	5.8%	2.7%	4.9%	0.8%	3.8%
Sales and Related Occupations	4.4%	1.5%	3.8%	2.0%	2.7%
Office and Administrative Support Occupations	1.1%	0.8%	1.2%	0.4%	0.8%
Construction and Extraction Occupations	4.5%	3.7%	7.5%	1.7%	4.3%
Installation, Maintenance, and Repair Occupations	17.0%	11.1%	17.0%	3.9%	13.9%
Production Occupations	34.2%	22.3%	41.2%	7.7%	28.6%
Transportation and Material Moving Occupations	3.5%	2.7%	3.6%	1.5%	3.0%
Total All Occupations	7.1%	3.1%	5.8%	2.1%	4.0%

Source: *Meeting the Commonwealth's Workforce Needs: Occupation Projections and Vocational Education*

Employment Barriers for Boston Residents

Beyond the occupational labor imbalances discussed above, Boston workers may not have access to jobs at new development projects due to more general barriers to employment, such as lack of English language skills, poor reading and math skills, low educational attainment, limited work

experience, prior criminal record and other factors. Boston has a well-educated and experienced workforce, but there is a sizable portion of the city's labor force that faces language and educational barriers to employment. Based on ACS 5-year estimates, 28.6% of workers in Boston's labor force between 25 and 64 years old have a high school level education or less (see Table 44). Educational barriers are especially high for unemployed workers, with 51% of them in the prime working age cohort lacking post-secondary education. This profile is confirmed by recent clients of Boston's Career Link shown in Table 45: 47% of the 2016 year-to-date clients attained education at or below a high school diploma. Additionally, 15.5% of Boston's employed workers reported that they do not speak English very well, indicating that almost one in six Boston workers may face barriers to employment, obtaining a quality job or job advancement based on their English language skills.

Table 44. Educational Attainment for Boston Workers and Residents, Age 25 to 64 Years

Education Level	Percent of Population (25 or older)	Percent of Labor Force (25 to 64)	Percent of Unemployed (25 to 64)
Less than high school graduate	15.0%	9.4%	18.5%
High school graduate	22.0%	19.2%	32.5%
Some college or associate's degree	18.3%	18.9%	26.3%
Bachelor's degree or higher	44.6%	52.5%	22.7%

Source: American Community Survey, 2010 to 2014 Estimates

Table 45. Educational Attainment, Boston Career Link Clients 2016 August Year to Date

Education Level	Number	Percent
Less than high school graduate	720	10.4%
High school graduate	2,533	36.5%
Some college/vocational degree	1,369	19.7%
Associate's degree	536	7.7%
Bachelor's degree or higher	899	13.0%
Graduate degree	489	7.0%
No information	393	5.7%
Total	6,939	100.0%

Source: Boston Career Link

Despite a well-established system of providers and education programs for adult basic education (ABE) and English for Speakers of Other Languages (ESOL)[27], the supply of these services is insufficient to address the need and demand among Boston residents. According to The Boston Foundation report, *Breaking the Language Barrier: A Report on English Language Services in Greater Boston*, there were 4,546 people on waiting lists among Boston providers for ABE and ESOL services in December 2010, with 80% of these for ESOL.

[27] There are 25 ESOL providers in Boston funded by the Office of New Bostonians and listed on their web site. The Massachusetts Department of Elementary and Secondary Education ABE/ESOL directory lists 29 providers in Boston.

Among workforce development practitioners, access to child care was the most frequently cited non-job skill employment barrier for Boston workers. Other common barriers reported by practitioners are English language skills, job readiness including soft skills and prior work experience and CORI records and drug use. Transportation and basic education skills in reading, writing, and math were mentioned less frequently by a quarter of interviewees. These barriers are consistent with those identified in a recent report in improving high rates of unemployment prepared by Governor Baker's Task Force on Economic Opportunity for Persons Facing Chronically High Rates of Unemployment[28] and a 2016 report by the Job Training Alliance[29]. The Governor's Task Force report also noted limited knowledge of the job market, how benefit programs work, poor credit scores (used by employers in screening applicants), access to mentors, and employer bias and stigma as additional barriers.

Workforce Practitioner Interviews

Several observations about Boston's current workforce development services for low-income workers, including labor skill and supply gaps, funding limitations in the current system, and non-skill barriers to employment among Boston residents emerged from interviews with workforce development practitioners in Boston. The key findings from these interviews are:

- Training under the Workforce Opportunity Investment Act (WOIA) system is based on individual vouchers and choice, which is a barrier to using these funds to target training programs to specific development projects.
- Federal funding for no-college based job training has declined severely over the last three decades. Due to these limited and declining funds, the demand for WOIA vouchers is vastly greater than the available supply. In the current year, there were 200 vouchers for all of Boston. This compares with 14,671 Boston unemployed workers searching for jobs in July 2016.
- The resources for training at colleges have grown and become more important with the expansion of federal Pell Grants, which has increased the importance of training at community colleges. Some practitioners noted that community college provides a less accessible and supportive training environment for many disadvantaged workers and have experienced low graduation rates.
- Occupational skill gaps were most frequently reported in health care, which may reflect the large role health care plays in the Boston economy and its priority among training providers. Specific health care occupations with labor supply gaps include: Registered Nurses (RN): Certified Nurses' Assistants (CNA): Acute Care or Patient Care Assistants (CNAs with additional acute care training); and up to twenty other specialized health care occupations, e.g. Central Processing Technicians; Surgical Technologists, etc.
- Additional skills gaps were cited for information technology jobs, including programming, quality control and IT administration and restaurant jobs.

[28] *Report and Recommendations to Improve Employment Outcomes Among Populations Facing Chronically High Rates of Unemployment* January 2016, http://www.mass.gov/lwd/docs/executive-office/eo-561-task-force-report508.pdf .

[29] Root Cause, *Job Training Works, Pays and Saves: An Economic Impact Study on Outcomes of Job Training*, January 2016

- Several practitioners observed that some labor supply gaps, such as cooks, home health aides and CNAs are partly due to high turnover from lower wages and difficult shift times in these positions.

Two-thirds of NJT-funded training programs reported occupational or skills training programs in which employer demand exceeded the number of program graduates. These include programs training for Culinary Home Health Aides, Certified Nursing Assistants, Culinary Arts, Retail Banking, Office and Medical Administration, Human Services, Facility Maintenance, Software Coding, and Customer Service. These providers estimated employer demand for over 1,200 positions annually beyond the number they train.

Warranted Jobs Linkage Fee and Recommendations

Boston's future non-residential development will create demand for workers in several occupational areas that are accessible to low-income and moderate-income residents but insufficient workforce training capacity and funding exists to address this demand. With the city's tight labor market and limited capacity of the existing job training system to address new demand, additional investment in job training will be necessary to fill this demand for workers. While there is an existing Boston labor force in these occupational areas, demand in the occupations with the largest need for new workers is above 12% and as high as 43% of the city's current supply and this is unlikely to be filled with Boston's existing workforce. Since the goal of the Jobs Exaction Policy is to expand opportunity for Boston's low-income and moderate-income workers from new development, it is necessary to provide training and education to connect and prepare unemployed and under-employed workers for these new jobs rather than relying on existing employed residents to fill them. Moreover, barriers exist that will prevent many of the city's less educated and immigrant workforce from benefiting from these jobs. Finally and most importantly, the current workforce development services do not have sufficient funding and capacity to meet the increased demand for skills training and education needed to connect DIP employment to Boston residents. For all these reasons, a jobs exaction is warranted to fund job training and workforce development services to address the potential occupational and skills gaps among Boston residents to meet labor demand at the projected new development, particularly in occupations that can benefit low-income and lower skilled workers.

