Trends in Somerville:
Land Use Technical Report
May 2011

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1. INTRODUCTION – LAND USE IN SOMERVILLE

A. INTRODUCTION

Somerville, Boston, Brookline and Cambridge, comprise greater Boston's central hub. According to the 2000 Census, Somerville's population of 77,478 makes it the second smallest population (after Brookline), and its area of only 4.1 square miles makes it the smallest geographic area in the inner core.

This is the fifth report in a series on Trends in Somerville. The first dealt with Population Trends; the second, Economic Trends; the third, Transportation and Infrastructure Trends; and the fourth, Housing Trends. This report analyzes the results of a city-wide parcel-by-parcel land use inventory and identifies where commercial, industrial, residential, civic, and open space land uses are located. Through evaluation of current and historical land use trends, Somerville can plan for the efficient use of its most constrained resource.

The report is divided into seven (7) subject sections:

1. Introduction – Land Use in Somerville
2. Commercial Land Use
3. Industrial Land Use
4. Residential Land Use
5. Civic Land Use
6. Open Space Land Use
7. Other Land Attributes

B. DATA AND METHODOLOGY

This study is a quantitative analysis of existing patterns of land use. Parcel-specific data provided by Somerville's Assessing Department was augmented by a city-wide land use inventory that took place during the summers of 2008 and 2009. City staff and representatives of several community organizations[1] covered every street to validate/invalidate and supplement the Assessor's data.

The land use inventory lends the advantage of "first hand" observation of all of the properties in Somerville – the first time this has been done in the City's history. However, since the methods developed for the survey inventory are independent and (purposely) adjusted from existing land use classifications that are employed at the State or Federal level, the data are not apples to apples. There are analyses in this report where reference to survey data may differ or even contradict other sources and it's important to note the sourcing for a given piece of data when evaluating such instances.

Multiple data cleanup activities were necessary in order to create a usable dataset for mapping and quantitative analysis through use of geographic information systems (GIS). The final dataset contains one record per parcel identified by the parcel's Map-Block-Lot (MBL) label. Because the Assessor's data sometimes contained multiple records per MBL or several MBL's per single parcel, some data reconfiguration was necessary to translate these sources accurately into the final data set. For example, when multiple condo units with individual MBL's were located on a single parcel, the data for all of the condos was merged into a single record that included the square footage of the parcel. In other instances, data was missing for select

[1] Thanks are owed to Somerville Transit Equity Partnership (STEP), Groundwork Somerville, Somerville Community Corp (SCC), Tufts University students, and others who contributed significantly to the inventory.

records because they have been made "subordinate" to another parcel under the same ownership and were therefore subsumed by the other parcel.[2] Where information was available to identify the parcels that had been linked, either through physical survey, use of Pictometry® software, or other sources, the subordinate parcel data was manually separated from the primary parcel data and given its own dataset. Additionally, records that did not have a unique MBL referring to the parcel, such as railroad rights-of-way, were discarded.

Overall, the structural differences between the Assessors data and the land use inventory are modest. However, the greater detail and more up-to-date information provided by the land use inventory allows for a much finer understanding of the use characteristics on any given parcel.

Additional data sources included InfoUSA, the 2000 U.S. Census, MassGIS, and the Massachusetts Department of Revenue, as well as additional research and analysis completed by the Office of Strategic Planning and Community Development.

C. HISTORY OF LAND USE & POPULATION IN SOMERVILLE

In the 17th and 18th centuries, land in Somerville was primarily used for agriculture. As the adjacent urbanizing center of Cambridge grew, an important route (now Washington Street) was established, connecting Cambridge to Boston through Somerville. Washington Street is the earliest known thoroughfare in the city. Built in 1628 (two years before Boston's settlement) under the original name of "Road/Highway to Newtowne," Washington Street ran from the Charlestown Neck to Harvard Square.

Somerville's ridgeline of hills naturally defined the east-west travel routes of Broadway, Somerville Avenue and Highland Avenue, with 11 north-south roads built between 1681 and 1685 connecting them. Other early roads include Winter Hill Road (now Broadway), which ran to Medford and later connected with Arlington; Charlestown Lane (once known as Milk Row and now Somerville Avenue), extending from Washington Street to Medford as a main route through Somerville; and Main Street, running from Winter Hill to Medford over Craddock's Bridge (the first bridge built over the Mystic River). In addition, eight lanes known as "range ways" led from Washington and Bow Streets, Somerville Avenue, and Elm Street over the hills to Broadway, each of them one-quarter mile apart to make space for hay fields. These included Franklin, Cross, Walnut, School, Central, Lowell, and Cedar Streets, and Willow Avenue.

Land in early Somerville was used primarily as grazing commons and small farms. Somerville gained its independence from Charlestown in 1842, but did not experience significant growth until after the Civil War.

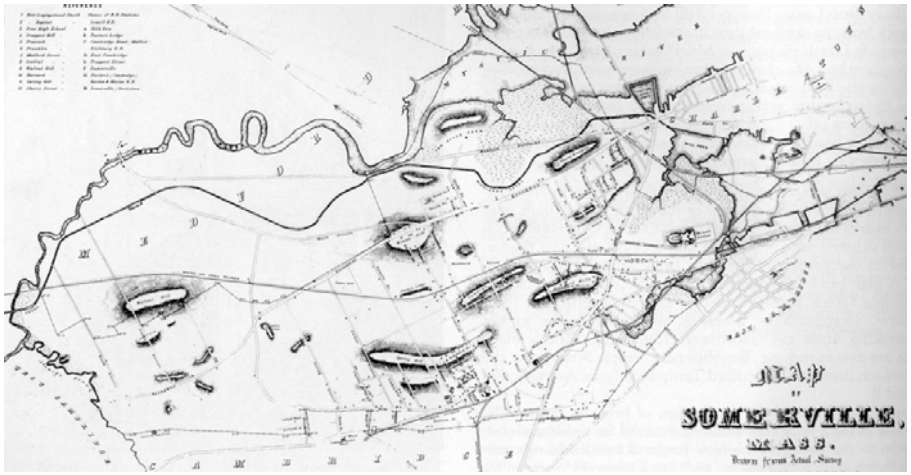
After the Civil War, more affordable transportation provided by rail and streetcar increased the desirability of Somerville as a residential location. Residents were moving to the city from throughout New England, raising the population to 29,971 in 1885 from only 1,013 in 1842. Industry, in addition to residents, followed the new rail lines and became clustered around the Fitchburg railroad line. In addition to the Boston commuters that were increasingly populating the city, workers' housing was developed adjacent to the burgeoning industries. One legacy of this form of development is the relatively dense neighborhood of housing clustered along the Fitchburg rail line. In 1852, surveyor George Draper produced one of the first maps of Somerville based on actual land surveying, where one can

[2] *The process of subordination is authorized under State Assessing Law (M.G.L. Chapter 59) as a means of efficiency for the Assessing Department and property owners.*

begin to see the structure of what makes up modern-day Somerville (see Figure 1-1).

The Industrial Revolution arrived in Somerville just prior to its incorporation as a city in 1872. Industry erupted along the railroad corridors, particularly in the southeast where several lines crossed. This low floodplain, the Miller's River marsh, was turned into rail yards, slaughterhouses, and other large-scale land uses. Entrepreneurs capitalized on Somerville's natural resources and labor supply. The city quickly became home to a variety of industries, most prominently brick-making and meatpacking, which were added to older industries, such as dairy farms and stone quarries. In addition to industrial growth, infrastructure improvements continued to foster growth throughout the city. The railroads built new stations, linking newly settled Somerville neighborhoods to Boston and establishing the attractiveness of these neighborhoods. The electric streetcar was introduced in 1889, encouraging new development around Union, Gilman, Davis, and Teele Squares. New high-pressure water service enabled the subdivision of properties along the highest hills, from Prospect Hill to Winter Hill.

Figure 1-1: Draper Map of Somerville, 1852[3]



Over time larger agricultural estates were subdivided to construct new housing at the end of the nineteenth century and two-family houses and three-family houses began to be built across the city. This was coupled with a practice of inserting short streets into the interior of large blocks in order to add more housing, which ultimately produced the compact and intimate pattern of development that remains to this day. Construction activity between 1890 and 1900 was so significant that approximately 50% of all of Somerville's current residential structures were built during that ten-year period.[4] Among the last areas of the city to be developed were the Ten Hills and Mount Benedict (also known as "The States") neighborhoods, which were filled with predominantly two-family homes by 1920.

[3] *Source: City of Somerville Map Collection*
[4] *Beyond the Neck, The Architecture & Development of Somerville, Massachusetts, 1990, page 74*

Only a few public parks were constructed before or during the housing boom at the turn of the 20th century. In the 1870s, two major parcels were dedicated as permanent open space: Central Hill Park (current home of Somerville's High School, City Hall, and Central Public Library) and Broadway Park (now Foss Park, currently owned and operated by the Department of Conservation and Recreation). Private estates were largely sold for development and, in fact, only one tract of land was donated to the City for public use – Nathan Tufts Park in 1890.[5] After the turn of the century, the City dedicated only two major parks: Lincoln Park (1900) and Trum Field (1903).

At the beginning of the 20th century, brick apartment buildings were constructed along a number of thoroughfares. These new buildings primarily served commuters while the wealthier residents of earlier days began a pattern of leaving the city for more suburban locations. In the same period, the commercial nodes that have persisted through today also took shape.

This period of rapid growth and construction was also accompanied by increasing debate about the quality of growth in Somerville. Reformers lamented the loss of open areas and urged the integration of landscaping into development plans. Pressure from such groups combined with nationwide trends to result in the enactment of the city's first zoning ordinance in 1925. Shortly thereafter, the city's population reached 103,908 in 1930 and reached its peak at 105,813 during World War II. While post-WWII development was significantly less than in prior era's, the developments in this period tended to be larger, including several high-rise developments for the elderly.

Indeed, Somerville's population began a slow decline after WWII until it stabilized several decades later in the 1990's, reaching the 2000 population of 77,478. The razing of the Brickbottom neighborhood in 1950 to prepare for a proposed Inner Belt Expressway and housing demolition associated with construction of Interstate 93 contributed to the decline. In addition, in the 1950's and 1960's, industry slowly moved outward to the metropolitan fringes, encouraged by highway access and cheap, unbuilt land. The Ford Motor Plant at Assembly Square, which had been one of the region's largest employers, closed in 1958.[6] Also, as noted in the *Population Trends Report*, household sizes also declined during this period.

In the last years of the 20th century, growth and change returned to Somerville. New development, primarily consisting of infill projects, occurred in the residential areas and various commercial or industrial zones. In 1986, subway service was extended through West Somerville to Alewife, spurring reinvestment in neighborhoods such as Davis Square and Porter Square. Rent control in neighboring Cambridge ended in 1994, resulting in an influx of residents seeking affordable housing. Immigration has also helped reinvigorate Somerville: foreign-born residents numbered 17,000 in 1990 and 23,000 in 2000.

Although the form of Somerville was set more than a century ago, new developments hold great promise and in the first decade of the new century, Somerville has positioned itself for renewed population and economic growth. The redevelopment of Assembly Square will create a vibrant new neighborhood, and the anticipated MBTA Green Line extension provides the opportunity to identify appropriate infill opportunities in other parts of the city.

[5] *Beyond the Neck, The Architecture & Development of Somerville, Massachusetts, 1990, page 58.*

[6] *Somerville, Massachusetts: A Brief History, 2008, page 25*

D. CITY-WIDE LAND USE

1. The foundation for land use in Somerville today was established by the city's natural features (e.g. topography, waterways, etc.) as modified by human interaction during the 19th and 20th centuries, land subdivision during the early farming years, and the industrial economy.

Centuries ago, glaciation left a series of drumlins running west to east across the landscape of what would become Somerville. These ridges would later become known as the "seven hills of Somerville" and each was named (Central Hill, Clarendon Hill, Cobble Hill, Mount Benedict, Prospect Hill, Spring Hill, and Winter Hill.) These hills rise from the floodplain of the Mystic River and Alewife Brook, and generally run west to east, providing for beautiful vistas of Boston to the south and Medford/Everett to the north. Physical boundaries are also defined by prominent waterways: the Mystic River to the north, the Alewife Brook to the west, and the Miller's River (now underground) to the southeast.

The strong road network and the new Middlesex Canal provided the means for dairy farmers in western towns to move their products through Somerville to Boston, and Somerville agriculture shifted largely to small crops and fruit orchards during the 1800s[7].

In 1835, railroad construction began, resulting in the establishment of the Boston-Lowell line and the Fitchburg line within a decade. The railroads heralded both the industrial and residential expansion that would define Somerville's growth throughout the mid-1800s.

The railroads had a significant early impact on the landscape. New passenger rail service drove the subdivision of land into house lots, though the cost of railroad travel was prohibitive to all but the wealthiest citizens. Industry erupted along the railroad corridors, particularly in the southeast where several lines crossed. As a result of significant land movement and the elimination of former Cobble Hill, this low floodplain, the Miller's River marsh, was turned into railyards, slaughterhouses, and other large-scale land uses. Eventually, the uncontrolled filling and industrial occupation of these tidal flats between Somerville and Cambridge caused enough pollution that the Commonwealth decreed that the river be filled.

The land-use pattern that the City would follow for the next 50 years had been set, with commerce and industry locating in the lower elevations and along major travel routes, and residential lots on the hillsides and higher elevations. As the western part of the city opened up, orchards, farmlands, brickyards and marshlands were redeveloped into tracts of predominantly two- and three-family housing.

2. Due to the extent of existing roadways (approximately 25 miles of road per square mile of land) Somerville has less land available for other purposes than other surrounding communities.

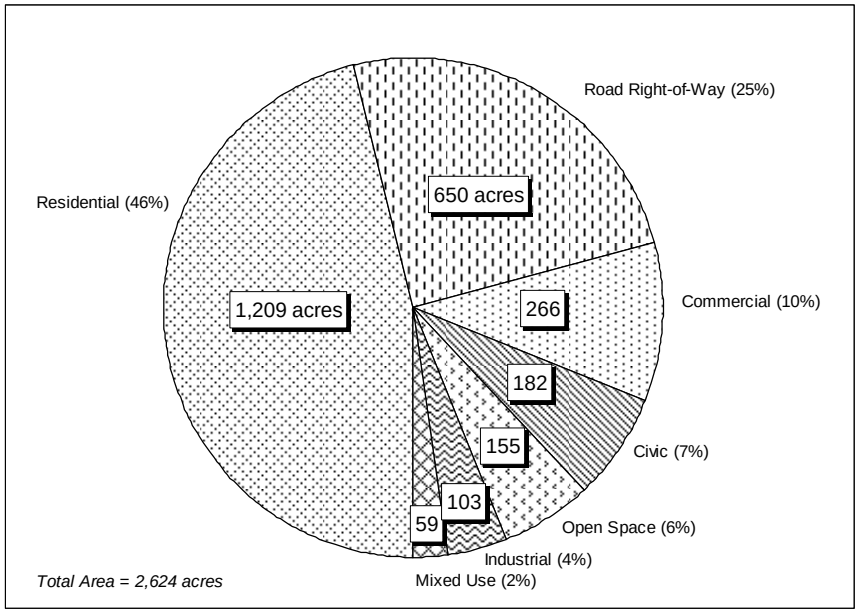
As discussed in the *Transportation & Infrastructure Trends Report*, Somerville contains a total of 105.6 miles of paved streets, of which 88.1 miles are under local jurisdiction, 3.2 miles are under Mass Highway jurisdiction, and 4.1 are under DCR jurisdiction; the remaining 10.3 miles are listed as unaccepted or private (those roads which no state, city, or institution has authority over). The City is responsible for maintaining a total of 683 roads, which include both public and private streets. The City does not maintain state roads,

[7] *Beyond the Neck, The Architecture & Development of Somerville, Massachusetts, 1990, page 18.*

such as McGrath Highway and Alewife Brook Parkway, which are under the jurisdiction of the Commonwealth.[8]

With few exceptions, all of the land in Somerville is used actively by nearly 80,000 residents. Figure 1-2 shows the division of land in Somerville by land use category. By far the largest land use category, comprising nearly half of city land (over 1,200 acres), is devoted to residential uses. The second highest use of land is road rights-of-way, which account for approximately 25% of Somerville's land area (650 acres). Commercial, industrial and land used for mixed use purposes collectively account for 16% of land area. Open space represents a modest 6.75% of land area or 155 acres.

Figure 1-2: Somerville's Land Use[9]



At just 4.1 square miles, Somerville contains more miles of roads per land area than surrounding communities. By comparison, the cities of Cambridge and Chelsea each have 20 miles of road per square mile of land compared to Somerville's 25 miles of road per square mile.

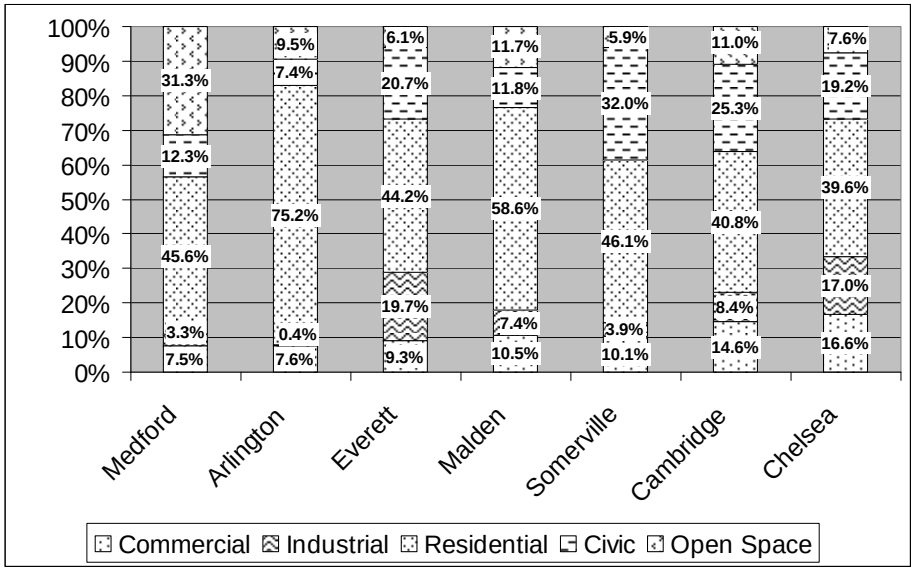
As illustrated in Figure 1-3, Somerville has less land dedicated to residential uses than Arlington and Malden. However, Arlington and Malden are much larger cities in terms of land area than Somerville. Further, it is important to recognize that in Figure 3, the "Civic" land use category also includes roadway infrastructure. As a result, Somerville's high percentage of land dedicated to civic uses is deceiving. In fact, once roads and rail infrastructure are stripped from this percentage, only 4% of Somerville's land area is dedicated to

[8] EOT, Office of Transportation Planning. (2008). *Road Inventory Year End Report 2008*. "Centerline Miles Table 5: City/Town by Jurisdiction". pp. 19-24.