To estimate and quantify this need, the analysis focused on those low and middle skill occupations that are most accessible to low-income and moderate-income residents and ESOL and ABE services which are important barriers to both employment services. Table 46 summarizes the 10-year projected new employment in DIP projects for these occupations which total 16,188. To estimate the cost of training services for these jobs, a goal of filling 50% these positions with Boston residents is used. This goal is based on Boston's Resident Jobs Policy that sets a standard of 50% resident employment for construction projects in Boston[30]. This target results in the need for training to support 8,094 jobs for low-income and moderate-income Boston residents.

[30] This policy was established by Chapter 30 of the Ordinance of l983.

Table 46. Projected DIP Projects' Ten Year Job Growth in Low and Middle Skill Occupations

Occupation Category or Position	Estimated New Jobs at DIP Projects
Healthcare Support Occupations	485
Protective Service Occupations	119
Food Preparation and Serving Related Occupations	4,288
Building, Grounds Cleaning and Maintenance Occupations	452
Personal Care and Service Occupations	219
Sales and Related Occupations	1,905
Office and Administrative Support Occupations	5,417
Farming, Fishing, and Forestry Occupations	8
Construction and Extraction Occupations	177
Installation, Maintenance, and Repair Occupations	308
Production Occupations	573
Transportation and Material Moving Occupations	632
Miscellaneous computer occupations, including computer support specialists	863
Drafters, engineering, and mapping technicians	357
Life, physical, and social science technicians	385
Total	16,188
Total for Boston residents at 50% of new jobs	8,094

Source: Karl Seidman Consulting Services

The estimated total cost to train 8,094 residents is $37.6 million based on an average per participant training cost of $4,645 for the NJT-funded training programs in FY2016. An exaction of $3.64 per square foot is needed to generate these funds using a base of 10,329,500 square feet of DIP projects expected to pay an exaction over the next ten years[31].

Two adjustments are needed to this initial jobs exaction figure. First, the exaction will not need to fund the full $37.6 million cost since Boston residents have access to training beyond the programs funded by the NJT, and other funding sources supplement NJT resources. Consequently, the number of participants to be trained was adjusted for two other major sources of skills training:

- Vocational training through high school and community college slots; and
- Training provided by non-profit providers beyond that funded by NJT.

Annual vocational training capacity was based on data from *Meeting the Commonwealth's Workforce Need: Occupation Projections and Vocational Education*, which projected graduates by occupational category. Non-profit training capacity was estimated from the Root Cause

[31] This figure differs from the 12.04 million square feet used to project employment impacts for two reasons: (1) it includes several institutional projects that will replace or relocate existing facilities but will not create new jobs but will have to make exaction payments; and (2) applies the current 100,000 square foot exemption assuming an average DIP project size of 400,000 square feet.

impact report on Job Training Alliance (JTA) members plus Skillworks training programs delivered by non-JTA vendors. Since the NJT funds some JTA members and Skillworks, the number of FY2015 NJT-funded training completions was subtracted. The resulting estimate of training capacity is 446 training program graduates per year, which can prepare 4,460 Boston residents for the new jobs at DIP projects. Table 47 details the components of this estimate. Once this training capacity is deducted, the jobs exaction would need to fund training for 3,634 jobs at a cost of $16,880,000 which translates into a per square foot exaction of $1.63.

Table 47. Estimated Skills Training Capacity for Boston Residents
Non-NJT- Funded Programs

Annual vocational system graduates for targeted occupations	321
Annual Job Training Alliance providers completions, Boston residents	377
Annual Skillworks completions by non-JTA providers, Boston Residents	52
Less NJT-funded completions, FY2015	-304
Net Capacity, non-NJT Funded	446
Ten years capacity	4,460
Net positions to fund	3,634
Percentage of targeted jobs funded by the Jobs Exactions	44.9%

Source: Karl Seidman Consulting Services[32]

A second adjustment relates to workers' broader educational barriers to employment. As documented in multiple reports and noted in practitioner interviews, many of Boston's unemployed and low-income workers lack English language proficiency, basic math skills and a high school diploma or equivalent. Since these basic competencies are needed for many occupational skills training programs, the sufficient supply of these services is a complement to the skills training program, as well as vital to securing ultimate employment for most occupations. Consequently, an additional jobs exaction amount is estimated to address the cost of providing ABE and ESOL education to prepare targeted Boston residents for the projected new jobs at DIP projects.

[32] Estimates based on data from three reports: *Meeting the Commonwealth's Workforce Need: Occupation Projections and Vocational Education; Job Training Works, Pay and Saves An Economic Impact Study on Outcomes of Job Training;* and S*killworks Phase II Evaluation: Overview of Outcomes*, October 2014.

Table 48. Ten Year Estimate, ABE and ESOL Services for Targeted Jobs at DIP Projects

Education Level	Percent of Unemployed Boston Workers	Percent Not Speaking English Well Boston Labor Force	Percent Needing ESOL Services	Low Estimate Need for ABE Services*	High Estimate Need for ABE Services+
Less than high school diploma	18.50%	63.8%	11.8%	18.5%	18.5%
High school diploma or equivalent	32.50%	29.4%	9.6%	0.0%	8.1%
Some college or associate's degree	26.30%	14.3%	3.8%	0.0%	0.0%
Bachelor's degree or higher	22.70%	5.5%	1.2%	0.0%	0.0%
Total percentage of workers			26.4%	18.5%	26.6%
ABE/ESOL slots to fund for DIP targeted jobs			2,134	1,497	2,155

*Includes only workers with less than a high school diploma; +Includes workers with less than a high school diploma and one quarter of workers with a high school diploma or equivalent.

The exaction amount for these education services was estimated based on American Community Survey estimates for the education level of unemployed Boston residents and the English language proficiency for Boston residents at each education level (see Table 48). Unemployed workers were used for these estimates since they are a key client target for training programs, a key source of workers to fill new jobs, and provide a better proxy for the Boston residents who are likely to receive training for DIP jobs than the overall Boston labor force. Two estimates were made for ABE services: (1) a low estimate assumes that all workers with less than a high school education will need ABE services; and (2) a high estimate that includes 25% of workers with a high school diploma or equivalent. The high estimate is intended to address workers who, despite having a high school diploma, lack high school-level competencies. Based on these figures, 26.4% of workers for DIP targeted jobs will need ESOL services to improve their English proficiency and between 18.5% and 26.6% will need to complete an ABE program. When applied to the 8,094 low-skill and middle-skill jobs at DIP projects targeted to Boston residents, this translates into the need to provide ESOL education to 2,134 workers and ABE to between 1,497 and 2,155 workers. The estimated cost per participant is $2,432[33], which results in education costs of between $8,831,000 and $10,431,000. When applied to the projected DIP project exaction base of 10,329,500 square feet, the addition warranted exaction for ABE and

[33] This figures in based on a $2,202 average FY2010 expenditure per participant for ESOL programs in Greater Boston (Breaking the Language Barrier, p. 27) adjusted 2016 dollars by the Boston CPI for Urban Consumers.

ESOL services is $.85 to $1.01 per square foot. After both adjustments, the warranted jobs exaction per square foot ranges from $2.48 and $2.64 per square foot. Table 49 summarizes the components of the final warranted jobs exaction level.

Table 49. Calculation of Warranted Jobs Exaction

Required Training/Education	Number of Training/Education Slots	Cost	Per SF Cost*
Skills training to prepare residents low and middle skill jobs	8,094	$37,597,000	3.64
Less Available Vocational and Nonprofit Skills Trainings	-4,460	-$20,717,000	-2.01
Plus Required ESOL Service	2,134	$5,190,000	+.50
Plus Required ABE Services	1,497 to 2,155	$3,641,000 to $5,241,000	+.35 to .51
Total		$25,711,000 to $27,314,000	$2.48 to $2.64

*Based on DIP Project Exaction Base of 10,329,500 square feet.