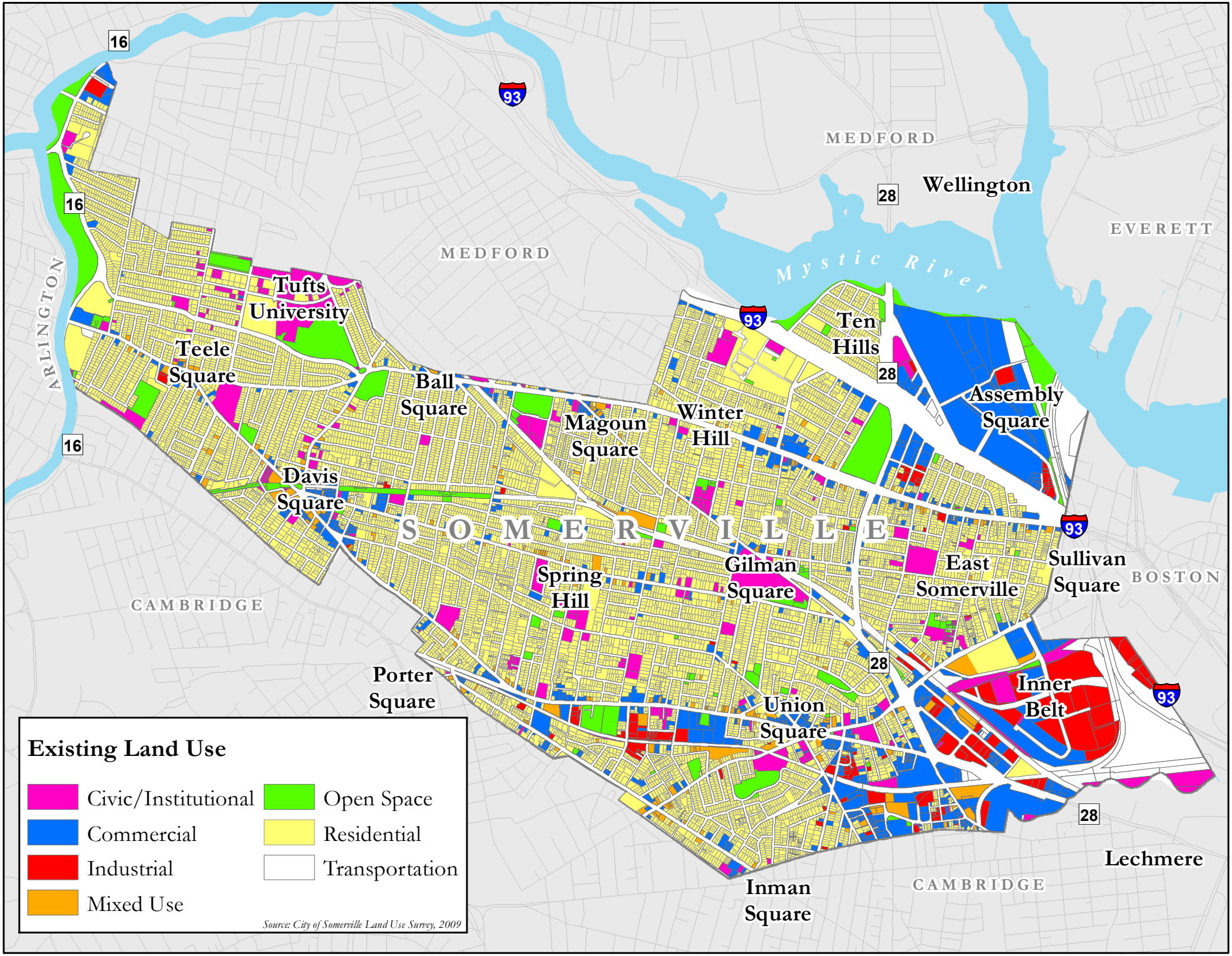
[9] Land Use Inventory 2009.

civic use - schools, public buildings, institutions, and other public gathering places.

Figure 1-3: Regional Comparison - Land Use[10]



[10] Mass GIS 2005, Land Use Inventory 2009.


16
93
MEDFORD
Wellington
28
EVERETT
16
MEDFORD
Mystic River
ARLINGTON
Tufts
University
93
Ten
Hills
Teele
Square
28
Ball
Square
Assembly
Square
Magoun
Square
Winter
Hill
16
Davis
Square
SOMERVILLE
93
Gilman
Square
East
Somerville
Sullivan
Square
BOSTON
Spring
Hill
CAMBRIDGE
28
Porter
Square
Inner
Belt
93
Union
Square
28
Lechmere
Inman
Square
CAMBRIDGE
Existing Land Use
Civic/Institutional
Commercial
Industrial
Mixed Use
Open Space
Residential
Transportation
Source: City of Somerville Land Use Survey, 2009

2. COMMERCIAL LAND USE

A. HISTORY OF COMMERCIAL DEVELOPMENT

1. Most of the commercial parcels in Somerville developed during the late 19h and early 20th century and 90% of the parcels in active commercial use today have been used for commercial use for more than 60 years.

Somerville's commercial parcels were developed predominantly along with the rapid growth experienced in the beginning of the 20th century, however, the development of commercial land lagged slightly behind population growth. This was due to the fact that commercial and industrial centers which started in Boston and Cambridge attracted new workers who moved to surrounding towns before the economic activity itself expanded outwards. With the construction of the Middlesex Canal, then the later expansion of the railroad and streetcar networks into Somerville the expansion of the local industrial base and accompanying commercial sectors followed.

As shown below in Figure 2-1, development of commercial parcels surged in the periods of the 1890's and the 1910's where over half (305 of 594) of these properties were built upon. In addition, Figure 2-2 shows the rate of build out for commercial land use types compared with non-commercial types. Commercial parcels lag slightly behind until the 1870's when it pulled strongly ahead. Following this, commercial development, along with industrial and exempt property development maintained a low steady pace during the years after 1950.

Figure 2-1: Commercial Properties Newly Developed per Decade[1]

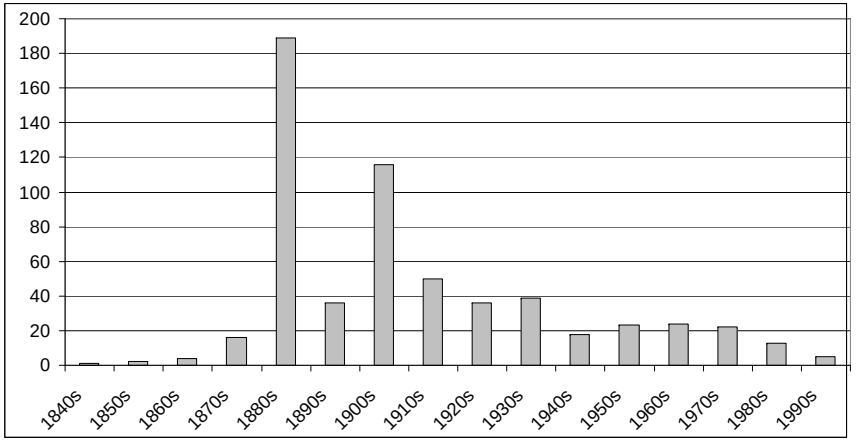
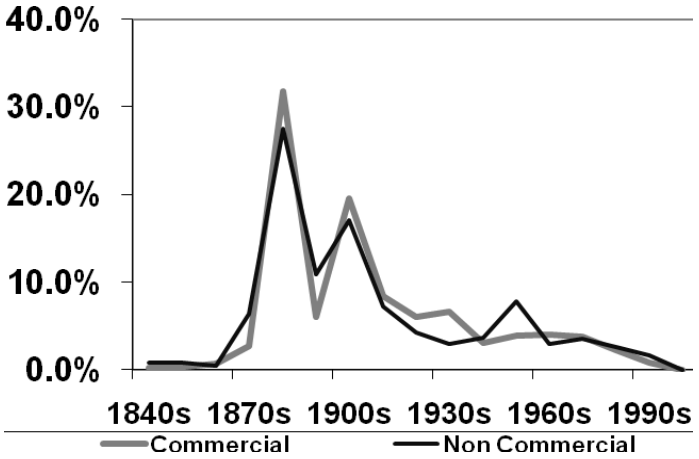


Figure 2-2: Build-Out of Commercial Parcels over Time[2]



[1] *Somerville Assessing Department, 2010.*
[2] *Somerville Assessing Department, 2010.*

2. Somerville does not have a central downtown area but instead is characterized by numerous squares of varying size and industry mix.

Somerville's commercial property is not concentrated in a recognized downtown business district but instead is spread over many different nodes or corridors of business activity. The difference in character ranges from the vibrant nightlife, live music and theaters of Davis Square to the large scale retail and highway access of Assembly Square. This spatial allocation is directly related to the early influence of rail and streetcar systems which caused economic activity to occur at stops. The other key factor in the creation of commercial squares is the area's topography. The numerous hills making up Somerville's landscape determined where road networks would allow neighborhood commercial development. These occurred both at the intersection of dense residential areas and in low-lying flood plains near either the Alewife Brook or the Mystic and Millers River that provided access points for early industry and complimentary commercial uses.

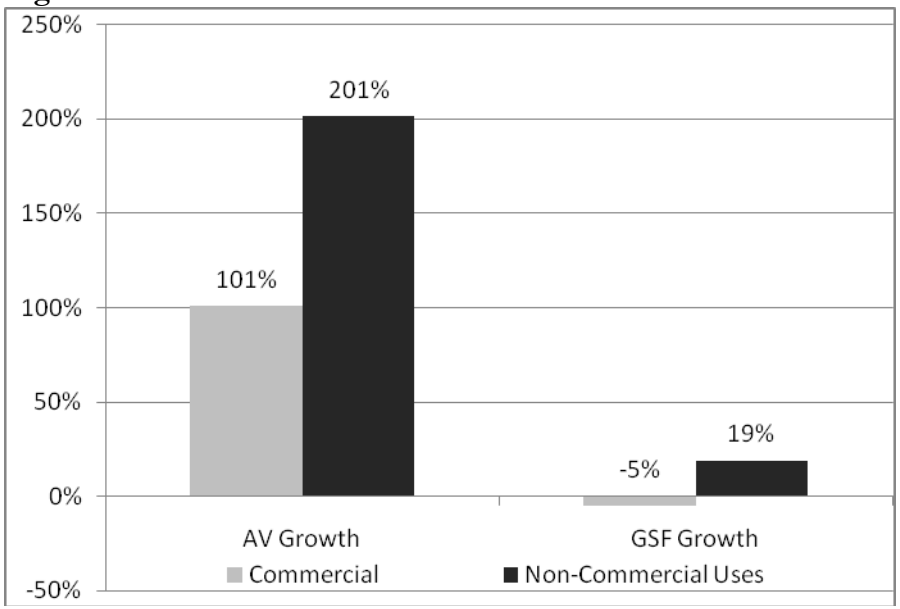
3. Commercial growth has continued to slow in recent decades, especially in the 1980's. Built gross square feet of commercial property and assessed value of commercial property have not kept pace with other uses.

Development of commercial space has not kept pace with the other major property use types during the period from 1980 to 2010. The total value of commercial property in Somerville has increased from $360 M in 1991 to $744 M in 2010. This increase, almost exactly doubling in twenty years, has not kept pace with the tripling of value of non-commercial properties.

Figure 2-3: Somerville Commercial Squares

In fact, gross square feet of commercial property has not just slowed, but declined over this period. The 1991 level of 6.2 million square feet has shrunk to 5.8 million square feet as commercial lots either converted to other uses or reduced their density in the face of market down-cycles, not to return.

Figure 2-4: Growth in Assessed Value and Gross SF 1991 – 2010[3]

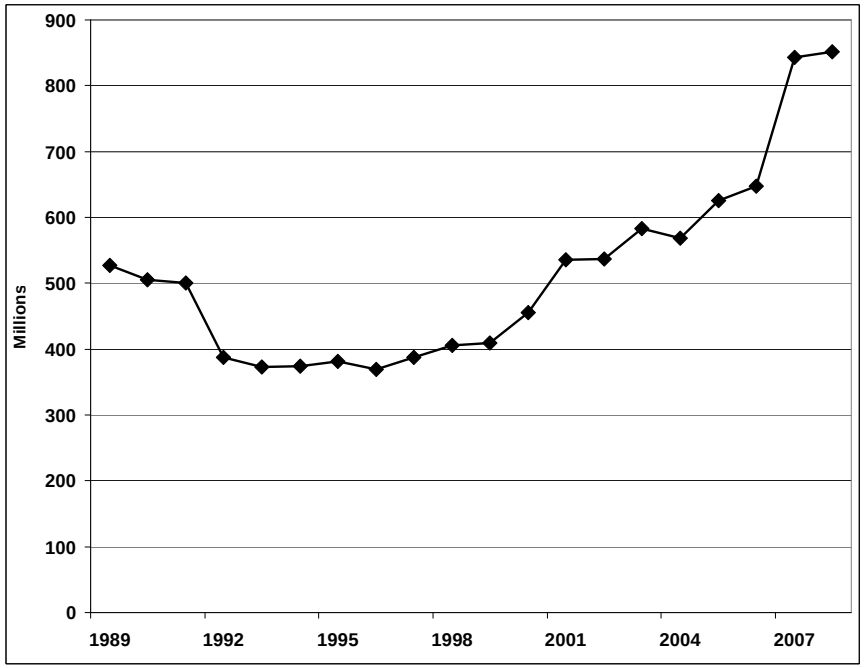


4. Land area devoted to commercial uses in Somerville has remained essentially constant since 1990.

Data recorded by the Assessing Department suggest that the city has approximately the same amount of commercial land today as in 1990 and 2000. According to standards developed by the Commonwealth of Massachusetts, assessing officials assign "commercial" classifications to privately-owned properties for office, retail, restaurant properties, commercial warehouses, automobile-related businesses, personal services, entertainment and accommodation. Properties excluded from commercial classification include residential, public or institutional offices, industrial warehouse properties, and many types of mixed-use properties.

As illustrated in Figure 2-5, after a period of growth during the early 1990's, a sharp drop in commercial land use was recorded between 1992 and 2000.

Figure 2-5: Commercial Land Use Value, 1989-2009[4]



[3] *Somerville Assessing Department, 2010.*

[4] *Somerville Assessing Department, 2010.*

B. CURRENT CONDITIONS

5. Somerville has limited land designated for commercial purposes; the acreage of residential land and right-of-way together is nearly ten times greater than commercial land.

According to recent land survey, Somerville has 266 acres of land in commercial use. This places commercial use far behind the two dominant land uses-residential and transportation right-of-way. Commercial properties are predominantly found in dense squares that were the original transit nodes from the period of rail and streetcars.

Commercial land exists throughout the city, as illustrated in the graphic at the end of this chapter. While Davis Square and Union Square are home to much of the commercial activity, it also shows that commercial land exists in the neighborhoods and along Somerville's rail and transportation corridors.

6. Somerville's commercial layout is indicative of historic land use patterns.

The history of development in Somerville has not yielded one clear downtown central business district like many other communities and is instead characterized by a number of smaller commercial nodes. Commercial activities are typically centered around the major transportation intersections of Davis Square, Union Square, Teele Square and Magoun Square as well as main street corridors of Broadway, Highland, McGrath and Somerville Avenue. It is important to note that change in or size of commercial acreage does not directly imply economic growth or decline rather it is a measure of how much area is devoted to commercial uses.

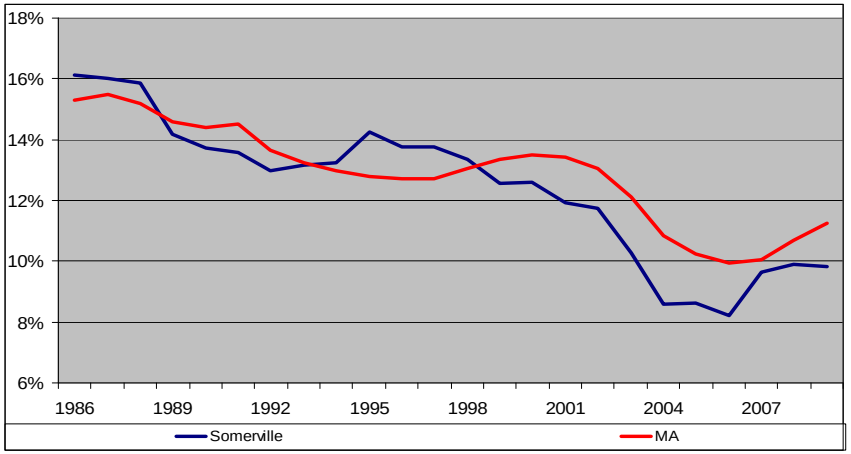
7. Although Somerville's commercial property value has increased in nominal terms from $317.1 million in 1986 to $826.2 million in 2009, during the same time period the percentage of commercial property relative to overall property value in the City decreased from 16.1% to under 10.0%.

The nominal value of commercial property nearly tripled over the last twenty four years. This increase in valuation was common across the State of Massachusetts and commercial property in the Commonwealth increased over five-fold from $183.2 billion to $976.3 billion.

Despite this, increases to value in Somerville's commercial property were exceeded significantly by appreciation in residential property. Again, this pattern is seen in the State as a whole. In Somerville, the effect is more severe, especially in the period starting in the late 1990's and extending through the first half of the 2000's. During this period Somerville saw its share of commercial value drop from approximately 14% to less than 10% of total property value.

While inflation of price for commercial property is common over time, the rate of increase seen in recent decades is above historical averages. This was proven to be an unsustainable bubble as evidenced by the real estate collapse starting in 2009. Fortunately for Somerville (and Metro Boston), price correction in property has not been severe as in areas that saw dramatic real estate expansion such as the Florida, California and the south west.

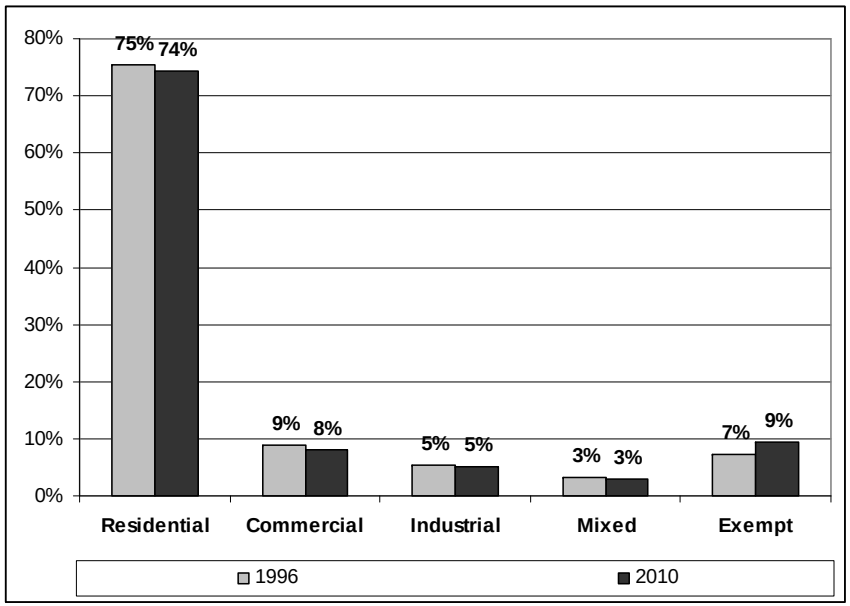
Figure 2-6: Commercial Assessed Value as Share of Total[5]



8. The intensity of development on commercial land is low compared with other uses in Somerville and has decreased over time since the early 90's.

Both in absolute terms and proportionally the amount of gross square feet of commercial property has declined in the last two decades. Gross square feet has decreased from 6.2 million in 1996 to 5.8 million in 2010. This is a marginally small decline, but it comes at the same time that the residential and exempt categories were growing substantially.

Figure 2-7: Gross SF Proportion by Major Use Category[6]

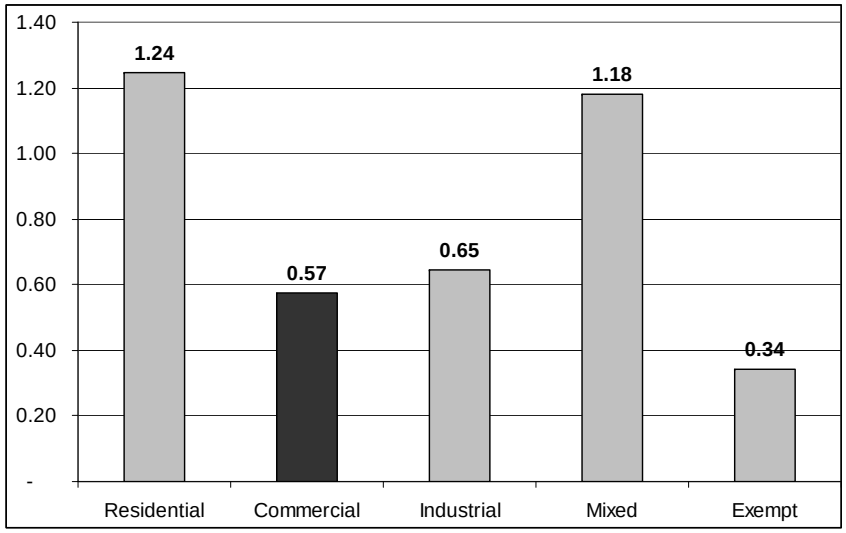


The average floor-area ratio for commercial parcels in Somerville in 2010 is 0.57. This is lower than the citywide average (0.90) for all uses and well below the average for residential (1.24). In contrast to other urban communities, commercial buildings in Somerville tend to be single story buildings with significant accessory parking; residential structures are mostly two and three story houses (some much taller) with smaller amounts of parking.