Review of Policy Options and Other City Policies

This section reviews and compares Boston's housing exaction to policies in other cities (no other cities have a jobs exaction), considers several policy options for changing current exaction policies and assesses the impact of the new maximum determined housing and jobs exaction rate on Boston's competitiveness for attracting businesses and development.

Review of Linkage Programs in Other Cities and Regions

Linkage fees[34] charged to commercial development for the purpose of funding affordable housing is a policy utilized in a number of communities around the United States. They are often found in communities with high housing costs where there is a demonstrated need for affordable housing. Numerous communities in California have enacted such policies, and they are also found in other states, such as Washington, Colorado, Florida, and New Jersey. Boston is among the Massachusetts communities that have a linkage fee policy, along with the cities of Cambridge and Somerville and Barnstable County. This section reviews selected linkage policies to identify the best practices associated with linkage fee programs. The key focus of the review is upon selected issues identified by and relevant to the City of Boston as it reviews its linkage ordinance.

Justification for Linkage Fees

Linkage fees have been an established policy for local governments for over three decades, with the City of Boston's policy first enacted in 1983. In recent years, there has been no significant change in the legal basis and justification for linkage fees. The Nollan and Dolan Supreme Court cases continue to be the primary basis for justifying the linkage fees, as well as an impetus for communities to conduct nexus studies that establish the relationship between new jobs and housing. The U.S. Supreme Court decision in the Nollan case [Nollan v. California Coastal Commission, 483 US 825 (1987)] declared that there must be an essential nexus between the exaction or mitigation imposed on the party and a legitimate state interest. The U.S. Supreme Court decision in the Dolan case enshrined into law the proportionality test that mitigations required by municipalities must be roughly proportional to the impact that the proposed developments will create [Dolan v. City of Tigard, 512 US 687 (1994)]. Further, the Supreme Court clearly placed the burden of proof on the municipalities to prove, within reason, that the mitigation is in fact necessary.

It should be noted that California cities operate under a different set of constraints than those in Massachusetts. Mitigation measures such as development linkage fees are used for purposes beyond housing. Communities impose linkage fees for parks, child care, transit, housing, and schools. The widespread use of linkage fees and other exactions in California was spurred by the decline in local revenues following the adoption of the property tax limitation measure known as

[34] Linkage fees policies have been called different names in different communities. Boston calls its linkage fees development exaction fees, and Cambridge a housing contribution. For the purposes of this analysis reviewing these policies throughout the country, linkage fees has been used throughout to maintain consistency of usage and terminology in order to improve readability.

Proposition 13 (1978). Public concern over the use of linkage fees by municipalities led the State of California to adopt state law AB 1600 in 1987. AB 1600 requires cities to demonstrate a rational nexus between the exaction or mitigation imposed and the public interest that is threatened or affected. The law imposes an additional test of ensuring that the fee or mitigation imposed is proportional to the harm caused by the development.

Linkage Fee Program and Policy Administration

All housing linkage fee programs operate in a similar manner. Commercial, mixed-use, or other types of developments over a certain number of square feet are subject to a fee assessed per square foot of new developed space over the threshold size for the development. Though the essence of the policy may be the same, programs differ in a variety of ways. Some governing bodies restrict the application of the linkage fee to the use type, such as office space or retail space, whereas others impose the linkage fee on all nonresidential development in their jurisdiction. Some policy programs allow developers to either directly build the required housing or to pay an exaction into an affordable housing trust over a set period of time. In some cases, the fee is divided into installments and paid at certain intervals over a period of several years, most frequently related to the issuance of the certificate of occupancy or building permit.

Governments adjust the fee on a regular basis, most often relating to the Consumer Price Index (CPI) or a construction cost index, such as the Engineering News Record Construction Cost Index. It should be noted that adjustments based on these indices do not take into account changes in land values, which impact the costs of developing affordable housing. Major revisions to the fee structure are undertaken less frequently, requiring approval of the local legislative body and often a new nexus study. Many communities have maintained the original fee structures from when the fees were first enacted, adjusting only based on the index, largely due to the cost and complexity of re-evaluating and passing new linkage legislation.

The following section reviews linkage programs in Massachusetts along with those in Seattle, San Diego and San Francisco. Exaction/linkage fee rates and key policies for Boston and five comparison cities are summarized in Table 51[35] on page 86. Appendix C provides information on programs being proposed or formulated in three additional cities.

City of Cambridge. The City of Cambridge's commercial linkage fees (referred to as a Housing Contribution) in its Incentive Zoning Ordinance were first adopted in 1988. Developers can also opt to create affordable housing units, under the "Housing Creation" option, but this has reportedly not occurred in the past decade. The Incentive Zoning Ordinance applies to commercial development of more than 30,000 square feet of gross floor area devoted to one or more of the following uses: Hotel or Motel; Radio and Television Studio, College or University (with some exemptions), Noncommercial Research Facility, Healthcare Facility, Social Service Facility, Office and Laboratory Use, Retail and Consumer Service Establishment, Open Air or Drive In Retail, Light Industry, Wholesale Business, Storage, and Heavy Industry. The current housing contribution is $12.00 per square foot over 2,500 square feet of the project authorized by

[35] Barnstable County was omitted as it is less urbanized area with a quite different and more complex policy,

the special permit granted with one-dollar increases occurring annually from 2016 to 2018. Consequently, the Cambridge fee is scheduled to reach $15 per square foot in 2018. The fee does not vary by type of use or by size of development. The amount of the housing contribution may be adjusted annually by the Cambridge Affordable Housing Trust based on the CPI Housing Index for the Boston-Brockton-Nashua, MA-NH-ME-CT area. The current fee was recommended by a 2015 Nexus Study for the Incentive Zoning Ordinance and went into effect on September 28, 2015. The Housing Contribution is paid, as a lump sum payment, directly to the Managing Trustee of the Affordable Housing Trust (AHT) or its designee. The AHT Managing Trustee must certify to the Superintendent of Buildings that the payment requirements for the ordinance are met prior to issuance of the Certificate of Occupancy. There are no reported problems with the administration or collection of the fee.

Prior to the 2015 Nexus Study, the City had been seeing a growing number of commercial projects that did not trigger the Incentive Zoning Ordinance due to new categories of Special Permits that had been created and were not reflected in the Incentive Zoning Ordinance. Also institutional and hotel uses were not subject to housing contributions. In the updated ordinance, all projects over 30,000 square feet trigger the ordinance, rather than just those requesting special permits, and several exempt uses were eliminated, which has increased potential linkage fee collections.

In addition to the Housing Contribution, Cambridge adopted a 3% property tax surcharge under the Community Preservation Act (CPA) in 2001. Each year the City Manager makes recommendations to the city council on how to allocate CPA revenues with, as required by law, a minimum 10% allocation each to affordable housing, historic preservation and open space. Through FY2016, $155.45 million has been allocated for Cambridge Community Preservation Act projects, including $124.36 million for affordable housing initiatives.

City of Somerville. The City of Somerville's commercial linkage fees, referred to as Project Mitigation Contributions, were first implemented in 1991. Article 15 of the Zoning Ordinance states that the policy's purpose is to increase the supply of available and affordable housing to low-income and moderate-income people, to ensure that such housing is affordable over the long-term, and to mitigate the impact of large-scale development on the supply and cost of housing in the City of Somerville. The linkage ordinance applies to applications for new construction or substantial rehabilitation projects with gross square feet of 30,000 or greater that are seeking special permits, special permits with site plan review, or site plan approval. Linkage fees apply to any such project that will be occupied by all uses (or combination of uses) except for residential, protected religious uses, buildings owned by the City of Somerville, and artist studio spaces. The current contribution, adopted by the Board of Aldermen in November 2013, is $5.15 per square foot.

Before the new ordinance was approved in late 2013, the Project Mitigation Contribution policy had last been evaluated with a nexus study conducted in 2004, and subsequently updated, doubling the fee to $3.91 per square foot for projects over 30,000 gross square feet. In 2013, a new nexus study was conducted to evaluate the 2004 policy. Fast-paced development in

Somerville had made it necessary to reevaluate the linkage fees as they were first implemented in 1991 and updated in 2004.

The recommendation was to increase the housing linkage fee from $3.91 to $5.15 per square foot. The study also recommended a job-creation linkage fee of $1.40 per square foot; however, this policy was not adopted. The 2013 ordinance states that the fee is subject to recalculation every three years, as recommended by the Planning Board to the Board of Aldermen based on a consideration of the current impact of new commercial development on the cost and supply of housing in the City.

The amount of the Project Mitigation Contribution is calculated by multiplying the $5.15 per square foot fee by the total number of square feet in the project over the initial exempt 30,000 gross square feet. In the event that a project is phased, the fee is calculated based on the combined square footage of the phases. The fee is paid in five equal installments to the Somerville Housing Trust Fund. The first of the five installments is to be paid upon the issuance of a certificate of occupancy, and the remaining four are due and payable annually on the anniversary of the first payment.

Barnstable County. The Cape Cod Commission is a regional planning agency that acts as the regulatory authority for all development projects in Barnstable County. In 2005, the Commission carried out a nexus study to investigate the impact of regional development on low-income and moderate-income residents. The results of the study were incorporated as an affordable housing linkage fee policy as part of the 2009 Regional Policy Plan, which has since been amended under a number of county ordinances.

The linkage fee policy is triggered by all new commercial developments and expansions to existing developments over 10,000 square feet or 40,000 square feet of outdoor areas. These developments are called "Developments of Regional Impact" or "DRI," which are regionally significant development projects that, due to their size, location, or character, impact more than one community. The 2009 plan puts forth a process for the appropriate review of these projects and includes appropriate affordable housing and other mitigation fees. The affordable housing fee varies depending on the type of development and its location. These categories were determined based on the number of lower-than-average-income jobs each industry or use creates. The fee also depends on whether the development is located in an area that is determined to be an "economic center." The fee schedule was updated in November of 2014 and the new fee schedule went into effect on July 1, 2016. Table 50 summarizes the current linkage fee rates. Fees are adjusted on an annual basis based on the Consumer Price Index.

The fee schedule is subject to reductions and discounts of up to 50%, or 65% if the development is approved for a Hardship Exemption. Discounts include development in an economic center (15% reduction), redevelopment projects (15% reduction), non-profit organization development (10% reduction), and reservation of land for estate or conservation purposes (10%).

Fees accrued under the DRI mitigation policy are collected in advance of the issuance of a Certificate of Compliance, which states that the development complies with the DRI policy.

Only upon receipt of the Certificate of Compliance can the developer receive the Certificate of Use and Occupancy by the Municipal Agency. The fees are collected by the Cape Cod Commission, which holds the funds until the town manager of the town where the development took place requests them for affordable housing projects. Instead of paying the fee, developers can mitigate the affordable housing impacts by developing 10 % of the housing units determined necessary to support the lower-than-average-income jobs that are projected to be created by the new development; for example, if a development is projected to create 20 new jobs, then the developer could build 2 low-income housing units instead of paying the mitigation fee.

Table 50. Mitigation Fees for Developments of Regional Impact
March 2014 – February 2015

Type of Development	DRI Mitigation Application Fee
Residential	$10,813 base fee, plus $324 per lot or unit
Non-Residential Building	Fifty-four (54) cents per square foot of gross floor
Non-Residential Outdoor Space (such as swimming pools and tennis courts)	Fifty-four (54) cents per square foot
Wind Energy Conversion Facilities	1-3 WECF with an output of 250kW up to less than 1MW each: $3,244 1-3 WECF with an output of 1MW or greater each: $9,732 Per WECF over 3: $3,244 per WECF Not eligible for Fee Reductions$
Other Non-Residential Developments	$10,813 base fee plus:
Divisions of Land:	$324 per lot
Gravel Pits, Mining and Extraction Activities and Golf Courses:	$324 per acre
Wireless Communication Towers:	$54 per linear foot of tower/monopole height above ground level
Water dependent uses including but not limited to docks, piers and revetments:	Twenty-seven (27) cents per square foot
Utilities and other linear development:	Fifty-four (54) cents per linear Foot
Mixed Use Projects	The applicable residential and non-residential per lot/unit/foot fee set forth above. The residential base fee is not applied to Mixed Use Projects
Historic Properties	Single Family or Accessory Building - $434 Other - $2,704
Other	For other types of land uses not covered above, $10,813 base fee plus (to be determined as needed, based upon similar uses in the fee schedule above.)

Source: Cape Cod Commission.

City of San Francisco. San Francisco first adopted its commercial development linkage fee as a mandatory program in 1981. The fee is applied on projects of 25,000 gross square feet or more on a square footage basis above that threshold and includes both new and rehabilitated

construction. The fee is due at the time of issuance of a building or site permit, depending on the development, as a lump sum. Fee rates vary depending on the development type at a rate of $22.42 per square foot for Entertainment and Retail developments; $17.99 per square foot for Hotel developments; $24.03 per square foot for Office developments; $16.01 for R&D uses; and $18.89 for Integrated Production, Distribution and Repair (PDR) and Small Enterprise developments. Property owned and used for governmental purposes by the U.S. government, State of California, or City of San Francisco for a period in excess of 50 years is exempt, as are pharmacy developments under 50,000 square feet and grocery uses under 75,000 square feet. The fee is designed to be updated annually based on the Engineering News-Record (ENR) Building Cost Index. The funds are maintained in a citywide Affordable Housing Trust Fund, separate from other housing funds.

Table 51. Key Housing Exaction/Linkage Policies in Boston and Comparison Cities

City	Exaction/Linkage Fee Rate (per square foot)	Project Size Threshold (square feet)	Exemption (square feet)	Payment Schedule	Rate Adjustments
Boston	$8.34 PSF	100,000	100,000	Seven payments, at certificate of occupancy (COO) and 6 anniversary dates	No sooner than three years based on mix of CPI for urban consumers and CPI Housing Component
Cambridge	$12 + $1 annual increases through 2018	30,000	2,500	One payment at COO	Recalculation after three years or longer
Somerville	$5.15	30,000	30,000	Five payments at COO and next four anniversary dates	Annually based on CPI Housing Component. Reevaluation every three years
Seattle	$8.00 to $17.50 by district	4,000	4,000	One payment at building or site permit	Annually based on CPI
San Diego	$0.80 to $2.12	0	0	One payment at building permit	Annually based on CPI
San Francisco	$16.01 to 22.52	25,000	25,000	One payment at building permit	Annually based on Engineering News-Record (ENR) Building Cost Index.

Source: ConsultEcon, Inc.

City of San Diego. San Diego enacted its mandatory commercial development linkage fee first in 1990 and updated it in 2014. The fee is applied on a gross square foot basis on non-residential development projects involving construction, addition, or interior remodeling. Properties owned by the State of California, the U.S. Government, or other government uses are exempt, as are non-profit hospitals, manufacturing, and warehouse facilities. The fees are incurred at a rate of $2.12 per square foot for office developments, $1.28 per square foot for hotel and retail developments, $0.80 per square foot for research and development space. The payment is due at the time of issuance of the building permit as a lump sum. The fee is designed to be updated annually based on CPI. In lieu of payment, the developer may donate air or land rights to the city; however, the fair market value of those assets must be greater than the proposed fee amount. Funds are held in the city's Housing Trust Fund, co-mingled with other inclusionary housing fees.