[5] *MA Department of Revenue, 2009.*

[6] *Somerville Assessing Department, 2010.*

Figure 2-8: FAR by Major Land Use Category[7]

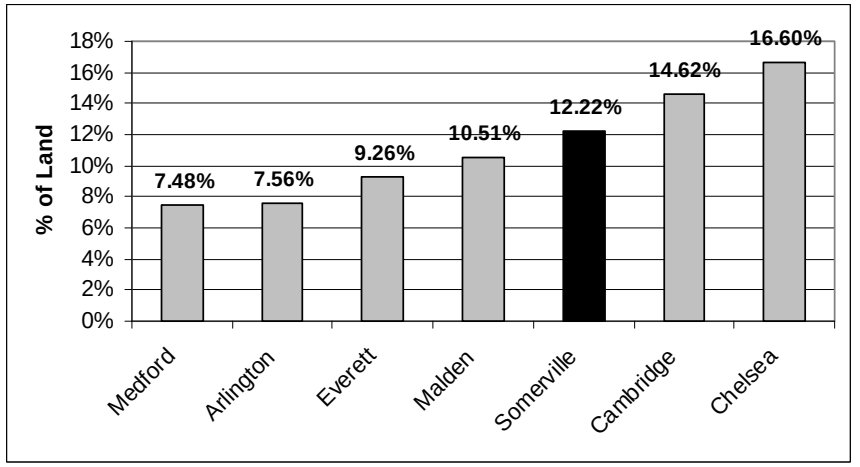


C. REGIONAL COMPARISON

9. Somerville's proportion of commercial land area is comparable to nearby cities. At 12.22%, it ranks behind Cambridge and Chelsea, but ahead of neighboring Medford, Arlington, Everett and Malden.

Somerville's utilization of land use for commercial uses may be low relative to the other major categories. However, this ratio is comparable to other regional neighbors. Cambridge and Chelsea have a higher percentage of commercial land, but Somerville outranks its more suburban neighbors to the north and east. Somerville ranks with Everett and Chelsea as the top ten for smallest municipalities in the State in terms of land area. Figure 2-9 shows that Somerville is positioned between these two cities. Everett has an even larger concentration of residential area, while Chelsea (which is less than half the size of Somerville at 1180 acres) comes in with the highest commercial concentration.

Figure 2-9: Commercial Land as % of Total Land Area 2009[8]



When compared to the rest of the region Somerville has a much higher percentage of its total land used for commercial purposes than communities that were developed later. This reflects the traditional land use patterns often found in older communities like Somerville where residential areas were never far away from local businesses. As noted earlier, Somerville largely began as a residential suburb of Boston that added considerable commercial activity when the rail lines opened. This pattern was not followed in other nearby communities such as Medford and Arlington.

Somerville's commercial property is divided into 605 parcels, representing 3.8% of Somerville's 15,800 parcels. While commercial properties are large compared to residential properties, the average

[7] *Somerville Assessing Department, 2010.*

[8] *MA Department of Revenue, 2009.*

commercial parcel remains less than 20,000 square feet in size. Commercial properties tend to be larger due to the nature of most commercial operations requires a larger ratio of square-footage per person. This is especially true of warehousing and quasi-industrial uses, as well as uses such as hotels, supermarkets and auto dealerships, that are only viable at a certain lot area.

10. Less than 10% of the total assessed land value in Somerville comes from commercial land.

Figure 2-10: Commercial Assessed Value as % of Total, 2009[9]

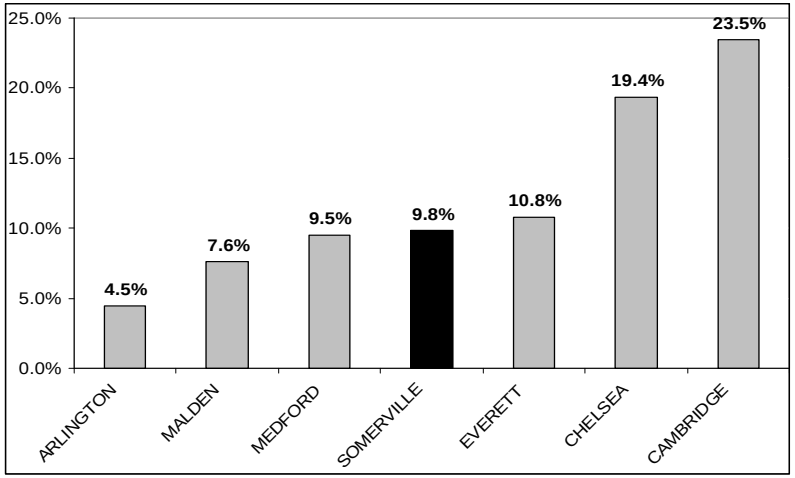
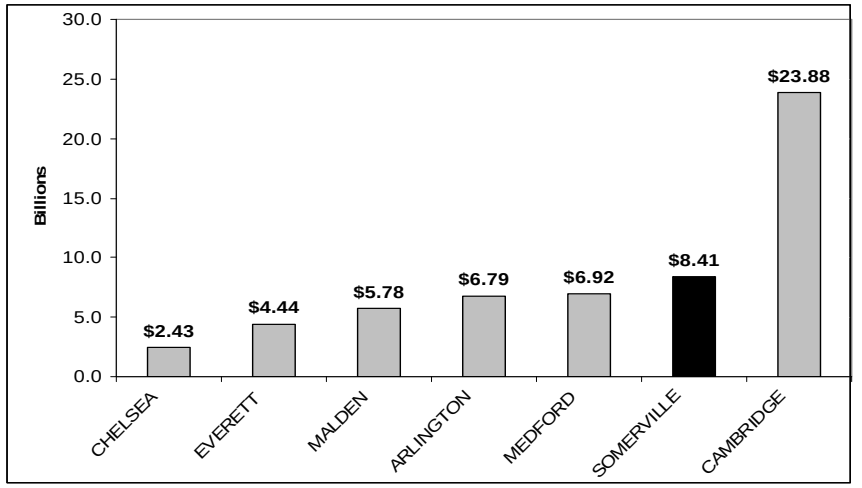


Figure 2-11: Total Commercial Assessed Value, 2009[10]

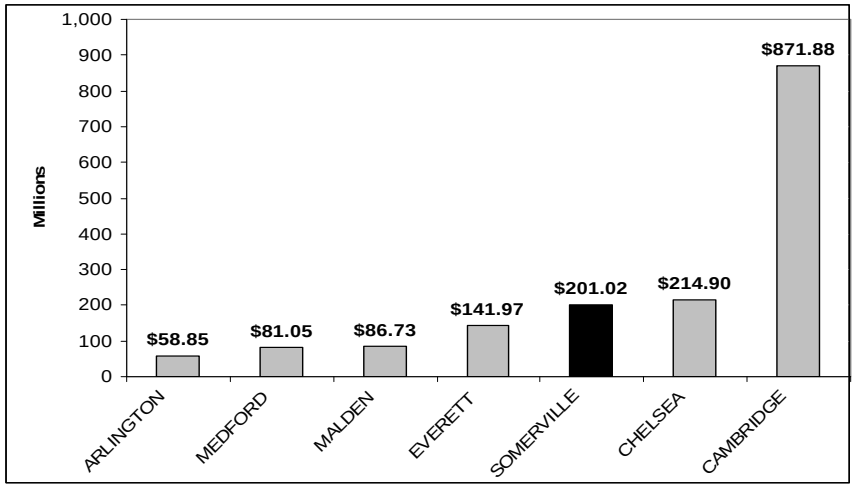


Proportional assessed value conveys a similar picture: Somerville is in the middle of the pack for municipalities neighboring Boston on the north side of the Charles River. The difference in ranking is that Everett move slightly above Somerville. Also apparent is the magnitude of difference between municipalities. The lot area comparisons had all seven cities within a range of 7% to 17% and Cambridge only twice as much as Arlington. The proportional assessed value comparison reveals the strong difference in quality, density and location between cities. This difference in magnitude is accentuated further when looking at commercial assessed value not as a share of land use types, but in absolute terms. Cambridge, with nearly $24 billion in commercial value dwarfs the other municipalities.

[9] *MA Department of Revenue, 2009.*

[10] *MA Department of Revenue, 2009.*

Figure 2-12: Commercial Assessed Value per Square Mile[11]

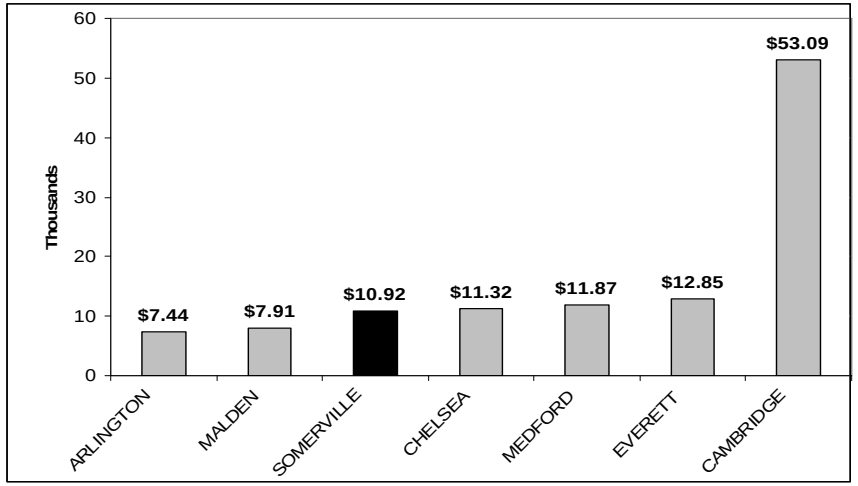


Considerations should be given due to Cambridge's overall size. It is the largest in terms of population and second largest (to Medford) in land area. Still, when accounting for these factors Cambridge is far and away the most value-laden municipality.

11. When considering commercial assessed value on a per capita basis, it can be seen that Somerville receives less revenue from commercial property than many of its suburban neighbors and is absolutely dwarfed by Cambridge.

This advantage was not always enjoyed by Cambridge; in the post-WW2 period many cities in the north east were seeing their industrial base leave for lower-cost areas in the south and west of the U.S. and overseas in developing countries. Cambridge responded to this by reinventing its eastern waterfront and developing deeper links with its institutional partners MIT and Harvard. The result has been a series of new economic engines (IT, Biotech, RnD) that have created millions of new square feet of commercial development. However, many communities, especially those who were heavily tied to industrialism, have struggled to find new sources for jobs, commercial development and tax revenue. The issue of continued tax growth is important in Massachusetts give the effects of proposition 2½. Steady new growth of high value property is needed as costs continually increase at a rate above 2½ %.

Figure 2-13: Commercial Assessed Value per Capita[12]



D. COMMERCIAL SUB- CATEGORIES USES

12. Within the different types of commercial uses, shopping centers, malls and accessory uses take up the greatest amount of acreage in Somerville.

[11] *MA Department of Revenue, 2010.*

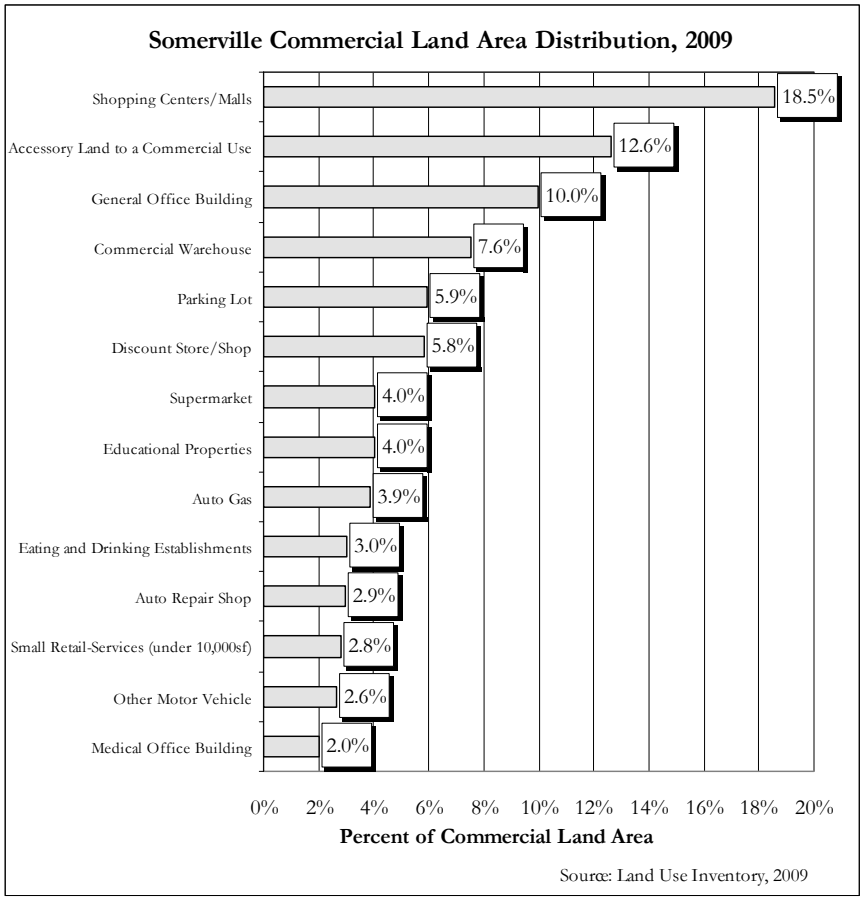
[12] *MA Department of Revenue, 2010.*

Although Somerville is recognized for its urban squares, the largest concentration of commercial land is actually in traditional 'big box' shopping centers and malls. Retail trade is not only the largest subcategory in terms of land area; it also has the most parcels as well as the highest gross square footage (3.8 million), and assessed value ($130 million). This finding is supported by employment data which show that retail trade jobs are the largest sector behind health services and administrative services.

The preponderance of shopping centers and malls is important to Somerville's commercial land use, but it's important to keep in context the way that the built form of this land use type drives the data comparison. Since shopping malls have large footprints and even larger parking requirements compared with other commercial uses (or uses of any type), the total gross area is far lower than other uses, such as office or mixed use, which more efficiently utilize land.

Second to shopping centers is accessory land, which includes the vacant property in Assembly Square and side lots to primary commercial uses that are undeveloped. General office, commercial warehouses and parking lots round out the top 5 and together these represent almost exactly 50% of the land area of commercial uses (still less than 5% of the City total land area). General office structures and warehouses provide tenant space for the other key employment sectors mentioned above. The largest office space in Somerville and the highest tax generating parcel in the City is the Harvard-Vanguard building in Davis Square.

Figure 2-14: Commercial Land Area Distribution, 2009[13]



The remaining commercial land types generally fall into three categories: (1) neighborhood businesses, (2) auto oriented services and (3) non-profit and social services. Many of the higher value and density uses found in Boston and Cambridge are absent in Somerville today. Supply of the proper building types is a key factor in this lack

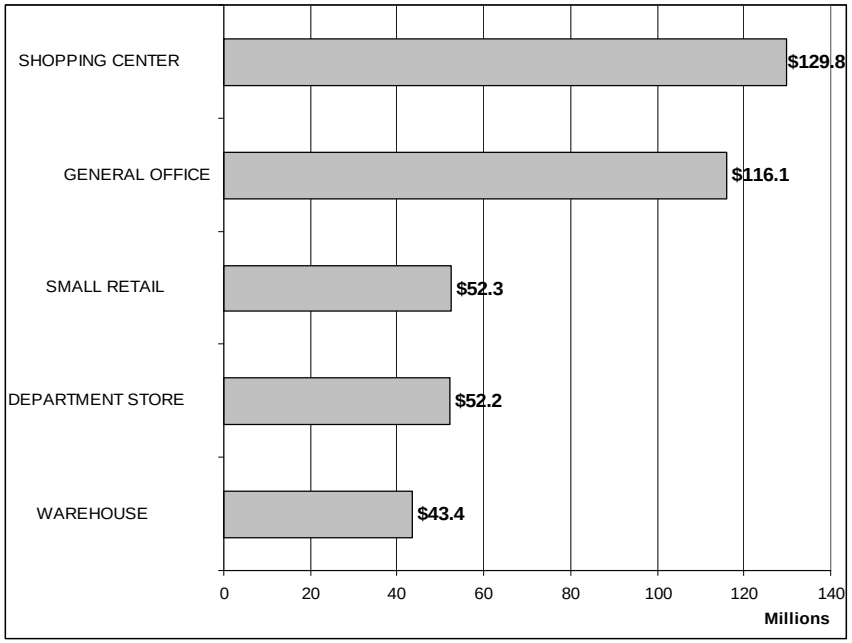
[13] *Land Use Inventory, 2009, Somerville Assessing Department, 2010.*

of high-end commercial, as very little new space has been constructed since the early 20th century (see finding #1).

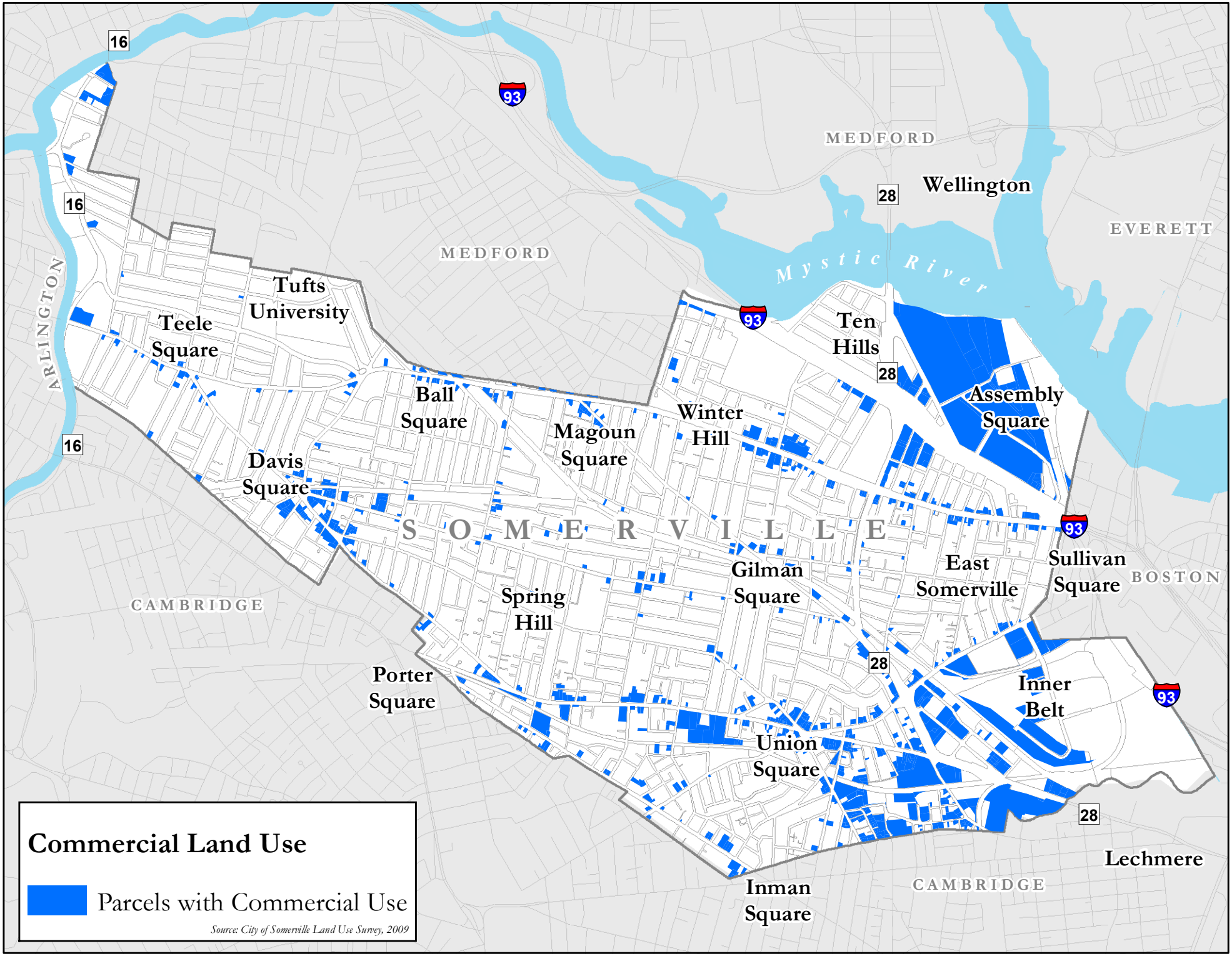
13. In terms of value, Shopping Centers are the largest sub-category within commercial uses. At nearly $130M, these large retail outlets edge.

In terms of value for commercial uses the story is similar with the exception that office buildings (mostly because of their higher average density and high rent tenants) rank higher in assessed value than in land area.

Figure 2-15: Largest Commercial Sub-Categories by Value[14]



[14] *Somerville Assessing Department, 2010.*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Magoun
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Winter
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Assembly
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Davis
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Porter
Square
Inner
Belt
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Union
Square
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Lechmere
Inman
Square
CAMBRIDGE
Commercial Land Use
Parcels with Commercial Use
Source: City of Somerville Land Use Survey, 2009

3. INDUSTRIAL LAND USE

Most industry is located in the southeastern corner of Somerville centered in the Inner Belt and Brickbottom districts. These areas are home to a number of warehouses, distribution centers, service and maintenance industries as well as railroad activities. The Brickbottom area, once the site of a large-scale bakery business, was converted in the 1980's to an artists' cooperative. The area is now home to several creative and boutique manufacturing businesses as well as nearly 200 artists residing in the live/work cooperative.