City of Seattle. Seattle enacted a commercial development linkage fee as a voluntary program in 1989, but this was shifted to mandatory in 2015 in concert with a phased citywide rezoning effort over 2016 and 2017. The fee applies to new or adapted commercial developments over 4,000 square feet and ranges by city district from $8.00 to $17.50 per square foot on developments in the Downtown and South Lake Union Districts, or from $5.00 to $10.00 per square foot in other city districts. The payment is due at the time of issuance of the building permit as a lump sum. Institutional uses, developments in industrial zones, master planned communities, or areas where no increase in zoning capacity is contemplated are exempt. The fee is designed to be updated annually based on CPI. Funds are deposited to a special account specifically for the use of rental housing up to 60% AMI and ownership housing up to 80% AMI.

Boston's Policies in Relation to Other Communities

Although there are similarities in the core linkage policy across cities, several aspects of Boston's policies emerge from the review of policies in other cities:

- Boston has the highest project threshold and exemption level among cities. Three cities have a threshold in the 25,000 to 30,000 square foot range with San Diego applying its exactions to projects of any size and Seattle having a low threshold of 4,000 square feet.
- Multi-year payment of exactions is unusual. Boston and Somerville are the only cities that use multiyear payments.
- Most cities make annual inflation adjustments to their exactions with Boston the only city applying a three year adjustment period.
- Fees that vary use or location are common. San Francisco and San Diego vary their fees by use while Seattle varies it by location. Barnstable County has the most complex system that varies its fee by both use and location within or outside an economic center.

This section reviews several policies and administrative aspects of Boston's exaction policy that inform recommendation for possible policy changes. This discussion focuses on four issues:

1. Project threshold and exemption level;
2. Fee variation by use;
3. Number and timing of exaction payments; and
4. Periodic adjustment of exaction level.

Project Size Threshold and Space Exemptions

As noted above, Boston's current 100,000 square foot threshold for triggering exaction payments is the largest among comparison cities. Reducing the project threshold would expand the number of projects subject to exactions and increase revenue generated by any fee level. On the other hand, Boston's threshold policy means that exactions apply only to large projects with more financial capacity to pay exactions. Projects at this larger scale are more likely to be built by larger development firms and leased to larger and financially stronger firms that are better able to absorb the financial impact of exactions compared to those in smaller projects.

With a high project size threshold, it is not clear what purpose is served by exempting the first 100,000 square feet of space from exaction payments. This provision does not serve to exempt small projects from exactions since the 100,000 square foot threshold achieves this purpose. However, this provision reduces housing exaction revenue at the established rate and adds a slight complexity to the policy and its administration. It also can contribute to a higher nominal rate since applying this large exemption requires setting a higher fee level to generate the specified level of revenue needed to mitigate the development impacts.

Development Use and Fee Levels

The impact of new development on the demand for affordable housing and need for education and training services does vary by building use and business type. Uses and businesses with a higher density of employment and a large share of lower paying jobs will generate greater impacts. Table 52 compares different uses by their employment density (measured by typical square feet per employee) and share of jobs with average annual wages below 80% of area median income. Restaurants have both the highest employment density and share of lower paying jobs. Universities are on the other end of the spectrum with low density and a relatively low share of jobs with wages below 80% of median income. Office uses fall in the middle—they have high job density but a middle range of low paying jobs. Hotels and Retail uses on the other hand, have a large share of lower paying jobs but relatively low employment density. Thus, based on impact alone, there is a case for varying exactions by use. For example, Boston could establish a multi-tiered exaction fee schedule with different rates for hospitals, hotels, office, retail/personal services, restaurants and universities.

Table 52. Variation in Employment Density and Job Wage Levels by Use

Development Use	Square Feet Per Employee	Percent of Jobs with Average Wages Below 80% of Median Income
Office -General	350	17% to 48%
Office-Finance	322	41% to 46%
Office-Medical	277	52%
Hotel	3125	87%
Hospital	385	35%
Retail	671	51% to 88%
Restaurant	225	97%
University	737	31%

Source: Boston Planning and Development Agency and Karl F. Seidman Consulting Services from BLS Data

There is a precedent for varying exactions by type of use. Many California cities, including San Diego and San Francisco do so, as does Barnstable County in Massachusetts, which has varied fee rates for eleven different use categories. Locally, Boston, Cambridge and Somerville all use a uniform rate for all uses.

Despite the differential impacts by use, Boston may want to continue its policy of a single exaction rate across uses for administrative simplicity and competitive factors. From an administrative perspective, the occupancy use of a project may be difficult to determine for some projects and may change over time for a building. The first problem is most likely to occur for institutional projects or office buildings that combine office uses with medical or university institutional uses, or have large portions of a building devoted to mixed activities. There would be an incentive for owners and developers to classify mixed space as institutional use or under-estimate office space if differential contribution rates were applied. Additional administrative complexities might result from the need to allocate common areas and shared uses (e.g., reception areas, conference rooms, etc.) among different uses. Furthermore, developers and building owners might view the exactions as unjustified and seek a refund or legal relief if the allocation of uses changed upon final occupancy. These problems can be addressed by having the contribution rate based on the predominant use in the building. However, this would mitigate the goal of having the exaction rate reflect differential impacts.

Another issue is that building uses often change over time: ground floor space may first be rented to a retail store and later converted to a restaurant. Similarly, a building might first have an office tenant and later be converted to institutional use. Boston could address this issue by basing the housing contribution rate on the initial use but this could create inequitable results between buildings with stable uses and those for which uses change more often. This problem seems greatest for buildings with a larger share of ground floor commercial space which may change more frequently between retail, restaurant and office uses.

Timing of Fee Payments

Boston has the longest time period and one of the more complex administration systems for collecting linkage fees. Boston collects housing exactions over seven years and job exactions over two years. This extended payment period slows the receipt of funds and the ability to deploy them to build affordable housing and expand training services. It also adds administrative costs and complexity as the BPDA and Treasurer must track, invoice, and collect payments from each project over seven years. An additional administrative complexity results from the unique annual payment date for each project, since Boston's policy has the first payment date and all subsequent payments based on the date of the Certificate of Occupancy or twenty-four months after the issuance of the building permit.

Since the affordable housing impacts from new development are likely to occur in the first year or two after project completion as the project is leased up and tenants hire new employees, the seven year payment period is not closely aligned with project impacts. A single payment or shorter payment period would supply funding to build housing and implement training programs at a pace that better matches impact while simplifying exaction administration and collection.

Fee Adjustments

Regular fee adjustments linked to inflation are fairly common with all comparison cities except Cambridge providing for an annual adjustment based on the CPI or a building cost index. Boston's policy allows CPI-based adjustments at three-year intervals when authorized by the BPDA Board but it has not consistently made these changes. One way to ensure more consistent inflation adjustments would be to make them automatic with the BPDA board retaining authority to delay or override the adjustment based on economic or other considerations.

Linkage fee policies are highly dependent on the market and economic conditions and should be updated regularly, beyond inflation adjustments, to appropriately mitigate the impact that commercial development has on the availability of affordable housing in a community. Somerville and Cambridge both have provisions in their ordinance to recalculate linkage fees every three years. Boston has not reevaluated the economic basis for its housing and jobs exactions for thirty years, over which time significant changes occurred in the type and level of development, its employment composition, housing preference and development costs. To avoid allowing such a long time period to lapse before the underlying impacts and required mitigation are reconsidered and fees reset, Boston may want to establish a policy requiring a periodic updating of the nexus impact analysis, perhaps every five to seven years.

Impact on Boston's Competitiveness

An important consideration for Boston in establishing the housing and jobs exaction rates is the rate's potential impact on attracting new development and tenants. This is a particularly important concern given that maximum combined exaction rate of $85.55 per square foot would be over eight times the current rate of $10.01. If adopted, this rate would be more than seven times the housing contribution rate in Cambridge ($12) and seventeen times Somerville's $5.15

amount. An increase in the exaction rate increases development costs, which developers must offset through either paying less for land (or an existing building in the case of renovation projects), reducing their return on investment, or collecting higher rents from tenants. The last option, raising rents, may affect Boston's competiveness in attracting businesses to new development projects.

Table 53 compares Class A office rents for Boston with competing areas in Cambridge and suburban locations with sizeable professional service and technology companies, such as Lexington, Waltham and Wellesley A developers' capacity to pass on the cost of exactions to tenants and still remain economically competitive in attracting tenants depends on rent differentials between Boston and competing locations. Boston's office rents are well above suburban locations, close to rents in mid-Cambridge and below those in the high-cost East Cambridge market. Boston's overall rent of $52.29 at the end of 2015 was 67% higher than the average in the 128/West market, the highest rent suburban market, and 35% above the highest cost suburban location (Wellesley). In contrast, Boston offers lower rents than Cambridge's two strongest locations. Its overall rent is 29% below the East Cambridge average of $73.22 and 5% below the mid-Cambridge area around Harvard Square. Back Bay, the city's highest rent office district had 2015 rents 23% lower than East Cambridge but 3% above mid-Cambridge. In the Seaport District, Boston's Innovation District which competes with Cambridge for technology firms, 2015 rents were $20 or 29% lower than East Cambridge and $2 or 4% below those in Mid-Cambridge.

Table 53. 2015 Fourth Quarter Class A Office Rents in Boston, Cambridge and Selected Suburbs

Community	Average Asking Rent Per Square Foot
Boston	$52.29
Boston-Back Bay	$56.65
Boston—Financial District	$53.44
Boston—Seaport District	$52.83
Boston-Charlestown	$38.37
Cambridge	$61.91
East Cambridge	$73.22
Mid-Cambridge	$54.95
Suburbs-128/West	$31.21
Lexington	$28.55
Waltham	$31.49
Wellesley	$38.82

Source: Lincoln Property Company Boston Average Rents, Fourth Quarter 2015

The maximum combined housing and jobs exaction, based on the city covering 100% of the affordable housing financing gap is $88.19 per square foot of new development—a $78.18 increase over the current rate. If a developer passed on this increase in full to tenants, it would

increase rents by $6.90 per square foot for a ten-year lease[36]. This represents a 12% to 18% increase in office rent depending on the property location. It would increase Boston's current rent premium with the highest cost suburban markets by 33% to 50%, eliminate the Seaport District's rent advantage over mid-Cambridge and reduce by one-third its cost advantage over East Cambridge

Table 54. Potential Impact of Maximum Exaction on Boston Class A Office Rents

Maximum Housing Exaction	$85.55
Maximum Jobs Exaction	$2.64
Total Combined Exaction	$88.19
Existing Combined Exaction	$10.01
Increase In Exaction	$78.18
Cost per Leased Square Foot*	$68.98
Amortized Over Ten Year Lease	$6.90
Amortized Exaction as Percent of Class A Rent	13.19%

*Assumes 85% net leasable space and a building size of 400,000 gross square feet.

Developers are constrained in their ability to pass the cost of additional exactions onto tenants by competition from outside Boston and existing Boston buildings that are not subject to the increased exactions. If developers are unable to pass on the exaction to tenants, it will increase their required equity investment and reduce their rate of return. A large negative impact on investment returns creates a risk that developers may decide to pursue projects in more profitable locations or impair their ability to raise equity capital that makes new development projects infeasible. Table 55 presents the estimated impact on a developer's return on equity assuming that the full cost of the additional exactions are paid by an increase in the developer's cash equity under scenarios in which the developer would earn a 6% and 8% return prior to the exaction increase. With the maximum exaction increase of $77.18 per square foot, a developer's annual return on investment from the building's net income would decrease from 8% to 5.61% or from 6% to 4.21%. These represent significant declines in the expected investment return by 26% to 30% and indicate that if the maximum exaction was adopted and most of the increase had to be paid with developer equity, it is likely to reduce investment in Boston's office development.

[36] This calculation is based on the current 100,000 square foot exemption, 85% net leasable space and a building size of 400,000 gross square feet.

Table 55. Potential Impact of Maximum Exaction on Developer Investment Return

Investment Parameter	8% Investment Return	6% Investment Return
Original Equity Investment*	$41,000,000	$41,000,000
Additional Exactions at $78.18 PSF	$23,454,000	$23,454,000
Present Value of additional exactions over seven years	$17,444,315	$17,444,315
New Equity Total	$58,444,315	$58,444,315
Investment Income+	$3,280,000	$2,460,000
New Return on Investment	5.61%	4.21%
Change in Investment Return	-2.39	-1.79
Percent Change in Returns	-26.5%	-29.8%

*25% of Estimate TDC of $164 million; +8% or 6% of original equity investment

Recommended Exaction Rates and Policy Changes

Boston established its development exaction policy in 1983 requiring developers to pay an exaction to address the impact of new non-residential development on affordable housing demand and employment of low-income residents. Boston commissioned a new study to review its current exaction rates and policies in response to changes in the nature of the city's development and employment, housing market conditions and higher housing development costs and a growing need for housing and living wage employment. This report provides an updated nexus study to quantify the impact of future non-residential development on the demand for affordable low-income and moderate-income housing and workforce development services in Boston and recommended housing and job exaction rates to mitigate these impacts.

The analysis detailed in this report supports an increase in Boston's jobs exaction and housing exaction rates. Projected new construction of 12 million square feet in Development Impact Projects in Boston over the next ten years is expected to generate over 32,300 jobs. This employment growth will create demand for 4,386 new units of housing for very-low, low-income and moderate-income households and expanded workforce education and training services to serve another 7,300 to 7,900 residents. An estimated financing gap of $884 million will exist to reach the $1.681 billion in total development costs necessary to build an additional 4,386 housing units. For workforce development services, a smaller funding gap of $25.7 to $27.3 million is needed to expand programs to address development impacts. The maximum warranted housing and jobs exactions to fill these financing gaps are $88.55 per square foot and $2.64 per square foot, respectively.

Setting the final exactions rates is a matter of balancing public policy goals and considering both the need to address increased demand for affordable housing and workforce development services with the potential impacts of an increased rate on the city's future development. We recommend that Boston increase the jobs exaction to $2.64 per square foot, which is only slightly higher than the current rate of $1.71. Since adoption of the maximum determined housing exaction rate could impair Boston's regional competitiveness in attracting businesses and make the city a less desirable location for real estate investment, we recommend that Boston increase the housing exaction to between $17.11 to $21.39 per square foot under current housing exaction policies, yielding a combined rate of $19.75 to $24.04 when the jobs exaction is included. This rate would fill 20% to 25% of the affordable housing financing gap and 100% of the workforce development funding gap needed to address the impacts of new large scale development. If the exemption is eliminated, as recommend below, the corresponding housing exaction rate would be $12.87 to $16.08 per square foot and the jobs exaction would be $1.99 per square foot, for a combined housing and jobs rate of $14.86 to $18.07.

By adopting a contribution rate in this $15 to $18 range (without, as noted below, an exemption for the first 100,000 square feet), Boston will lessen the potential for adverse impacts on the city's commercial rents and competitiveness in attracting and retaining businesses and continued investment. If the increased exaction cost is fully passed on to tenants, it will increase annual rents by $.65 to $1.03 per square foot over a ten-year lease, or a 1.2% to 2% increase in the city's

2015 Class A office rent. It will support maintaining office rents that are well below East Cambridge levels while also keeping the Seaport District competitive with mid-Cambridge locations. Alternatively, if the additional exaction cost is fully absorbed by developers without increasing rents, its impact on investment returns would be modest, reducing them by 28 to 58 basis points.