1. Land used for industrial purposes has declined from 229 acres to approximately 103 acres over the past 60 years.

As common to other cities, Somerville has seen less traditional industrial and manufacturing activity over the last several decades and land dedicated to industrial and manufacturing uses has decreased, giving way to residential and other retail or office uses. According to Assessor's data and data from a 2009 land use survey, over the last 60 years, land occupied with industrial uses has decreased from roughly 229 acres to 103 acres.[1] Today, approximately 4 percent of the city's land remains in use for industrial purposes.

One sizable area that has undergone significant changes in land use is Assembly Square; an area located in the north-eastern section of the city along the Mystic River. This was once the site of a Ford Motor Company automobile manufacturing plant. However, once Ford closed the plant, industrial uses never rooted in that same site. Assembly Square was designated as an urban renewal site and repurposed in the 1980s. It is now the site of a future 60-acre mixed use development that will include office, residential and open space uses.

Of the land being used for industrial activities, there is an estimated 127 parcels. The parcels range in size from 1,287 square feet to approximately 8 acres, located in the Inner Belt District; the average industrial parcel size is approximately 23,496 square feet or just over ½ acre.

2. The majority of the industrial areas are clustered and found in the city's southeastern section; however, there are some industrial areas that can be found scatter, alone, and surrounded by residential uses.

The Inner Belt area is in the southeastern section of the city. It is within this area that most of the city's industrial uses can be found. The Inner Belt area has many large parcels, including the city's largest industrial parcel over 300,000 square feet (just under 7 acres), which is home to Angelica Linen Services, the city's largest employer. The Inner Belt area has a significant amount of space for large-scale warehousing as well as sufficient surface parking to maintain fleets of vehicles which can distribute goods and products regionally. The area is also in close proximity to Interstate 93 and several major urban arterials allowing some industrial businesses easy access to Boston and surrounding communities. Hence, this area has had low vacancy rates and is desirable for certain industries.

3. The majority of Somerville's current industrial parcels can be categorized as Manufacturing Warehousing (56%), and Factory (26%) uses. [2]

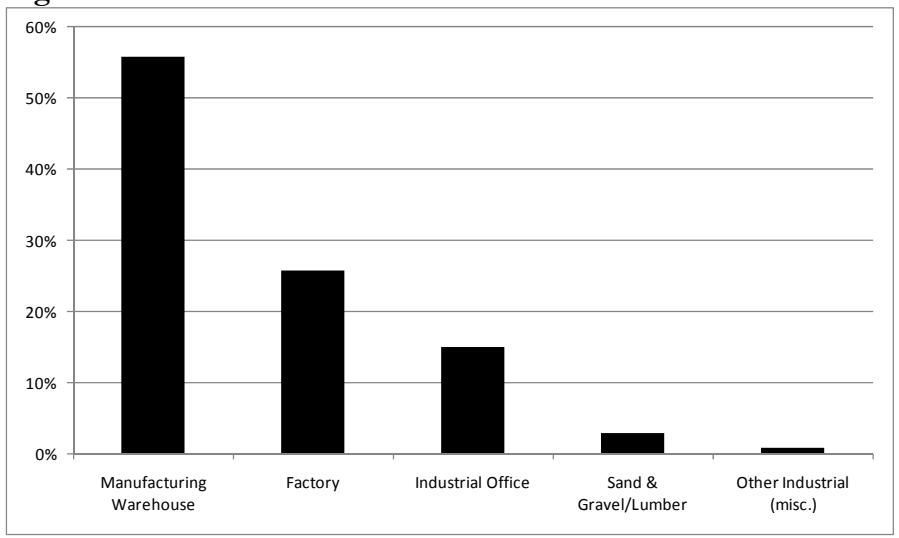
Based on the Assessing data and the 2009 land use inventory data, the majority of the industrial properties that currently exist in Somerville are classified as manufacturing warehouse and factory

[1] *Somerville Assessing Department, 2010, Land Use Inventory 2009.*

[2] *Somerville Assessing Department, 2010, Land Use Inventory 2009.*

activities. Nearly 56 percent of the industrial uses include manufacturing warehousing products as a main function. From this sector approximately 600 jobs are generated, which translates into 5.7 jobs per industrial acre. The second largest segment of industrial land use is factory operations. This makes up roughly 39 percent of the industrial land use. From this sector approximately 375 jobs are generated or 3.57 jobs per industrial acre.

Figure 3-1: Industrial Sectors in Somerville[3]

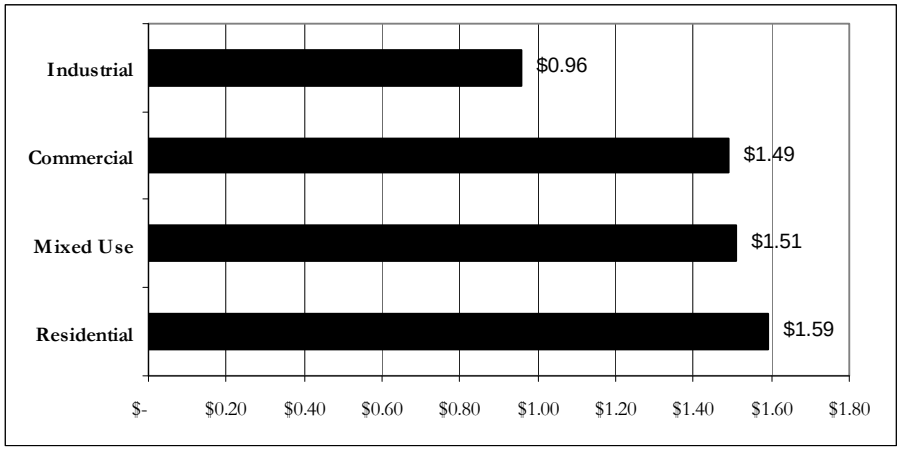


4. Although $5 million of the City's total annual tax levy is generated from industrial uses (5.4%), industrial uses generate less than $1 per square foot in tax revenue.

In addition to a certain amount of employment opportunities, industrial uses contribute to the city in terms of tax revenue. Based on FY2009 Assessor's data, tax revenue derived from industrial uses account for approximately $5 million, 5.4 percent, of the total annual levy.

Data collected from the Department of Revenue for 2010 indicates that every square foot of industrial land in Somerville generates an average of $.98 in tax revenue. Compared to other uses, including commercial ($1.49 per sf), residential ($1.59 per sf) and mixed use ($1.51 per sf), industrial land generates the least in tax revenue for the city.

Figure 3-2: Tax Revenue Generated per Square Foot by Use[4]



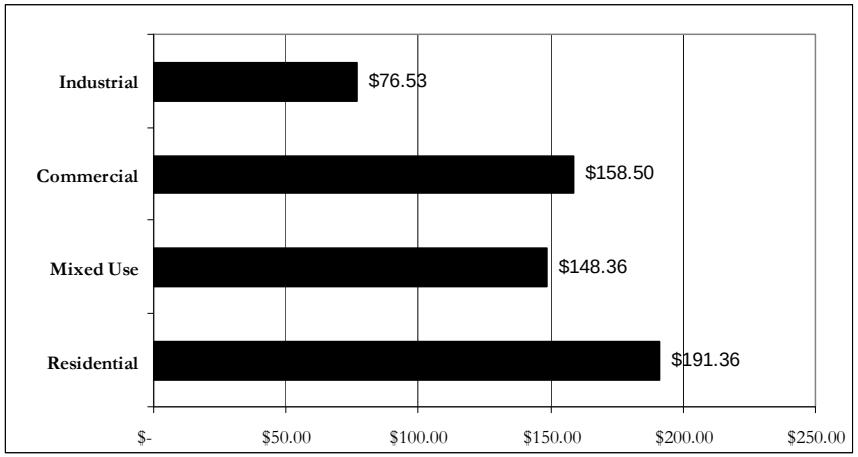
[3] *Somerville Assessing Department, 2010, Land Use Inventory 2009.*

[4] *MA Department of Revenue, 2010.*

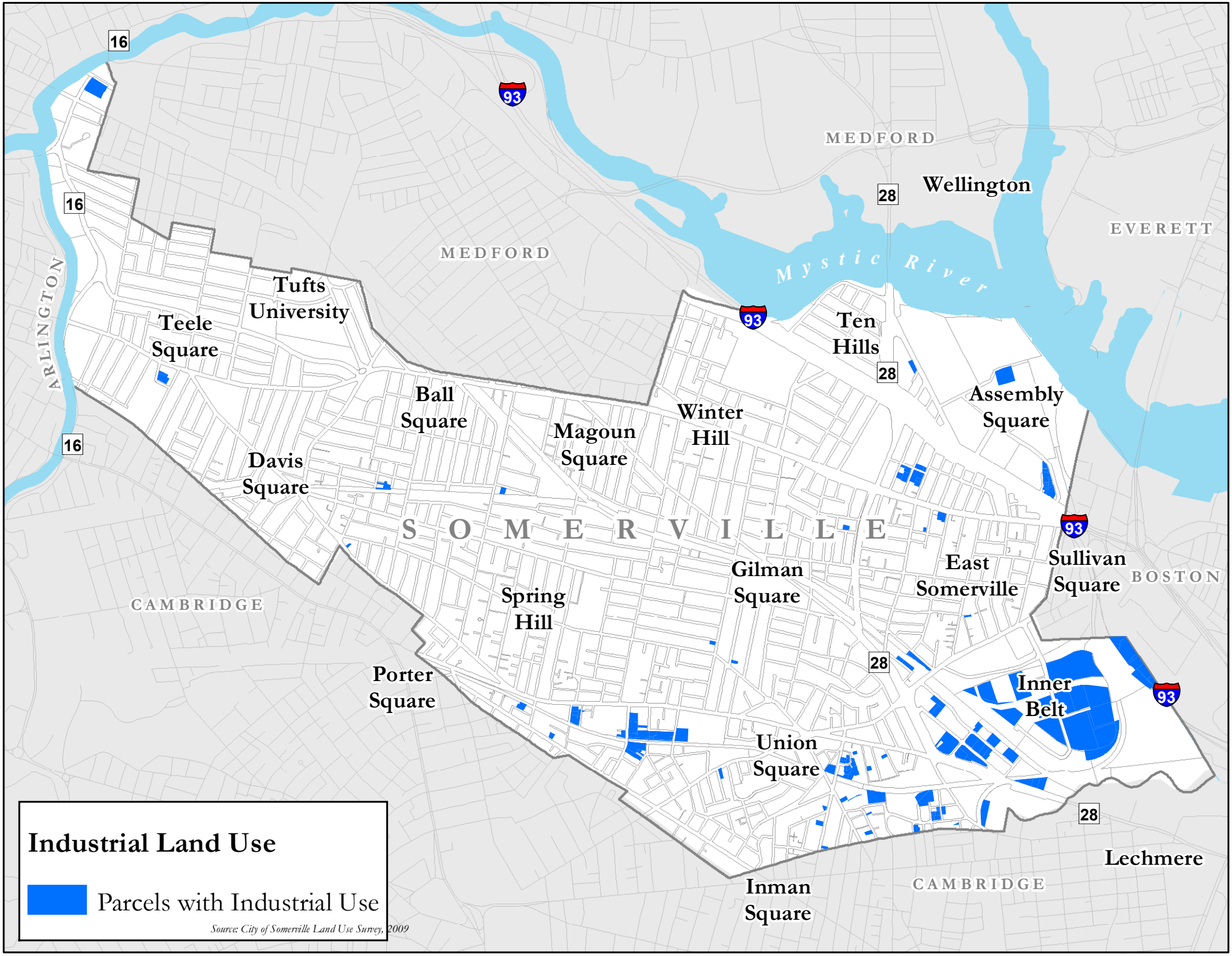
5. Industrial land has the lowest assessed value per square foot of land foot compared to other uses.

Assessor's data submitted to the Department of Revenue for 2010 indicates that industrial land on average is valued at $76.53 per square foot. Compared to other uses, including commercial ($158.50 per sf), residential ($191.36 per sf) and mixed use ($148.36 per sf), industrial land is the lowest assessed value among various uses.

Figure 3-3: Assessed Value per Square Foot by Use[5]



[5] *MA Department of Revenue, 2010.*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Assembly
Square
Ball
Square
Magoun
Square
Winter
Hill
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Davis
Square
SOMERVILLE
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Sullivan
Square
BOSTON
East
Somerville
Gilman
Square
CAMBRIDGE
Spring
Hill
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Porter
Square
Inner
Belt
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Union
Square
28
Lechmere
CAMBRIDGE
Inman
Square
Industrial Land Use
Parcels with Industrial Use
Source: City of Somerville Land Use Survey, 2009

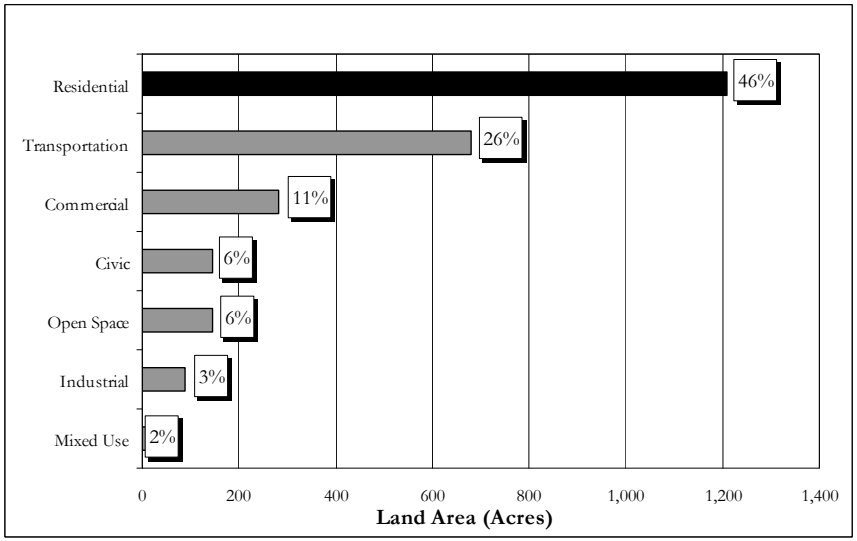
4. RESIDENTIAL LAND USE

While Somerville neighborhoods are recognized for their single-, two- and three-family residences, they actually contain a mix of land uses, resulting in land use patterns that allow residents to readily access goods, services and community facilities.

1. The majority of Somerville's land is used for residential use (1,209 acres or 46% of total land area). During the last two decades, an increasing number of properties have been converted to residential uses.

With approximately 46% of its land area dedicated to residential uses, Somerville offers a diversity of housing opportunities throughout its many neighborhoods. As illustrated in Figure 4-1, over 1,200 acres of land in Somerville are used for residential purposes. No other use represents a comparable share of Somerville's overall land use distribution.

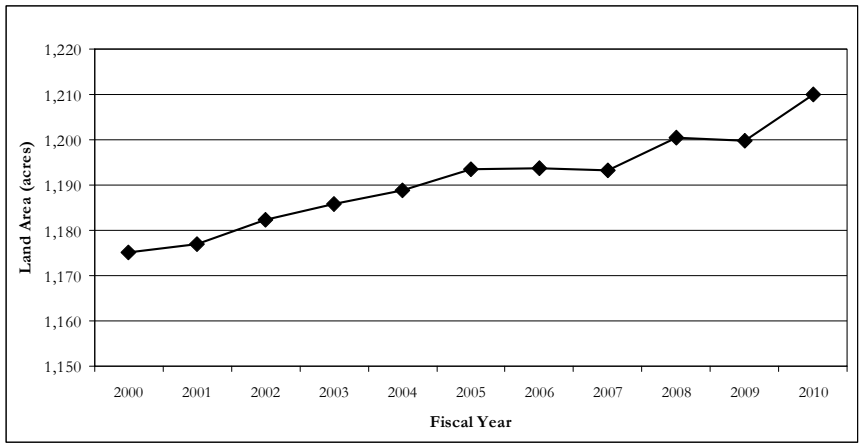
Figure 4-1: Use of Land Citywide[1]



Data maintained by the Somerville Assessing Department indicate that residential land uses have increased during the past two decades. In 1990, approximately 1,070 acres of land were used for residential purposes. A slow but steady increase in residential land use occurred between 1990 and 2000. As illustrated in Figure 4-2, since 2000, sharper increases in residential land use have occurred. Several large land parcels have been converted from non-residential use to residential use since 2000. Examples include the Union Place condominium development at NorfolkStreet and Windsor Street (one acre developed in phases between 2003 and 2008), the MaxPak development at Lowell Street and Clyde Street (5 acres, approved by special permit in 2008), and the Conwell Capen redevelopment (2 acres, completed in 2008).

[1] Land Use Inventory 2009.

Figure 4-2: Residential Land Use, 2000-2010[2]



In recent years, considerable progress has been made on the provision of permanent affordable housing. In 2008, of the 165 new units of housing that were permitted, 155 were affordable, senior, and multi-family dwellings, 7 were converted from non-residential units, and 3 were created by converting existing residential dwellings. Furthermore, most projects represented an improved utilization of an underdeveloped, brownfield, or dilapidated site. In 2009, the City permitted 103 new units of affordable housing.

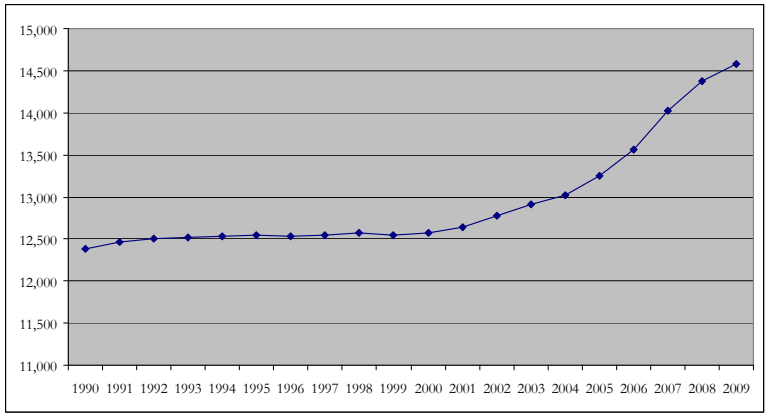
Conversions from residential to non-residential uses have been infrequent since 1990. The only major example of this type of land use change is the development of the Capuano School complex in East Somerville. To facilitate construction of the school complex between 1999 and 2001, ten residential properties were acquired.

2. Since 2000, Somerville has experienced a sharp increase in the number of residential parcels.

[2] *Somerville Assessing Department, 2010.*

In addition to the trend of increasing the acreage of residential land use, Somerville has experienced a trend of increasing fragmentation in land ownership patterns. As illustrated in Figure 4-3, there were approximately 12,100 residential properties recorded by the Assessing Department in 1990. Since 1990, an additional 575 residential properties have been created through use changes or condominium conversion. By 2009, there were more than 14,500 residential properties in Somerville, primarily due to brisk condo development in the years since 2000, which resulted in a 323% increase in the number of condominium units.[3]

Figure 4-3: Number of Residential Properties (incl. Condo Units)[4]

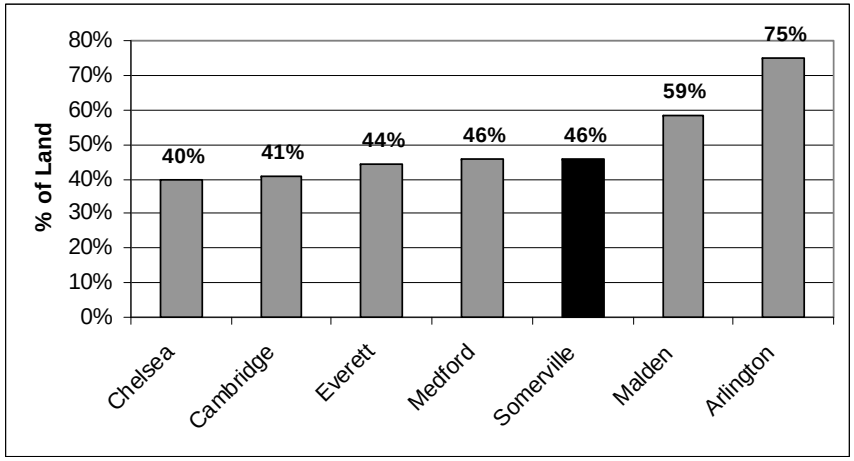


3. Compared with neighboring cities and towns, Somerville has a higher percentage of residential land and therefore less land available for other purposes.