Table 56. Recommended Housing and Jobs Exaction Rates

Exaction Type	With 100,000 SF Exemption	Without 100,000 SF Exemption
Jobs Exaction Rate	$2.64	$1.99
Housing Exaction Rate (20% of financing gap)	$17.11	$12.87
Housing Exaction Rate (25% of financing gap)	$21.39	$16.08
Combined Exaction Rate	$19.75 to $24.04	$14.86 to $18.07

Several additional changes to the current exaction policies are recommended to ensure the full application of exactions to all comparable uses simplify fee policies and their administration and accelerate collection of exaction revenues:

- Expand the definition of DIP uses to include check cashing businesses and tattoo parlors that are currently not included;
- Eliminate the "first" 100,000 square feet of DIP use space exemption;
- Shorten the Housing Exaction payment schedule to three payments made at the building permit date; the COO date; and one year after COO. Use of a single due date will ease administration for collection of the final payment; and payment for the Jobs Exaction to a single payment at the building permit date;
- Consolidate the payment schedule for each payment after COO to January 15 of year after anniversary of COO to simplify book keeping and administration of fee collection;
- Continue the current process for rate adjustments based on the CPI but make the change automatic unless deferred by action of the BPDA board;
- Create a schedule of nexus studies or comparable analysis on routine basis (e.g., every three to five years) to review the DIP pipeline, market conditions, project economic performance and their impacts; and
- Seek state legislative authority to adjust the exaction rates and policies without approval by the state General Court.

Appendix A: Definitions of Development Impact Project Uses[37]

Office

39- Office of accountant, architect, attorney, dentist, physician, or other professional person, not accessory to a main use
39A- Clinic not accessory to a main use
40- Real estate, insurance or other agency office
41- Office building, post office, bank (other than drive-in bank) or similar establishment
42- Office or display or sales space of a wholesale, jobbing or distributing house

Retail

30- Private club (including quarters of fraternal organizations) operated for members only
31- Public service pumping station; public service sub-station, automatic telephone exchange; telecommunications data distribution center; outdoor payphone
32- Telephone exchange (other than automatic)
34- Store primarily serving the local retail business needs of the residents of the neighborhood, but not constituting a business as described in Use Item No. 34A, including, but not limited to, store retailing one or more of the following: food, baked goods, groceries, packaged alcoholic beverages, drugs, tobacco products, clothing, dry goods, books, flowers, paint, hardware and minor household appliances
34A- A shop for the barter, rental or sale of printed matter, pictures or motion picture film, if such shop is not open to the public generally but only to one or more classes of the public excluding any minor by reason of age; or if such shop keeps a part of such stock segregated as available to only one or more classes of the public excluding any minor by reason of age; or shop for the barter, rental or sale of printed matter, pictures or motion picture film bearing a legend restricting it to adults only or to one or more classes of the public excluding any minor by reason of age
35- Department store, furniture store, general merchandise mart, or other store serving the general retail business needs of a major part of the city, including accessory storage
36- Indoor sale of motor vehicles

Service; Public

36A- Sale over the counter, not wholly incidental to a use listed under Use Item No. 34 or Use Item No. 37 or Use Item No. 50, of on-premises prepared food or drink for off-premises consumption or for on-premises consumption if, as so sold, such food or drink is ready for take-out

[37] Numbers refer to use items in Article 8 of Boston's Zoning Code

Eating Places and Entertainment

37- Lunch room, restaurant, cafeteria or other place for the service or sale of food or drink for on-premises consumption, provided that there is no dancing nor entertainment other than phonograph, radio and television, and that neither food nor drink is served to, or consumed by, persons while seated in motor vehicles
37A- The maintenance and operation of any amusement game machine in a private club, dormitory, fraternity or sorority house, or similar noncommercial establishment (other than as an accessory use described in Use Item No. 86a)
38- Place for sale and consumption of food and beverages (other than drive-in restaurant) providing dancing or entertainment or both; theater (including motion picture theater but not drive-in theater); concert hall; dance hall; skating rink; bowling alley; pool room; billiard parlor; other social, recreational or sports center conducted for profit; or any commercial establishment maintaining and operating any amusement game machine (other than as an accessory use described in Use Item No. 86b or 86c); provided that such establishment is customarily open to the public at large and does not exclude any minor by reason of age as a prevailing practice
38A- Any of the uses enumerated in Use Items 38 and 52 if such establishment is customarily not open to the public generally but only to one or more classes of the public excluding any minor by reason of age
43- Barber shop; beauty shop; shoe repair shop; self-service laundry; pick-up and delivery station of laundry or dry-cleaner; or similar use
44-Tailor shop; hand laundry; dry- cleaning shop

Service Uses

45- Laundry plant; dry-cleaning plant; rug cleaning plant
46-Caterer's establishment; photographer's studio; printing plant; taxidermist's shop; upholsterer's shop; carpenter's shop; electrician's shop; plumber's shop; radio and television repair shop
47- Funeral home; undertaker's establishment; mortuary
48- Research laboratory; radio or television studio
49- Animal hospital or clinic; kennel; pound
60- Repair garage; gasoline service station; car wash
60A, Sale and installation within a building of batteries, seat covers, tires and similar automotive parts and accessories
61-Rental agency, storing, servicing, and/or washing rental motor vehicles and trailers

<u>Institutional</u>

16- Elementary or secondary school attendance at which satisfies the requirements of the compulsory education laws of the Commonwealth of Massachusetts
16A-College or university granting degrees by authority of the Commonwealth of Massachusetts
18- Trade, professional or other school
19- Machine shop or other noisy activity accessory to a school, college or university
20- Library or museum, not conducted for profit and **not accessory** to a use listed under Use Item No. 16A, 18, 22, 23, or 24

20A-Library or museum not conducted for profit, and **accessory to** a use listed under Use Item No. 16A, 18, 22, 23, or 24, whether or not in the same lot
21-Place of worship; monastery; convent; parish house

Educational

22-Hospital or sanatorium not providing custodial care for drug addicts, alcoholics or mentally ill or mentally deficient persons; clinic or professional offices accessory to a hospital or sanatorium whether or not on the same lot
22A- Convalescent, nursing or rest home; home for the aged; orphanage; or similar institution not for correctional purposes
23-Any use listed under Use Item No. 22 or 22A providing custodial care for drug addicts, alcoholics or mentally ill or mentally deficient persons
24-Scientific research and teaching laboratories not conducted for profit and accessory to a use listed under Use Item No. 16, 16A, 18, 22, or 23, whether or not on the same lot, provided that all resulting cinders, dust, flashing, fumes, gases, odors, refuse matter, smoke and vapor are effectively confined to the lot or so disposed of as not to be a nuisance or hazard to health or safety; and provided also that no noise or vibration is perceptible without instruments more than fifty feet from the lot or any part of the lot
29-Adult education center building; community center building; settlement house

Hotel; Motel

15-Hotel; motel; apartment hotel

Appendix B: Table for Financing Gap Calculations

Table B-1. Illustrative Distribution of Affordable Rental Housing Units by Number of Bedrooms and Building Area

	Number of Units	Average Net Square Feet (SF) per Unit [1/]	Total Living Area
Studio	1,159	500	579,500
One Bedroom	554	700	387,800
Two Bedrooms	989	900	890,100
Three Bedrooms	466	1,200	559,200
Total Units	**3,168**	**763**	**2,416,600**
Net Square Feet as a Percent of Gross Square Feet [1/]			85.0%
Total Gross Square Feet (GSF) (Rounded)			**2,843,000**
Average Gross Square Feet Per Unit [1/]			***897.4***

1/ Average unit size and net square feet as a percent of gross square feet from City of Boston.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Table B-2. Illustrative Distribution of Affordable Ownership Housing Units by Number of Bedrooms and Building Area

	Number of Units	Average Net Square Feet (SF) per Unit [1/]	Total Living Area
Studio	341	500	170,500
One Bedroom	189	700	132,300
Two Bedrooms	459	900	413,100
Three Bedrooms	233	1,200	279,600
Total Units	**1,222**	**815**	**995,500**
Net Square Feet as a Percent of Gross Square Feet [1/]			85.0%
Total Gross Square Feet (GSF) (Rounded)			**1,171,000**
Average Gross Square Feet Per Unit [1/]			***958.3***

1/ Average unit size and net square feet as a percent of gross square feet from City of Boston.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Table B-3. Conversion of Ownership Unit Household Income by Persons to Household Income by Bedrooms

Household Size	Annual Income [1/]	Number of Households [2/]	Aggregate Income
Calculation of Aggregate Income			
Low-Income Households			
1 Person	$41,672	86	$3,583,792
2 Persons	$49,354	24	1,184,496
3 Persons	$50,456	10	504,560
4 Persons	$63,935	4	255,740
Total	**$44,585**	**124**	**$5,528,588**
Moderate-Income Households			
1 Person	$73,690	368	$27,117,920
2 Persons	$84,876	353	29,961,228
3 Persons	$84,876	188	15,956,688
4 Persons	$85,774	189	16,211,286
Total	**$81,282**	**1,098**	**$89,247,122**

	Units by Number of Bedrooms				
	Studio	One bedroom	Two bedroom	Three bedroom	All Units
Distribution of Units by Number of Bedrooms					
1 Person	75%	25%	0%	0%	100%
2 Persons	0%	20%	80%	0%	100%
3 Persons	0%	0%	80%	20%	100%
4 Persons	0%	0%	0%	100%	100%
Low-Income Households					
Distribution of Low-Income Aggregate Income by Unit Size					
1 Person	$2,687,844	$895,948	$0	$0	$3,583,792
2 Persons	0	236,899	947,597	0	1,184,496
3 Persons	0	0	403,648	100,912	504,560
4 Persons	0	0	0	255,740	255,740
Total	**$2,687,844**	**$1,132,847**	**$1,351,245**	**$356,652**	**$5,528,588**
Total Units by Size [2/]	**65**	**26**	**27**	**6**	**124**
Avg. Income per Unit by Size	***$41,351***	***$43,571***	***$50,046***	***$59,442***	***$44,585***
Moderate-Income Households					
Distribution of Moderate-Income Aggregate Income by Number of Bedrooms					
1 Person	$20,338,440	$6,779,480	$0	$0	$27,117,920
2 Persons	0	5,992,246	23,968,982	0	29,961,228
3 Persons	0	0	12,765,350	3,191,338	15,956,688
4 Persons	0	0	0	16,211,286	16,211,286
Total	**$20,338,440**	**$12,771,726**	**$36,734,333**	**$19,402,624**	**$89,247,122**
Total Units by Size [2/]	**276**	**163**	**432**	**227**	**1,098**
Avg. Income per Unit by Size	***$73,690***	***$78,354***	***$85,033***	***$85,474***	***$81,282***

1/ Source: Karl F. Seidman Consulting Services. Weighted average annual household income based on anticipated mix of occupations and average occupational wages for based on projected commercial development in Boston.

2/ See Table 29.

Source: City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Table B-4. Sales Price Analysis by Unit Size / Number of Bedrooms based on Estimated Monthly Housing Costs Set at 30% of Household

Assumptions	Low-Income	Moderate-Income	
Mortgage	4%	7%	Assumed Downpayment
	96%	93%	Percent of Price covered by Mortgage
	3.35%	3.35%	Mortgage interest rate [1/]
	NA	0.72%	Private Mortgage Insurance [2/]
Real Estate Taxes	$11.00	per 1,000 of assessed values [3/]	
Residential Exemption	$1,961.58	reduction in annual taxes [3/]	
Condo Fees	$300.00	monthly per BRA	

	Unit Size / Number of Bedrooms			
	Studio	One Bedroom	Two Bedroom	Three Bedroom
Very Low-Income Households	Not applicable because Very Low-Income housing units are assumed to be all rental units.			
Low-Income Households				
Sales Price	$173,488	$185,034	$216,505	$262,158
Downpayment	$6,940	$7,401	$8,660	$10,486
Monthly Payment Calculation				
Mortgage Payment	$734	$783	$916	$1,109
Real Estate Taxes	$0	$6	$35	$77
Condo Fees	$300	$300	$300	$300
Total Monthly Payment [4/]	**$1,034**	**$1,089**	**$1,251**	**$1,486**
Monthly Payment Target	$1,034	$1,089	$1,251	$1,486
Moderate-Income Household				
Sales Price	$320,859	$342,871	$374,290	$376,360
Downpayment	$22,460	$24,001	$26,200	$26,345
Monthly Payment Calculation				
Mortgage Payment	$1,315	$1,405	$1,534	$1,543
PMI [5/]	$96	$103	$112	$113
Real Estate Taxes	$131	$151	$180	$182
Condo Fees	$300	$300	$300	$300
Total Monthly Payment [4/]	**$1,842**	**$1,959**	**$2,126**	**$2,137**
Monthly Payment Target	$1,842	$1,959	$2,126	$2,137

1/ Average 30 year fixed rate mortgage in Massashusetts on September 8, 2016. Source: Bankrate.com.

2/ Low income and half of moderate income households are assumed to utilize the One Mortgage Program (http://www.mhp.net/homeownership/homebuyer/one_mortgage.php) that waives paying Private Mortgage Insurance (PMI) through participating lenders, many of which are located in Boston and allows buyers to put as low as 3% downpayment. Half of moderate income households are assumed to have PMI. PMI costs "between $40 and $80 per month for every $100,000 borrowed" or an average of 0.72% according to Freddie Mac.

3/ Source: City of Boston.

4/ Assumes 30% of income.

5/ Half of moderate income households are assumed to pay PMI and the other half are assumed to have PMI waved under the One Mortgate Program.

Source: Massachusetts Housing Partnership; City of Boston; Karl F. Seidman Consulting Services; and ConsultEcon, Inc.

Appendix C: Proposed Linkage Policies in Other Cities

City of Los Angeles

Los Angeles began investigating the potential for an affordable housing linkage fee to be imposed as a one-time monetary charge on new developments with a 2011 Affordable Housing Benefit Fee Study. The city's Housing and Community Investment Department has continued to research options to fund the development of affordable housing in the city. Seven options were identified by the department as of November 2015, with the recommended option being the affordable housing benefit fee or "linkage fee" option. At this time no fee level has been set, though it was cited that had the 2011 study's low-range fee been set, the city could have collected an average of $37 million in annual revenue, which could have financed 370 affordable housing units per year. The Housing and Community Investment and City Planning Departments noted the fees in other California communities and requested $500,000 of the city's budget to pursue another nexus study.

City of Portland, Oregon

In late 2015 the City of Portland approved a nexus study to assess the impacts that commercial and residential development have on the need for affordable housing. The results are expected in summer of 2016. The issue of affordable housing is cited among the most critical by Portland's housing commissioner, and the nexus study is just one of many measures being implemented to improve this outlook.

City of Denver

A number of Colorado communities, including Boulder, Aspen, and Vail, have already implemented commercial linkage fee programs. Denver's mayor recently proposed an affordable housing initiative that would raise over $150 million to create or preserve 6,000 affordable housing units. A part of this initiative included conducting a nexus study to evaluate the potential for imposing an affordable housing linkage fee on commercial developments. The results of the study, which evaluated linkage fees up to $7.00, are currently under review.