[3] *Massachusetts Department of Revenue, 2009.*
[4] *Massachusetts Department of Revenue, 2009.*

Compared with its neighbors, Somerville ranks third (tied with Medford) in terms of the amount of land dedicated to residential uses, falling only behind Arlington and Malden at 75% and 59% respectively (Figure 4-4).

Figure 4-4: Regional Residential Land Use[5]



Somerville's residential land use distribution is similar to that of its neighboring counterparts, particularly Chelsea and Cambridge. However, Malden and Arlington are cities that are bigger in size and, therefore, have more space available for residential use, as well as other uses, and, as discussed in Finding #5 below, have typically larger lot sizes.

4. Somerville's residential neighborhoods are not homogeneous; instead they house a mix of different uses.

The majority of Somerville neighborhoods are not strictly residential but have a natural mix of uses, including churches, schools, retail shops, and daycare. Of Somerville's 1,209 acres of residential land, only 80 acres (6.6%) are located more than 1/8 mile from a commercial or mixed use property[6]. This means that in many instances residents have access to goods and services in close walking distance to their homes. On the other hand, the interface between residential and commercial uses has the potential for conflict if the uses are not sensitive to each others needs.

Several Somerville neighborhoods have significantly higher frequencies of residential land uses than the citywide average. As illustrated in Figure 4-5, these areas are notably "isolated" from commercial and mixed-use properties and from current rail transit service. Spring Hill is a large area bounded by Broadway and Somerville Avenue and between Davis, Porter, and Union Squares, but it is separate from these commercial areas. Located between McGrath Highway and the Mystic River, the Ten Hills neighborhood is almost entirely residential. Additionally, parts of West Somerville, such as the Clarendon Hill neighborhood, between Tufts University and Teele Square, are dominated by residential land uses. Specifically, the following residential neighborhoods have the least access to commercial or mixed land uses in Somerville:

- The Somerville Housing Authority's Mystic Apartments complex (approximately 22 acres of residential land along Memorial Road, Conners Drive and River Road).

[5] *Mass GIS 2005, Land Use Inventory 2009.*

[6] *Land Use Inventory 2009.*

Figure 4-5: Residential Land in Mixed Use Areas, 2009

- Ten Hills (approximately 13 acres along Bailey Road, Governor Winthrop Road, Puritan Road, Putnam Road, and Ten Hills Road).
- Powder House (approximately 8.6 acres around the intersection of Willow Avenue and Kidder Avenue).
- Tufts/College Avenue (approximately 5.3 acres on College Avenue, Bromfield Road and Pearson Road.
- Spring Hill (approximately 5 acres around the intersection of
- Summer Street and Spring Street).
- Clarendon Hill (approximately 4 acres around Hooker Avenue/Victoria Street/Waterhouse Street).
- Tufts/Hillside (approximately 4 acres around Curtis Street/Sunset Road/Upland Road).

Somerville also has several neighborhoods with particularly low frequencies of residential land use, including Assembly Square, Inner Belt/Brickbottom/Boynton Yards, and the areas near Tufts University and the Alewife Brook Parkway (this is further discussed under below).

5. Somerville neighborhoods have generally been built with between 10 and 25 units per acre, with some exceptions. However, the distribution of Somerville's population varies around the city.

Somerville has a significant and recognizable stock of two-family and three-family houses. Somerville's average residential unit density is 7,921 units/square mile, or approximately 12.26 units/acre. As illustrated in Figure 4-6, data from the 2000 US Census show that Somerville had the highest overall residential density among communities in the urban core (total housing units/total land area) when taking total land area into account. Among its immediate neighbors, only Cambridge approaches Somerville's units per acre. However, when only considering residential units on residential land, Somerville is no longer the densest of its neighbors; Cambridge is, followed by Chelsea. See additionally Figures 4-8 and 4-9 on pages 6 and 7. Values for Medford and Boston are diluted by the presence of major parklands, institutions and industries in those cities.

Figure 4-6: Housing Units/Acre (Total Land Area), 2000[7]

Community	Housing Units, 2000	Land Area, Square Miles	Land Area, Acres	Units /Acre
Somerville	32,477	4.1	2,649	12.26
Cambridge	44,725	7.2	4,587	9.75
Chelsea	12,337	2.2	1,394	8.85
Boston	251,935	48.1	30,788	8.18
Malden	23,634	5.1	3,247	7.28
Everett	15,908	3.4	2,205	7.21
Arlington	19,411	5.4	3,481	5.58
Medford	22,687	8.5	5,426	4.18

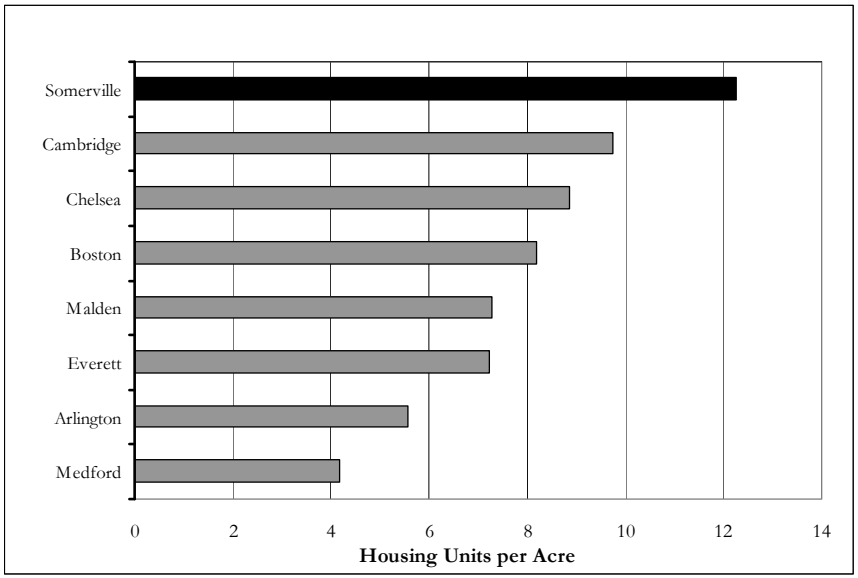
An analysis of Census Block Group data shows that population is not equally distributed around the city. Somerville's most developed areas include the Clarendon Hill Towers (43 units/acre), Beacon Street south of Washington Street (24 units/acre) and East Somerville east of Florence Street between Perkins Street and Washington Street (23 units/acre). Other Somerville neighborhoods with densities above 20 units/acre include Winter Hill north of Broadway, Spring Hill around Cedar Street, and Gilman Square. It should be noted that within each

[7] *US Census 2000.*

of these areas multi-story or high-rise developments can be found which skews the overall numbers.

In contrast, neighborhoods such as Assembly Square, Inner Belt/Brickbottom/Boynton Yards, Tufts University and Alewife Brook Parkway feature large areas of non-residential land use, and as a result are less populated than the citywide average. Assembly Square currently has no housing units and, therefore, has a density value of zero units/acre. The Inner Belt has a density of 1 unit/acre, owing to the presence of the Cobble Hill apartments and the Brickbottom Artists Collaborative. Among neighborhoods where land use is primarily residential, Ten Hills north of Interstate 93 has the lowest housing density (8 units/acre).

Figure 4-7: Housing Units/Acre (Total Land Area), 2000[8]



A more nuanced understanding of housing unit density can be gained by analyzing total housing units per acre of residential land. This density calculation can eliminate biases created by the presence of large areas of non-residential land use, such as industrial parks, institutional campuses and open space.

In 2000, Somerville had approximately 1,573 acres in residential use, yielding a density calculation of 20.65 housing units/residential acre. As illustrated in Figure 4-8, Cambridge (26.34) and Chelsea (23.41) exhibited higher housing/residential density values than Somerville did. Boston was slightly below Somerville, with a density of 19.65 units/residential acre, while Medford trailed significantly at 9.47 units/residential acre. The table below shows that, in effect, Somerville's reputation as a dense residential community is driven by its limited open space and lack of commercial and industrial land, and not by the form of development in its residential neighborhoods.

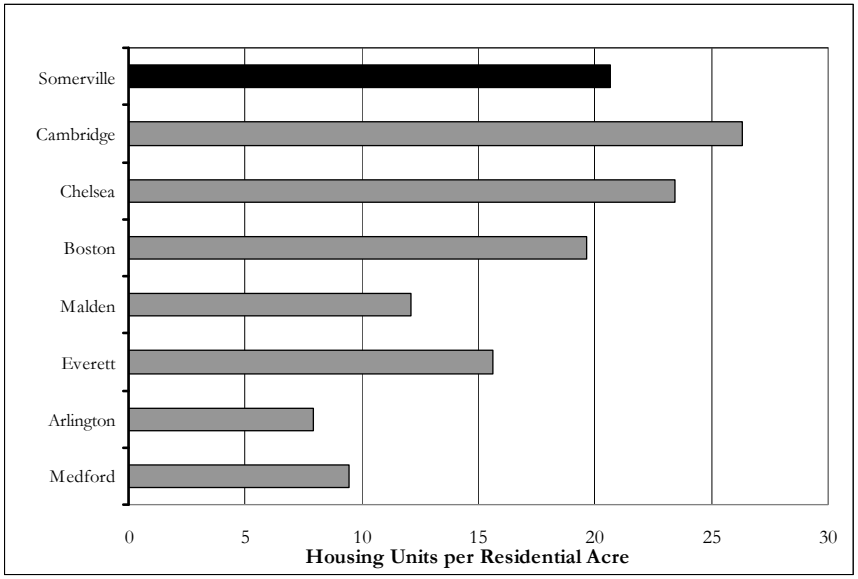
Figure 4-8: Housing Units/Acre (Residential Land Area), 2000[9]

Community	Housing Units, 2000	Residential Acres, 2000	Units/ Residential Acre
Cambridge	44,725	1,698	26.34
Chelsea	12,337	527	23.41
Somerville	32,477	1,573	20.65
Boston	251,935	12,821	19.65
Everett	15,908	1,019	15.61
Malden	23,634	1,950	12.12
Medford	22,687	2,395	9.47
Arlington	19,411	2,445	7.94

[8] *US Census 2000.*

[9] *US Census 2000.*

Figure 4-9: Housing Units/Acre (Residential Land Area), 2000[10]



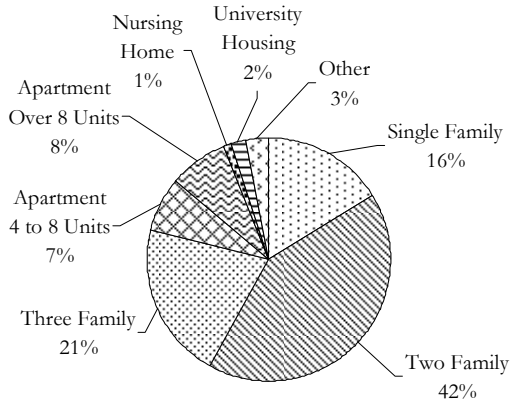
6. Residential land in Somerville is primarily used for one to three unit structures (927 acres, 79% of residential land), but larger structures are interspersed in many areas.

The Assessing Department has identified seven categories of residential land use in Somerville: single-family dwellings, two-family dwellings, three-family dwellings, 4-8 unit apartment buildings, 8 (or more) unit apartment buildings, university housing, and nursing homes. These seven categories comprise 97% of the land area and 98% of the number of units dedicated to residential uses. Residential uses are also captured as part of Rectories/Monasteries and Accessory land use categories but those only account for a small portion of the total.

[10] *US Census 2000, MassGIS.*

Figure 4-10 lists each of the seven residential land use categories, along with the percentage they comprise of total residential land[11]. Single family residential properties represent approximately 192 acres of land (approximately 16% of the residential land in Somerville). Two family residential properties represent approximately 493 acres of land (approximately 42% of residential land). Three family residential properties represent approximately 242 acres of land (approximately 21% of residential land). Small apartment buildings containing 4-8 residential units represent approximately 82 acres of land (approximately 7% of residential land). Large apartment buildings containing 8+ residential units represent approximately 97 acres of land (approximately 8% of residential land).

Figure 4-10: Residential Types as % of Total Residential Land



[11] *Somerville Assessing Department, 2010. Figures include condominium units as well as rental- & owner-occupied.*

Two-family dwellings account for nearly half of the residential buildings in Somerville and, as the name implies, they are typically occupied by two households of owners or renters. Three-family dwellings - the so-called "triple-deckers" - account for an additional 21% of the housing stock. Unlike nearby suburban bedroom communities, only 16% of Somerville's land area is single-family homes, which means that 84% of Somerville's residential land area is some type of multi-family dwelling. Residential uses additionally occur in mixed-use properties, which include commercial uses such as ground level retail stores.

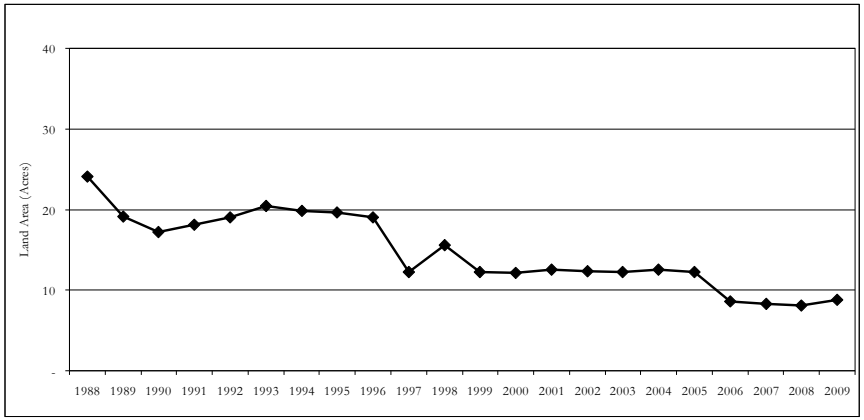
In Boston, by comparison, single-family properties make up 35% of the city's total residential land and the apartments category makes up 9% of residential land. In Cambridge, both single-family and two-family residential uses account for approximately 33% and 32% respectively, whereas, apartments make up almost 16% of total residential land.

7. Even with the scarce land resources in Somerville, there is some available land, although the amount has been in steady decline since the late 1980s.

Vacant land is classified by the Assessing Department as either "primary" (unimproved land which has the potential for development) or "secondary" (unimproved land which possess obstacles for development, such as inadequate road access, irregular shape or poor topography.) In addition, secondary vacant land that is too small to build on or land accessory to an adjacent use is tracked by the Assessing Department.

Figure 4-11 displays the amount of vacant residential land in Somerville during the period 1988-2009. As evidenced by Figure 4-11, there has been a steady decline over the twenty year period as primary properties were developed or improved. However, there were periods of significant changes in the amount of vacant land tracked; this is due to the Assessing Department re-categorizing the use (residential, commercial, industrial) of the vacant parcels from year to year, as well as, properties being redeveloped. In 2009, approximately 6.7 acres (0.3% of residential land) or 213 parcels, both primary and secondary, were vacant.

Figure 4-11: Residential Vacant Land, 1988-2009[12]



8. *Somerville's residential stock is heavily weighted towards small multi-family structures on small lots.*

Figures 4-12 and 4-13 identify the median lot sizes for all of Somerville's residential types. The median lot size for all residential parcels in Somerville is 3,520 square feet. Single-family residences occupy a median lot size of 3,199 square feet, whereas apartments with greater than eight units are situated on parcels with a median size of 10,617 square feet. One important note is that the lot size for single-, two- and three-family structures are nearly identical at between 3,200 and 3,600 square feet each.

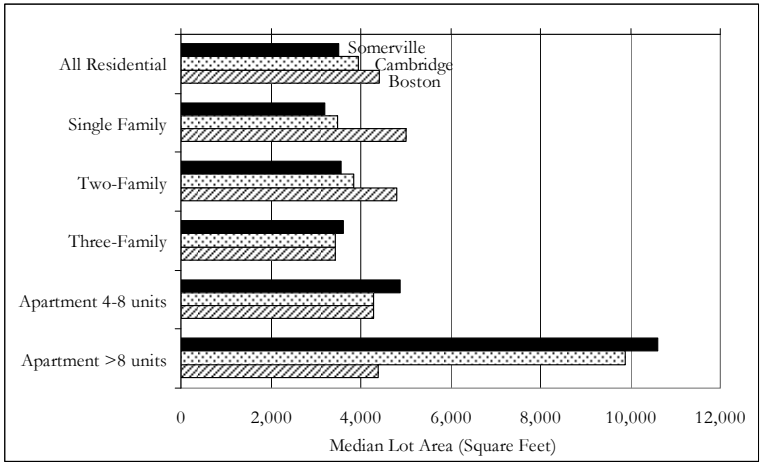
[12] *Somerville Assessing Department, 2010.*

Figure 4-12: Median and Mean Lot Size*, 2009[13]

Property Type	Median Lot Size	Mean Lot Size
All Residential	3,520	4,130
Single-Family	3,199	3,439
Two-Family	3,563	3,735
Three-Family	3,600	3,846
Apartment 4-8 units	4,886	5,236
Apartment >8 units	10,617	21,115

Compared to Cambridge and Boston (Figure 4-13), Somerville's single- and two-family structures are on smaller lots and its three-family and apartment buildings were built on slightly larger parcels. This is likely due to Somerville's topography and street network which produced tight neighborhoods with small lot sizes.

Figure 4-13: Regional Median Lot Size for Residential Parcels, 2009[14]



9. Somerville's residential land value has increased substantially since 2000.

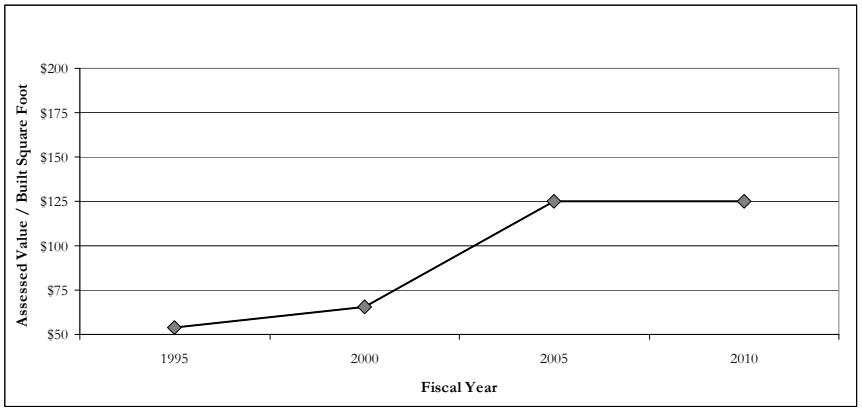
Since 2000, Somerville's residential market followed the national trend of increasing home values. However, because of the city's quality housing stock, proximity to downtown Boston and area higher education, healthcare and research institutions, as well as, a reluctance to overbuild, Somerville managed to avoid the national housing market's steep decline in the latter half of the decade.

[13] *Somerville Assessing Department, 2010.*

* A "mean" value is calculated by adding up all the values in a distribution and then dividing the sum by the total number of values contained in that distribution. To find a "median" value, one takes all of the values in the distribution, sorts in ascending order and finds the middle value. They sound similar, and in many instances, there is not much difference between the two values. However, the median usually provides a better gauge because the mean value calculation can easily be skewed by a few very high or low numbers. As evidenced in Figure X, the median lot size is a better indicator of the most common lot sizes in Somerville.

[14] *Somerville Assessing Department, Cambridge Assessing Department, Boston Assessing Department, 2010.*

Figure 4-14: Residential Land Value, 1995-2010[15]



10. Three-family residences generate more property tax revenue per square foot of land area than any other form of residential development.

Assessing Department data records include assessed values for land, structures and improvements. Assessed values are often related to the cost of land, but, since land is bought and sold on an open market, land costs can vary substantially based on a range of factors. The Assessing data provides a snapshot that equalizes among a number of conditions to consistently understand land prices across the city, rather than any sort of predictive value.

Figure 4-15 describes the assessed value per lot and value per square foot of lot area for Somerville's primary residential types. The assessed value per lot is calculated by taking the total assessed value of each residential type and dividing it by its total number of lots. The per lot square foot calculation is achieved by taking the total assessed value for each residential type and dividing it by its total land area. Citywide, the average assessed value per lot for all residential properties is approximately $496,157 or $120/square foot. Lots with three-family buildings produced the highest tax valuation per square foot of land at $137. Alternatively, apartments with eight units or more valued approximately $113/square foot of lot area. It should be recognized, however, that a large percentage of apartments >8 units are owned by non-profit or government agencies dedicated to the preservation of affordable housing. Contemporary, market rate rental housing with the types of amenities and finishes expected today could be of considerably higher value per lot and per square foot.

Figure 4-15: Average Assessed Value, 2009[16]

Property Type	Per Lot	Per Lot Square Foot
All Residential	$496,157	$120
Single-Family	$421,474	$123
Two-Family	$479,086	$128
Three-Family	$527,902	$137
Apartment 4-8 units	$633,219	$121
Apartment >8 units	$2,383,004	$113

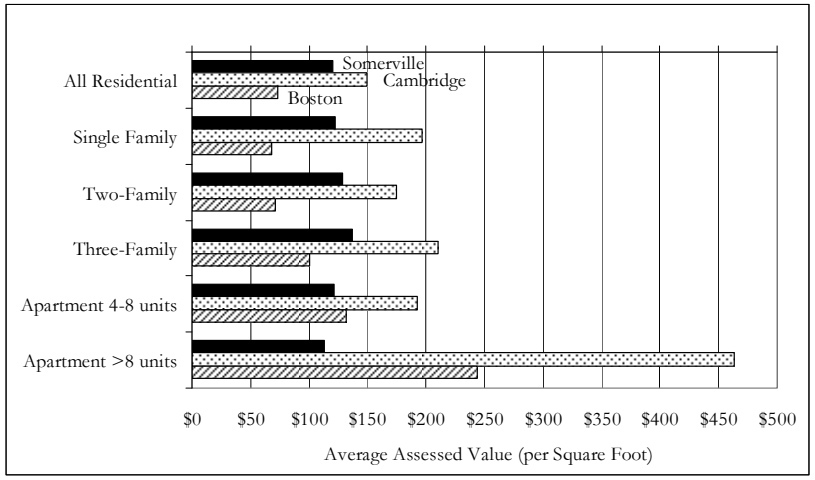
Regionally, Cambridge and Somerville are consistent in that three-family structures provide the highest tax valuations when compared to single-, two-family and apartments with less than eight units. However, in Cambridge, lots for apartments with eight or more units provide, by far, the highest valuation at $463/square foot of lot area. As mentioned above, this is likely due to the strong real estate market conditions for larger apartment buildings in Cambridge. Boston's highest assessed value per lot square foot is for apartments with eight units or more at $244. Boston is a more challenging comparison in

[15] *Somerville Assessing Department, 2010.*

[16] *Somerville Assessing Department, 2010.*

this case because of its large land area, significantly higher number of residential lots, and generally larger median lot sizes, especially for single- and two-family lots.

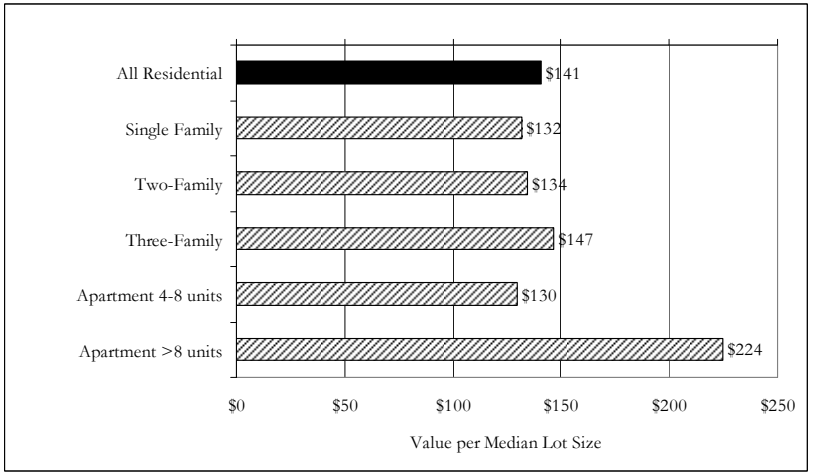
Figure 4-16: Regional Average Assessed Value for Residential Parcels, 2009[17]



11. *Not surprisingly, when using the median lot size, apartments with greater than eight units generate more property tax revenue per square foot of land area.*

As outlined in Figure 4-17, when comparing the assessed value per lot and the median lot sizes for each of the primary residential types, lots for three-family structures and apartments with eight or more units provide the highest tax valuations, $147 and $224/square foot respectively.

Figure 4-17: Value per Median Lot Size for Residential Parcels, 2009[18]

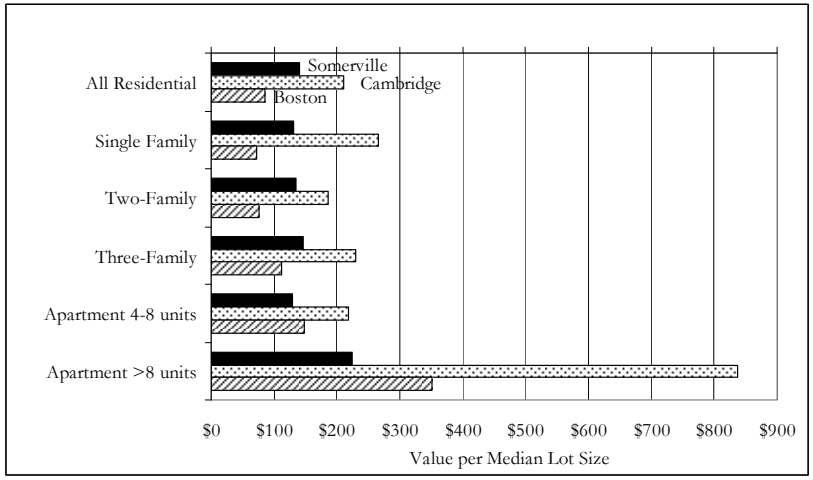


As illustrated in Figure 4-18, when using median lot size, Cambridge has, once again, the highest valuation in the apartment >8 units residential type, a substantial $838/square foot of lot. It is interesting to note though that the single-family type is that city's next strongest tax value at $265/median lot square foot, whereas three-family lots are assessed at $229. The data for Boston is not unexpected; lots comprising the large apartments are the city's top tax value, $352/median lot square foot. Remarkably, the median lot size (4,395 square feet) is substantially smaller than the median size of a two-family lot (4,800 square feet), i.e., tall buildings on small parcels.

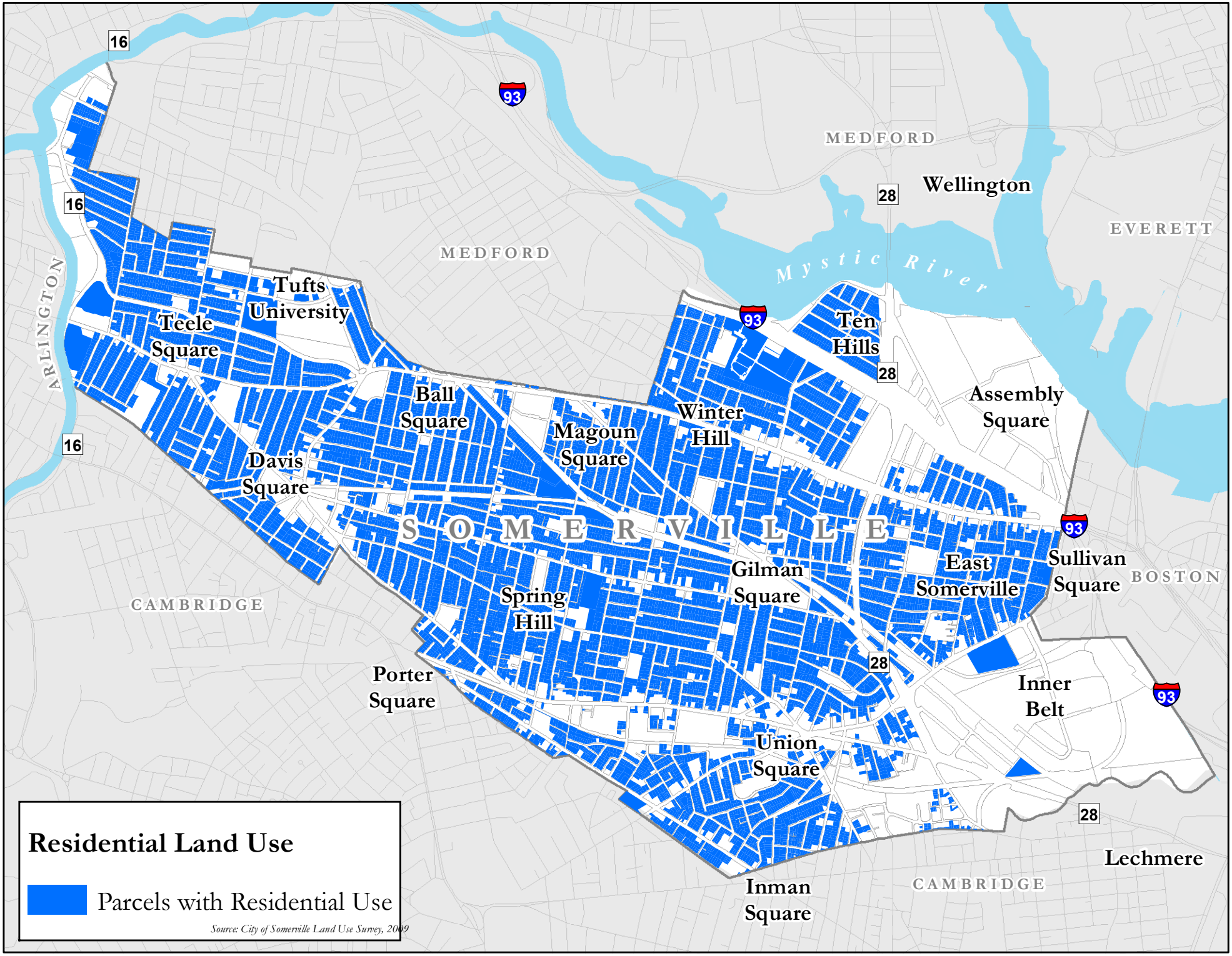
[17] *Somerville Assessing Department, Cambridge Assessing Department, Boston Assessing Department, 2010.*

[18] *Somerville Assessing Department, 2010.*

Figure 4-18: Regional Value per Median Lot Size for Residential Parcels, 2009[19]



[19] *Somerville Assessing Department, 2010.*


16
93
MEDFORD
Wellington
28
EVERETT
16
MEDFORD
Mystic River
ARLINGTON
Tufts University
Teele Square
93
Ten Hills
28
Assembly Square
Ball Square
Winter Hill
Magoun Square
16
Davis Square
SOMERVILLE
93
Sullivan Square
East Somerville
Gilman Square
BOSTON
CAMBRIDGE
Spring Hill
28
Porter Square
Inner Belt
93
Union Square
28
Lechmere
Inman Square
CAMBRIDGE
Residential Land Use
Parcels with Residential Use
Source: City of Somerville Land Use Survey, 2009

5. CIVIC, INSTITUTIONAL & TRANSPORTATION LAND USE

Civic land uses are those properties available for public use or public purpose. In some cases, tax-exempt lands are used for municipal, state and federal purposes such as public schools, libraries and post offices. In other circumstances, they are lands that support the well-being of the city, such as universities and religious institutions. Civic land uses encompass transportation and infrastructure right of ways, and open space such as parks and recreation areas. This chapter will focus on civic, institutional and transportation land uses. A discussion of open space will be covered in greater detail in Chapter 6.

1. ***Civic and institutional uses (including transportation) occupy 886 acres or 34% of the land in Somerville.[1] This is the second largest land use category behind residential uses (46% of land), and comprises more land area than commercial, industrial and mixed use lands combined (423 acres).***

Figure 5-1 provides the breakdown of civic land uses by type. The majority of civic land is utilized for transportation and infrastructure uses. This use category represents 82% of the total civic lands and 28% of the total land area.

Figure 5-1: Civic Land Uses by Type[2]

	Acres	% of Total Civic Lands	% of Total Land (2,613 acres)
Civic & Institutional Lands	**158**	**18%**	**6%**
Private College or University	*40.0*	*25.3%*	
Educational Properties	*30.0*	*19.0%*	
Municipal uses	*30.0*	*19.0%*	
Churches, Synagogues and Temple	*13.2*	*8.3%*	
All Other Civic & Institutional Lands	*45.1*	*28.4%*	
Transportation & Infrastructure Lands	**728**	**82%**	**28%**
Right of Way - Road	*605.0*	*83.2%*	
Right of Way - Rail	*79.0*	*10.9%*	
All Other Transportation Lands	*43.6*	*6.0%*	
Total Civic, Institutional & Transportation Lands	**886**	**100%**	**34%**

The graphic at the end of the chapter shows the distribution of civic land uses throughout Somerville. Because civic land uses include transportation right of ways, civic land uses permeate all neighborhoods, creating a web of right of ways interspersed with nodes of civic activity.

2. ***Civic lands such as schools, libraries, religious institutions, hospitals, universities and other municipal and non-profit lands occupy 6% of Somerville's land.[3]***

When transportation and infrastructure, and open space land uses are excluded from consideration, the remaining civic and institutional uses occupy 182 acres, or approximately 7% of the total land area.

[1] Land Use Inventory, 2009.

[2] Land Use Inventory, 2009.
[3] Land Use Inventory, 2009.

Nearly three-quarters of the civic and institutional lands are associated with four specific uses; the Tufts University campus (25%), educational properties such as public schools (19%), municipal land uses such as government buildings (19%) and religious institutions (8%). Figure 5-2 provides a more complete breakdown of civic, exempt land uses.

Figure 5-2: Civic and Institutional Land Uses by Type[4]

	Acres	% of Total Civic Lands
Private College or University	*40.0*	*25.3%*
Educational Properties	*30.0*	*19.0%*
Municipal uses	*30.1*	*19.0%*
Churches, Synagogues and Temple	*13.2*	*8.3%*
Accessory Land to a Public/Institutional Use	*6.6*	*4.2%*
Parking Lot for Civic/Institutional	*5.9*	*3.7%*
US Government (miscellaneous)	*5.5*	*3.4%*
Hospitals	*3.6*	*2.3%*
Non-profit community center	*3.4*	*2.1%*
Electric Substation	*1.4*	*0.9%*
Postal Service	*0.6*	*0.3%*
Parking Garage	*0.5*	*0.3%*
Telephone Exchange Stations	*0.5*	*0.3%*
Private Elementary Level	*0.3*	*0.2%*
Private Secondary Level	*0.3*	*0.2%*
Child Care Facility (Nonprofit)	*0.1*	*0.1%*
Museums	*0.1*	*0.1%*
Other	*3.8*	*2.4%*
Unclassified	*9.2*	*5.8%*
Total	**158.4**	**6% (of total land)**

Campuses: Universities and Hospitals

Institutions that have a significant impact on municipal land use and economic development include universities and hospitals. Both types of campus-based land uses provide important services to their direct consumer and can add recognition to the community at large. Somerville's major university (Tufts) and only hospital (Somerville Hospital) account for nearly 28% of civic land use.

Tufts University, which has its main campus located in both Somerville and Medford, is the city's only major university. The Somerville portion of the campus occupies 40 acres of land (~27% of the campus) and is located in West Somerville. Results from the Land Use Inventory show that Tufts is one of the largest landowners in Somerville, with control over 1.5% of the land. Tufts has 188 buildings on its Somerville/Medford Campus.[5] Their two satellite campuses in Boston and Grafton have 12 and 45 buildings, respectively.

In years past, there has been tension between Tufts University and the City of Somerville due to several factors: the fact that universities, as tax-exempt institutions, do not pay property taxes on their properties; the consequences of new construction and land acquisition in West Somerville as Tufts expands its physical campus; the preference for Tufts students to live in off-campus apartments, sometimes in homes owned by absentee landlords who do not maintain their properties; and the perception that Tufts students are disconnected from the life and activities of the city. The perception that Tufts has been slowly "creeping into the neighborhood" has been one of the substantial community concerns of late. However, analysis of property ownership has not identified any significant Tufts property acquisitions. In recent years, Tufts, like many colleges and universities across the country, has placed an increased level of importance on building a strong relationship with Somerville.

[4] Land Use Inventory, 2009.

[5] Tufts University. www.tufts.edu, 2010.

Tufts' location has been beneficial to both the institution and Somerville. It has allowed the institution to develop a campus with plenty of open space, while also having direct access to the amenities of Davis and Teele Squares and connections to Boston via the Red Line. Likewise, Somerville understands the value that a university, as an academic and economic generator, as well as a fundamentally place-based institution, can bring to a city.

The Somerville Hospital is the only hospital in Somerville today. It is located on Highland Avenue and occupies 3.6 acres of land, or 2.3% of the civic/institutional land use in the city. The hospital is a major employer within Somerville and is a teaching facility for the Harvard Medical School, offering student training and residency programs.

Schools
There are 10 public schools in Somerville, three private schools, a charter school and one former school site that is vacant. These educational properties (both private and public) account for 30.0 acres of land in Somerville, or just over 19% of all civic/institutional lands. The schools are distributed across the city with a larger number concentrated on the east side of Somerville.

Municipal Uses
Municipal lands are the third largest civic use, occupying 30.0 acres, or 19% of civic lands. Municipal activities are concentrated at approximately 15 locations, including City Hall on Highland Avenue, the Department of Public Works building on Franey Road and the Public Safety Building on Washington Street.

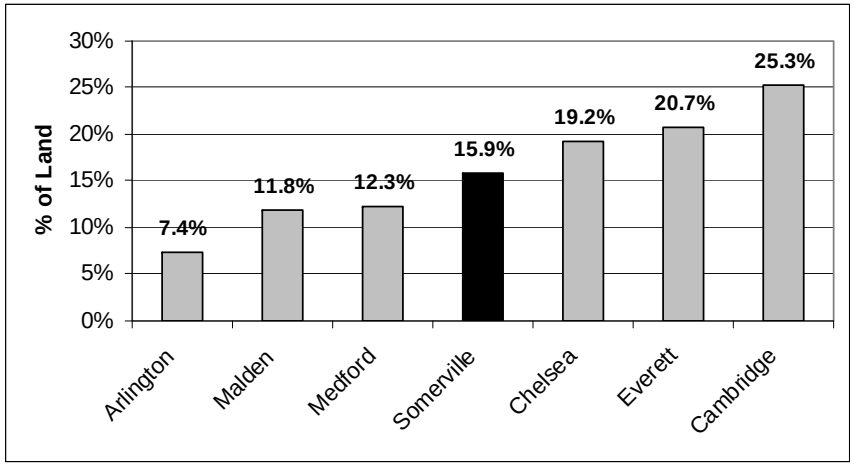
Religious Institutions
Religious institutions are the fourth largest civic land use, occupying 13.2 acres, or approximately 8% of civic lands. There are numerous places of worship within Somerville. The City is home to many churches, two synagogues, and one Sikh gurdwara. All religious land holdings are tax-free.

Civic and cultural activities in Somerville do not always occur on civic lands. Some of the cities most well-known civic facilities, including the Somerville Theater and the Armory, are operated by private businesses and non-profit organizations; yet contribute to community well-being and cultural identity. Additional activities, such as the Union Square Farmer's Markets, occur on space that is traditionally considered open space or transportation land, yet supports the community. While civic and institutional lands remain an important use in Somerville, it is important to highlight the variety of civic activities that occur on non-civic lands.

3. Somerville has less land dedicated to civic, exempt land uses than other surrounding cities.

Excluding transportation and open space uses, Somerville has less land devoted to civic uses than several neighboring cities, as can be seen in Figure 5-3 below. The regional comparison places Somerville in the middle when compared to other communities in terms of civic land available for use. Cambridge has a substantial percentage of civic and institutional land use, due largely to the presence of Harvard University and the Massachusetts Institute of Technology.

Figure 5-3: Percentage of Land devoted to Civic and Institutional Uses in Somerville and neighboring cities[6]



Historically, transportation has had a major influence on the development of Somerville, from the early construction of the railroads, through to the construction of I-93 and the extension of the Red Line to Davis Square. The city's physical proximity to Boston has led to the accommodation of significant regional transportation rights of way, resulting in substantial transportation and infrastructure land use across the City.

4. Transportation rights of way occupy 728 acres (28% of Somerville's land).[7] Of that, 605 acres (83% of Transportation & Infrastructure Lands) is comprised of the road network and 79 acres (11% of Transportation & Infrastructure Lands) is comprised of the rail network. In addition, there are 44 more acres of land in Somerville that are used to support the local and regional transportation network.

The public and private road network is the largest element of the transportation lands, accounting for 83.2% of the land used for transportation purposes. Figure 5-4 breaks down individual components of the transportation land uses. The two largest single land uses within this category are the I-93 ROW and the McGrath Highway/Route 28 right-of-way (ROW), accounting for 8.9% and 6.1% of land, respectively. Both of these lands are not controlled by the City of Somerville. The majority of the remaining road ROW is comprised of a vast network of predominantly local serving streets interspersed with cross-town arterials such as Broadway and Beacon Street.

The regional rail system comprises 10.9% of the transportation land. Despite a significant amount of land dedicated to rail, Somerville has no commuter rail stations and only one MBTA stop (David Square). Over time, the Fitchburg and Lowell right of ways will be used for the Green Line Extension, and an Orange Line station will be added at Assembly Square thereby creating seven new transit stations within the same right of way.

In addition to rights of way, about 6% of the land dedicated to transportation purposes directly supports transportation functions. The largest use within this category is the Boston Engine Terminal, which occupies over 23 acres and serves as a maintenance facility to the regional commuter rail system. The MBTA facility at Sullivan Square is also a large resource, which serves a regional network.

The geographic location of transportation infrastructure, particularly regional transportation infrastructure, has been concentrated in East Somerville reduces the taxable land and creating physical barriers between neighborhoods.

[6] MassGIS, 2005.
[7] Land Use Inventory, 2009.

Figure 5-4: Breakdown of Transportation Land Uses[8]

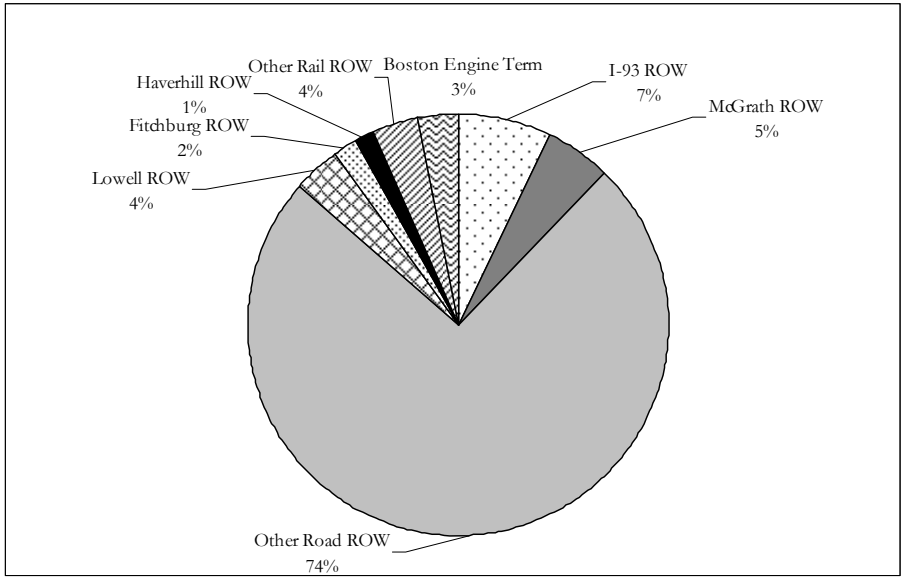
	Facility	Acres	% of subcategory	% of Total Transportation lands
Road Network		**605**		**83.2%**
	I-93 ROW	*54*	*8.9%*	
	McGrath ROW	*37*	*6.1%*	
	Other Road ROW	*514*	*85.0%*	
Rail ROW		**79**		**10.9%**
	Lowell ROW	*27*	*34.2%*	
	Fitchburg ROW	*15*	*19.0%*	
	Haverhill/Orange Line ROW	*7*	*8.9%*	
	Newbury/Rockport ROW	*4*	*5.1%*	
	*Other Rail ROW**	*26*	*32.9%*	
Other Transportation Lands		**44**		**6.0%**
	Boston Engine Terminal	*23.1*	*53.1%*	
	Other State-Owned Lands (MBTA)	*11.5*	*26.5%*	
	Marinas	*5.5*	*12.7%*	
	Trucking Terminals	*2.1*	*4.9%*	
	Bus Transportation	*0.8*	*1.8%*	
	Other Motor Vehicle	*0.4*	*0.9%*	
Total		**728**		**100.0%**

**Other Rail ROW includes land adjacent to Yard 8, land adjacent to the Boston Engine Terminal in the Inner Belt, and the Grand Junction ROW.*

Figure 5-5, below, illustrates the vast majority of the land in Somerville devoted to transportation and infrastructure consists of road rights of way.

[8] Land Use Inventory, 2009.

Figure 5-5: Distribution of Transportation Lands[9]



5. Somerville has a high ratio of road mileage to land area in comparison to neighboring communities.

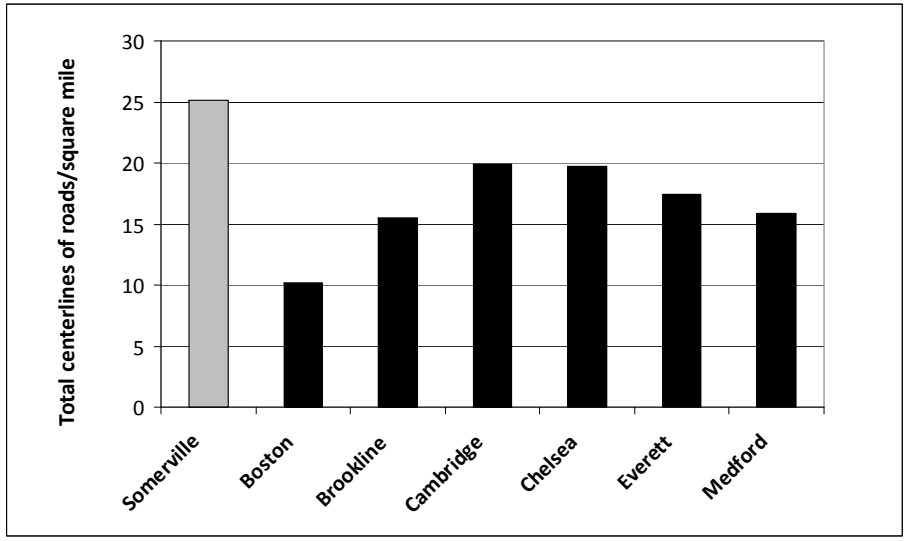
Somerville has 105.6 miles of paved roadways.[10] Figure 5-6 shows the ratio of *road* miles per land area in Somerville and surrounding communities, and Figure 5-7 shows the ratio of *lane* miles per land area. Linear road mileage is a measure the total linear length of roadway, while lane mileage is a measure the total length and width (area) of the roadway. Compared to surrounding cities, Somerville has the highest number of linear feet of roadway per

[9] Land Use Inventory, 2009.
[10] EOT, Office of Transportation Planning. (2008). *Road Inventory Year End Report 2008*. "Centerline Miles Table 5: City/Town by Jurisdiction". pp.19-24.

square mile and the largest amount of roadway area per square mile.

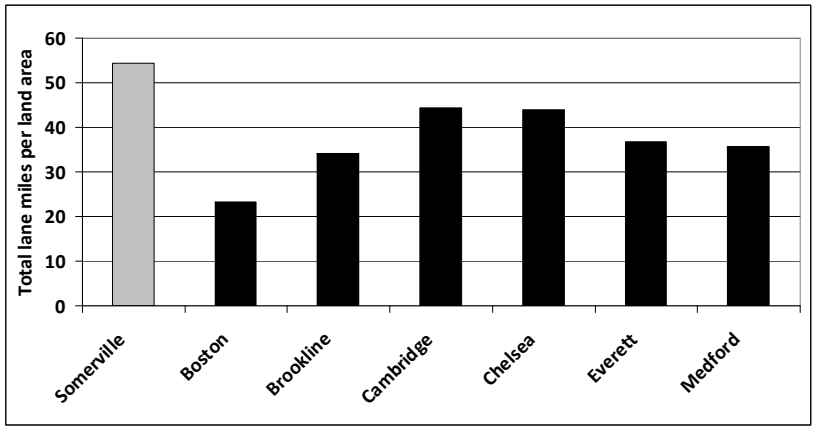
In looking at Somerville's history, it is apparent why there is so much land devoted to roads as compared to other communities. The concentration of streets is a function of the city's history as a streetcar suburb of Boston. The close-knit street grid allowed people to quickly walk from their homes to transit. The redundancy of the street network provides an opportunity to rethink how to make the best use of this asset. (See also Transportation and Infrastructure Trends Report, 2009.)

Figure 5-6: Miles of Roads per Town/City Land Area[11]



[11] *Source: EOT, Office of Transportation Planning. (2008). Road Inventory Year End Report 2008. "Centerline Miles Table 5: City/Town by Jurisdiction". pp.19-24. and US Census Bureau, Summary File 1: GCT-PH1. Population, Housing Units, Area, and Density: 2000.*

Figure 5-7: Lane Miles per Total Area[12]



6. Parcels that are entirely occupied by parking occupy 1.6% of the land in Somerville.

In conjunction with the extensive road network, parking is a dominant land use in Somerville. Data from the land use inventory identifies 264 parcels across all land uses as being covered entirely by surface parking lots. This amounts to 42.1 acres, or approximately 1.6% of the land in Somerville. Fourteen (14) of these are municipal parking lots available for public use. There are also 11 parcels that have parking garages on them, covering an additional 1.2 acres of land.

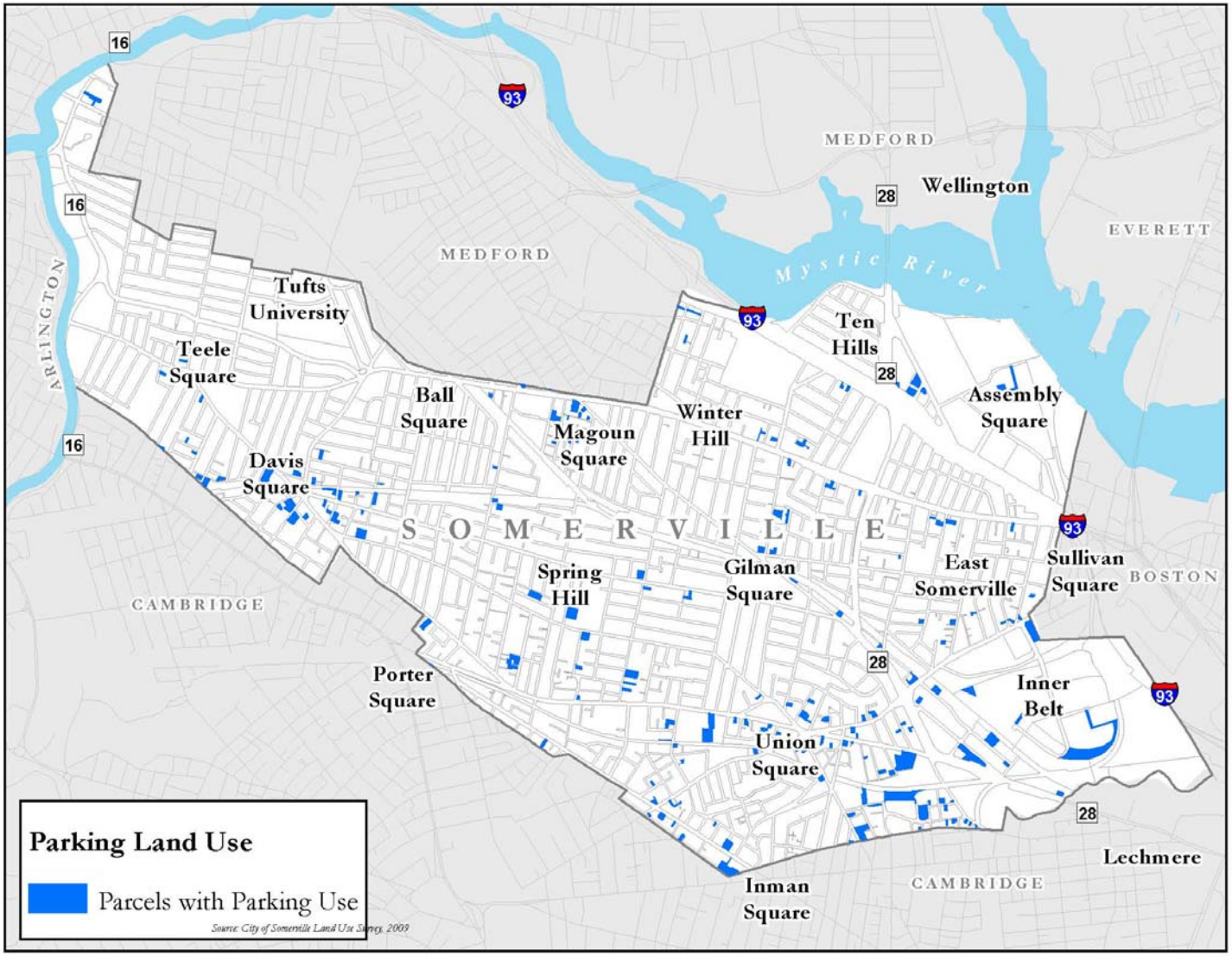
It is important to clarify that this finding underestimates the amount of parking. First, there are numerous parcels that have both parking and a structure on them – these parcels are coded as their primary use (residential, commercial, etc.) as opposed to

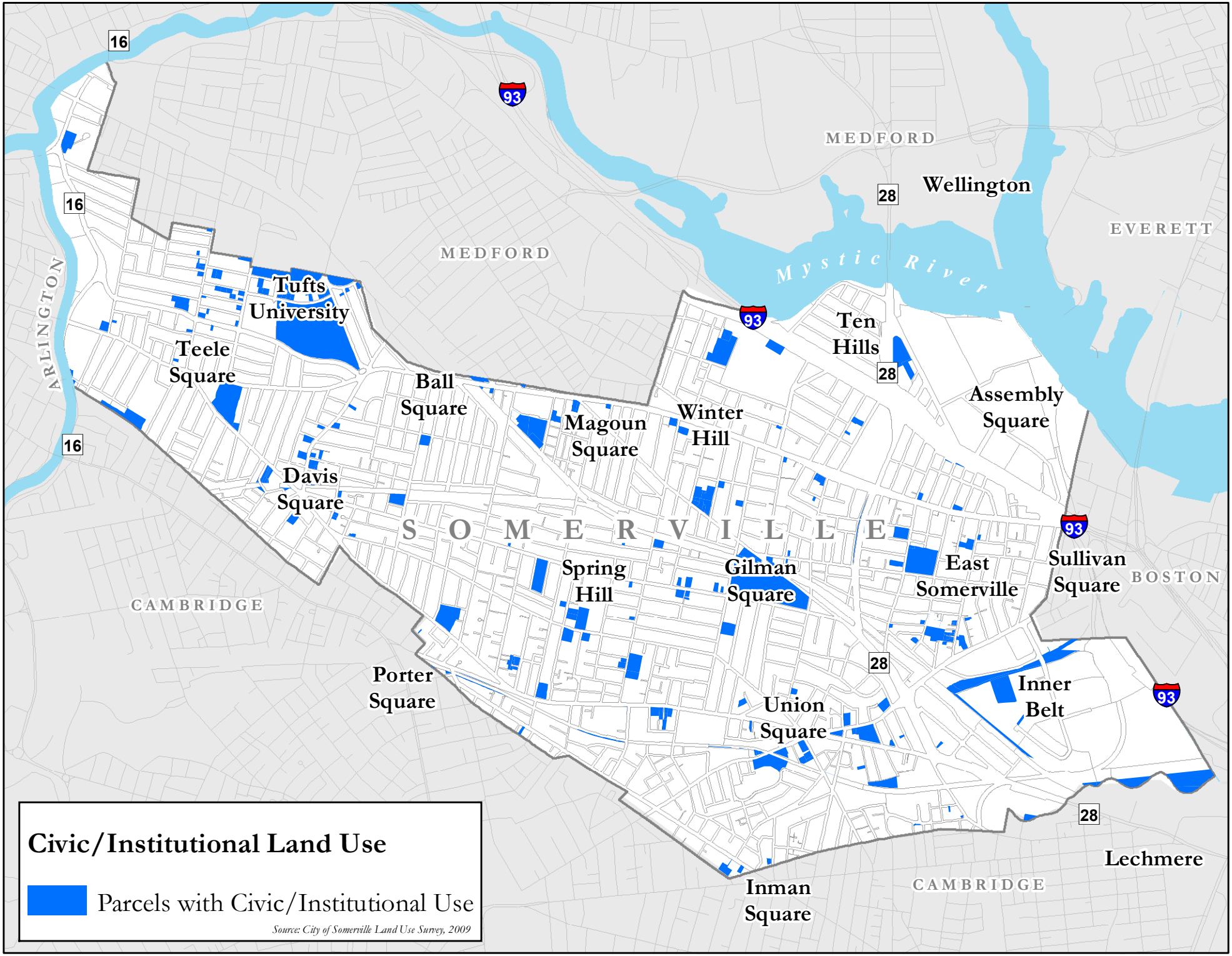
[12] *Ibid*

surface parking. Second, a large amount of land coded as roadway right of way is actually used as on-street parking.

Figure 5-8 shows the location of both surface and structured parking lots.

Figure 5-8: Location of Parking Land Uses




16
93
MEDFORD
Wellington
28
EVERETT
16
MEDFORD
Mystic River
ARLINGTON
Tufts
University
93
Ten
Hills
Teele
Square
Ball
Square
28
Assembly
Square
Magoun
Square
Winter
Hill
16
Davis
Square
SOMERVILLE
93
Sullivan
Square
Spring
Hill
Gilman
Square
East
Somerville
BOSTON
CAMBRIDGE
28
Porter
Square
Inner
Belt
93
Union
Square
28
Lechmere
Inman
Square
CAMBRIDGE
Civic/Institutional Land Use
Parcels with Civic/Institutional Use
Source: City of Somerville Land Use Survey, 2009

6. OPEN SPACE LAND USE

Open space is a broad term that includes recreational, natural and undeveloped areas. According to the *Open Space and Recreation Planner's Workbook*[1], open space:

"…is often used to refer to conservation land, forested land, recreation land, agricultural land, corridor parks and amenities such as small parks, green buffers along roadways or any open area that is owned by an agency or organization dedicated to conservation. However, the term can also refer to undeveloped land with particular conservation or recreation interest. This includes vacant lots and brownfields that can be redeveloped into recreation areas. Some open space can be used for passive activities such as walking, hiking, and nature study while others are used for more active recreational uses… Although open space itself is a simple concept, the factors that affect it, and that it affects, are complex."

Somerville has a collection of open spaces that have varied uses from athletic fields to bodies of water. These open spaces address the social and recreational needs of individual neighborhoods, while also serving citywide functions, such as offering transportation alternatives (e.g., Community Path), providing ecological "services" (e.g., reducing carbon dioxide levels, cleaning the air, reducing stormwater runoff), and improving the overall health of the community.

1. *Somerville's Open Space & Recreation Plan 2008-2013 has adopted eight goals to improve open space.*

The eight open space and recreation goals in the *Open Space & Recreation Plan 2008-2013* (page 76), listed below, support the existing open space of Somerville, enhance it with care, and encourage the expansion of open space and its benefits to the quality of life in the city. These eight goals comprise a comprehensive vision for open space in Somerville:

- Renovate Parks and Open Space
- Acquire Additional Land
- Analyze and Improve Access
- Increase Tree Canopy and Green Spaces
- Increase Off-Leash Recreational Areas and Create New Skate Parks
- Raise the Bar for Sustainable Practices
- Reduce Brownfields
- Set Vision through Strategic Planning Documents

An open space and recreation plan is a requirement of Massachusetts General Law in order to receive state grant funds. The *Open Space & Recreation Plan 2008-2013* is thus a major component of the Somerville Comprehensive Plan 2010-2030 and also a requirement under Massachusetts General Law.

2. *Open space constitutes approximately 6.75% of the total city land area, a smaller percentage than all surrounding communities.*[2]

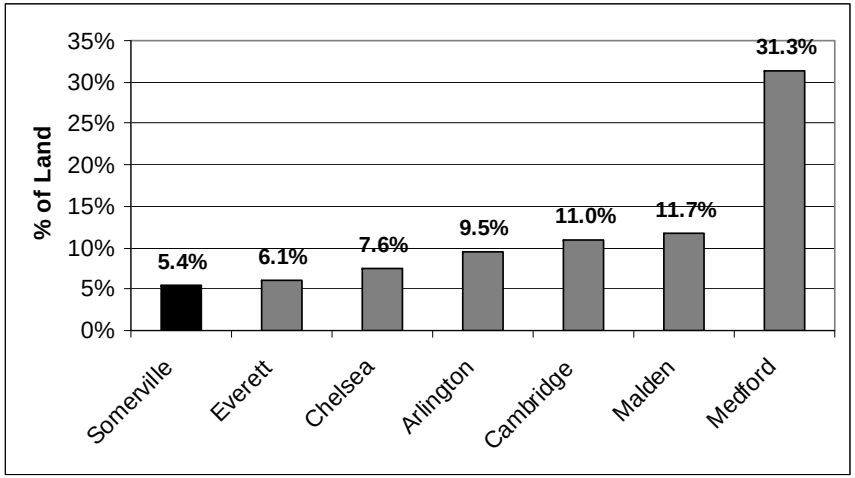
Somerville's open space land area totals approximately 177 acres, about 6.75% of the total land area. Of this, approximately 5.40% (approximately 141 acres) is public-owned land and the rest, 1.38% (approximately 36 acres), is private. Private open space includes Tufts University fields and Powder House Circle.

[1] *Executive Office of Energy and Environmental Affairs, Division of Conservation Services (March 2008 revision)*

[2] *The open space percentages provided in this chapter are taken from the Open Space and Recreation Plan 2008-2013, which provides information at a sub-parcel level and, therefore, a finer grain of detail than the parcel-based Land Use Inventory 2009.*

From a regional perspective (Figure 6-1), Somerville falls behind its neighboring communities in the amount of available public open space, at approximately 5.40% of total city land.[3] Nevertheless, Somerville is increasing open space resources each year through land acquisition for park space.

Figure 6-1: Regional Open Space Perspective



Public open space supports a variety of uses, including passive recreation, athletic activities, playgrounds, and natural habitat. Only 45% (63.52 acres) of public open space is actually owned by the City of Somerville. The remainder is owned by the Massachusetts Department of Conservation and Recreation (DCR) (68.36 acres), the Massachusetts Bay Transportation Authority (MBTA) (6.13 acres - Community Path), and Middlesex County (.50 acres - Somerville District Court). However, the City of Somerville manages and maintains the MBTA-owned Community Path through a license agreement, as well as, Dilboy Field, which is owned by DCR.

In addition to Somerville's parks and open spaces, residents have access to other regional open and natural spaces.

Figure 6-2: Public and Private Open Space, by ownership[4]

Public Open Space	Acres
City-Owned (Parks, Gardens, Playgrounds)	63.52
State-Owned	77.50
Total Public Open Space (City & State)	**141.02**
Percentage of Open Space Land Area	**5.37%**
Private Open Space	Acres
Tufts University Fields	35.83
Powder House Circle	0.26
Total Private Open Space	**36.09**
Percentage of Open Space Land Area	**1.38%**
TOTAL OPEN SPACE (City, State, Private)	**177.11**
TOTAL LAND AREA IN SOMERVILLE[5]	2,624
TOTAL PERCENTAGE OF OPEN SPACE LAND AREA	**6.75%**

The Department of Conservation and Recreation's 2,060-acre Middlesex Fells Reservation lies less than a mile north of Somerville's northwest border. The Upper and Lower Mystic Lakes are two miles to the northwest, while the 115-acre Alewife Reservation lies about a half mile beyond the western boundary of the city. DCR controls the

[3] *Somerville Open Space and Recreation Plan 2008-2013.*

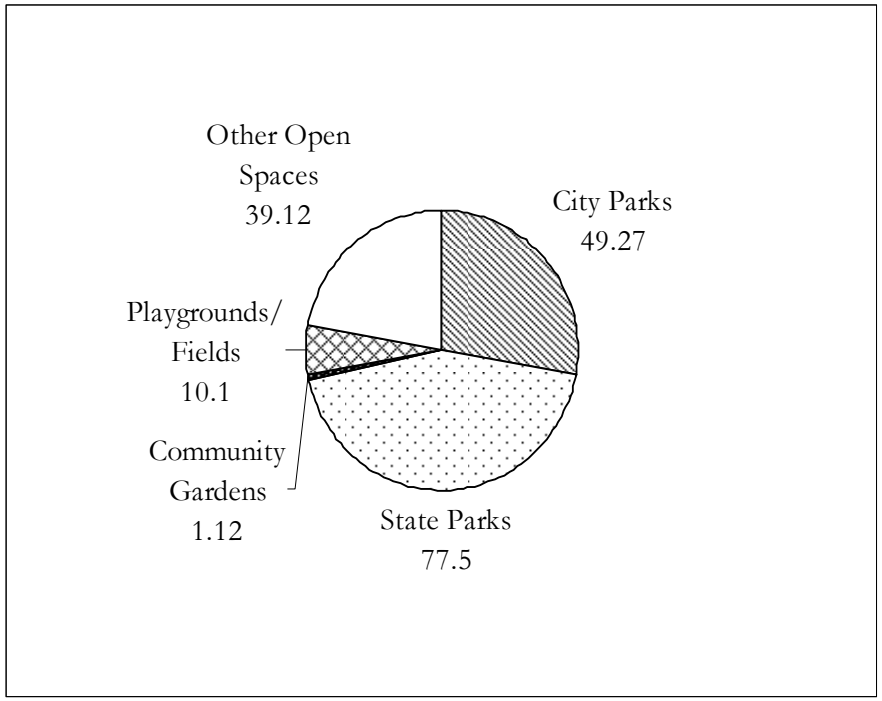
[4] *Somerville Open Space and Recreation Plan 2008-2013.*

[5] *For the purposes of this chapter, we are using the Open Space and Recreation Plan 2008-2013 information. The Open Space and Recreation Plan 2008-2013 total land area is modestly different than the Land Use Inventory 2009 due to the accumulated discrepancies in accounting for the road network, shore line and city boundaries.*

Mystic River Reservation, which runs along the Mystic River in north Somerville. The City is currently strengthening the connections to this substantial resource. Also, the popular Charles River shoreline and parkland is two miles south of Somerville.

In the *Somerville Open Space and Recreation Plan 2008-2013*, the total inventory of Somerville's open spaces is summarized in five categories: city parks, state parks, community gardens, playgrounds and other open spaces. The breakdown is shown in Figure 6-3.

Figure 6-3: Open Space Types by Acreage[6]



City parks include athletic fields and public parks. The City manages 46 parks, playgrounds and ball fields. Typically city parks are less than an acre in size, however, there are a few that are 4 to 8 acres. There are a total of 49.3 acres of city parks in Somerville.

State Parks are typically nature preserves along the sides of transportation right-of-ways. These parcels have been reserved mostly for ecological reasons. The exceptions are the Somerville Community Path, which is a pedestrian and bicycle transportation way and is slated for expansion, Dilboy Field, which is an athletic field, and Foss Park, which is a community park. Overall, there are 77.5 acres of State-owned parks in Somerville.

Community gardens, school playgrounds and fields are smaller open space uses. There are ten community gardens in Somerville (see Figure 6-4). Two are privately-owned (Tufts and Avon Community Gardens), one is owned by the MBTA (bikeway community gardens) and one is owned by the Somerville Housing Authority. School-District managed open space totals over ten acres on eleven sites.

3. ***The greatest amount of open space is used for passive recreation (132.29 acres), followed by active recreation (103.13 acres).***

Figures 6-5 and 6-6 identify the parks and open space by categories of use (the fourth listing in the figures, OLRA, stands for Off-Leash Recreation Area or places that allow for dogs to be without their leashes).

[6] *Somerville Open Space and Recreation Plan 2008-2013.*

Figure 6-4: Community Gardens

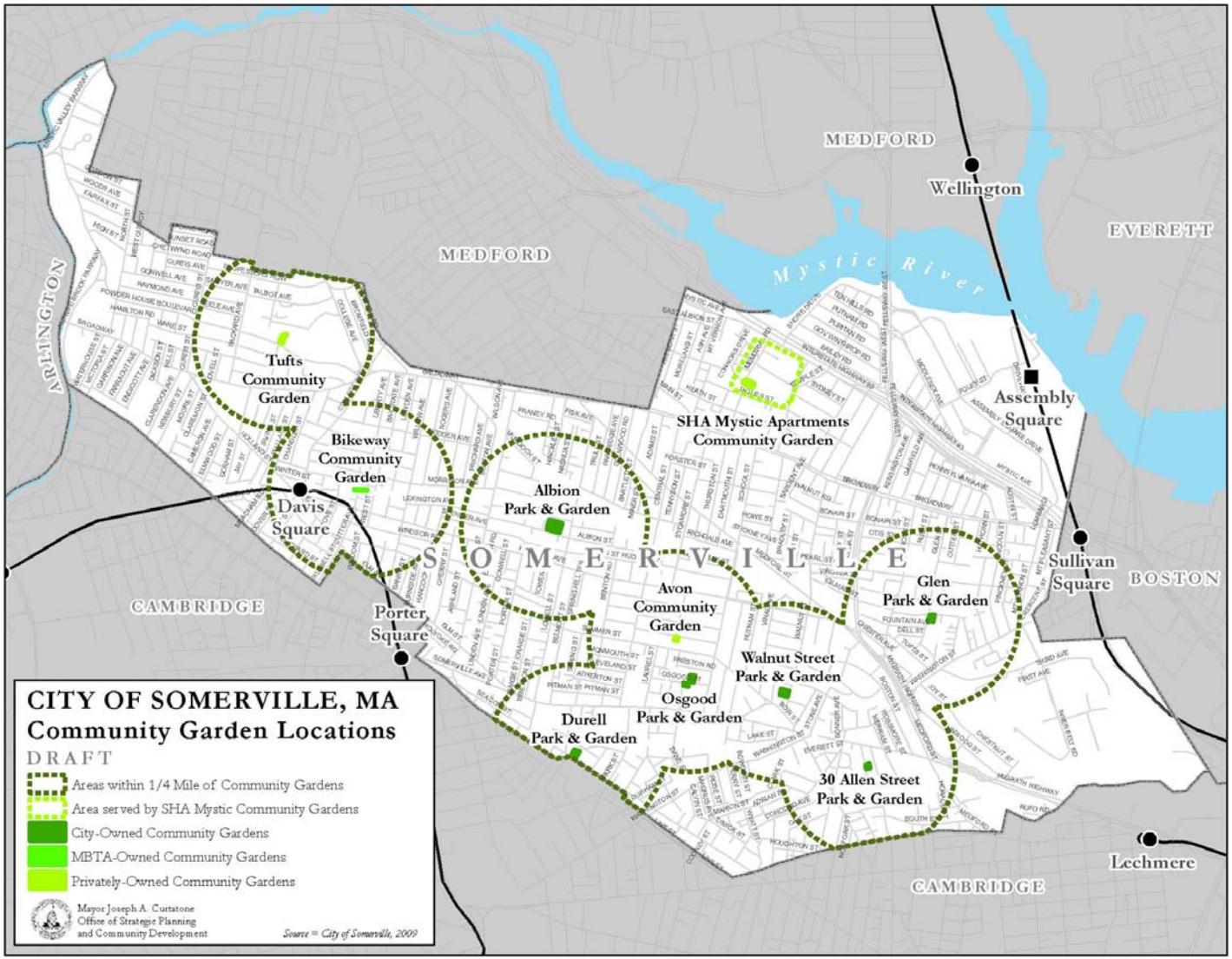
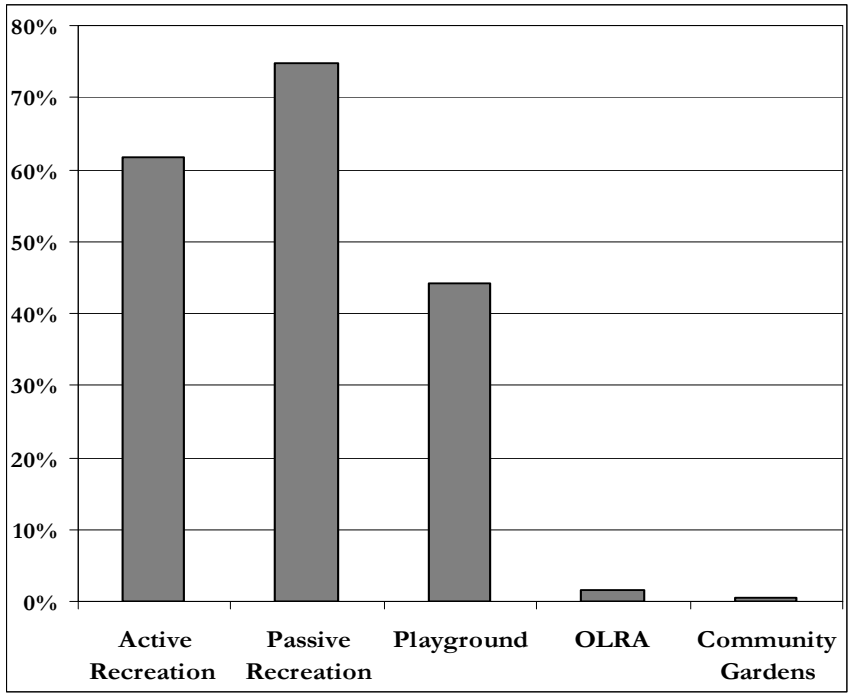


Figure 6-5: Open Space Uses[7]

Open Space Uses	Total area (acres)	Number of Properties	Total Open Space (%)
Active Recreation	109.13	32	61.62
Passive Recreation	132.29	20	74.69
Playground	78.19	37	44.14
OLRA	2.92	4	1.64
Community Gardens	1.12	8	.63

The two primary uses of open space in Somerville are active and passive recreation. Passive recreation makes up almost 75% of the total open space and includes landscaped areas, natural areas, bike and walking paths, and water bodies. Active recreation accounts for almost 62% of the total open space and include parks and open space for swimming, tennis, basketball, and soccer.[8]

Figure 6-6: Open Space Uses[9]



Note: Areas may be counted in more than one category.

4. ***Somerville contains less open space per capita than surrounding cities, with an average of 2.28 acres of open space per 1,000 residents; many areas of the city have significantly less space.***

Open space in Somerville is particularly scarce, due largely to development and subdivision patterns that predominated during the first half of the 20th century.

[7] *Somerville Open Space and Recreation Plan 2008-2013.*
[8] *Somerville Open Space and Recreation Plan 2008-2013.*
[9] *Somerville Open Space and Recreation Plan 2008-2013.*

Compared to neighboring cities in 2000 (Figure 6-7), Somerville has the second lowest ratio of open space per 1,000 residents, above only the City of Chelsea. Chelsea has the lowest amount of open space per 1,000 residents because of its small land area, large number of residents per acre and the fact that much of its land area is devoted to industrial uses. Medford has by far the highest amount of open space per 1,000 residents due to its large land area, relative low population and generally residential land use pattern.

Figure 6-7: Open Space Per 1,000 Residents[10]

	City	Open Space Acres in 2000	Per 1,000 Residents
1	Arlington	368	8.68
2	Cambridge	738	7.28
3	Chelsea	20	0.57
4	Everett	321	8.43
5	Malden	449	7.97
6	Medford	1,882	33.75
7	Somerville	169	2.28

Most of the block groups in Somerville have less than the average land of open space per 1,000 residents as illustrated Figure 6-9 below. Eight block groups have above 5 acres per 1,000 residents, while, 35 block groups have less than 0.5 acres per 1,000 residents. Powderhouse, Davis Square, Prospect Hill, and the West Somerville neighborhood have more open space per 1,000 residents whereas Spring Hill, Winter Hill and East Somerville have significantly less open space.

Even though Somerville is clearly below average in terms of acreages devoted to playgrounds and playing fields, residents do enjoy the many open space opportunities provided in the metropolitan region. The extension of the Community Path from Cedar Street to North Point in Cambridge (to be designed in conjunction with the Green Line Extension) will significantly add to the quantity and quality of open space resources. In addition, development at Assembly Square will make available approximately five acres of public space along the Mystic River and the MaxPak site will contribute one acre of publicly accessible open space near the future Lowell Street Station.

5. *Between 2000 to 2008, open space in Somerville increased by 5%.*

As identified in Figure 6-8, in the eight year period from 2000 to 2008, Somerville increased its open space amenities by 8.45 acres or 5.01%. The City acquired or expanded five dedicated parcels, including the Park at Somerville Junction, the Allen Street Community Garden, Durell Pocket Park & Community Garden, and Ed Leathers Community Park. Through these efforts, the City met the majority of goals outlined in the *Open Space and Recreation Plan 2002-2007*.

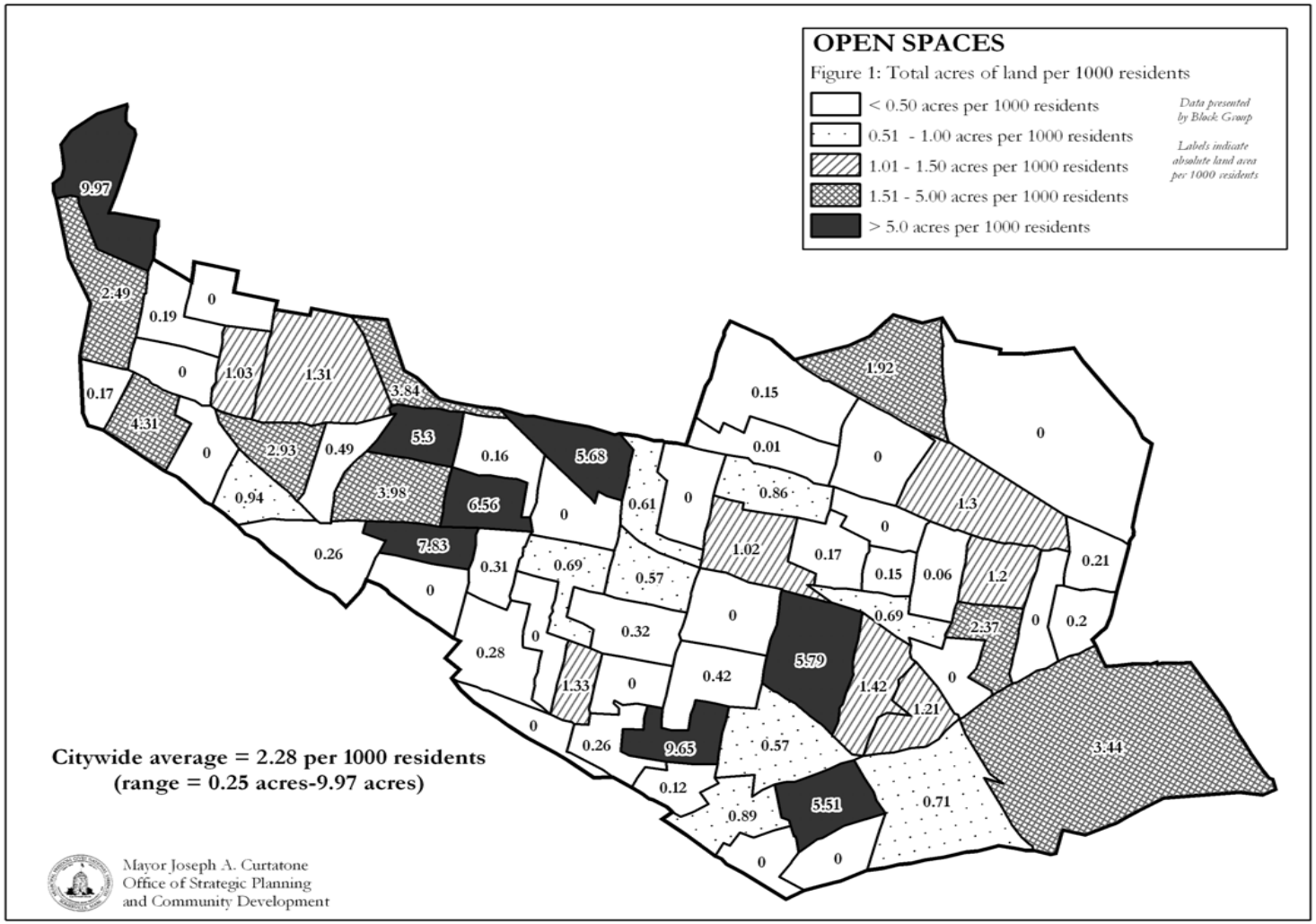
Figure 6-8: Change in open space from 2000 to 2008[11]

	Acres in 2000	Acres in 2008	Change
Somerville	168.66	177.11	5.01%

[10] *Based on 2000 Census data.*

[11] *Somerville Open Space and Recreation Plans 2002-2007, 2008-2013.*

Figure 6-9: Open Space Per Capita Uses[12]



[12] *Somerville Open Space and Recreation Plan 2008-2013.*

6. *Somerville has approximately 112 acres of open space protected in perpetuity.*

As illustrated in Figure 6-10, Somerville has approximately 112 acres of open space protected "in perpetuity." Only protection through deed restrictions or funding through the Land and Water Conservation Fund Protection (LWCF) or the Urban Self-Help Program are considered to be protected in perpetuity. Examples of Somerville open spaces that are protected in perpetuity are Central Hill Park, Albion Park, Glen Park, Nathan Tufts Park, and the Central Library Branch lawn. Additionally, approximately six acres of open space is protected by other means.

Figure 6-10: Open Space Protection[13]

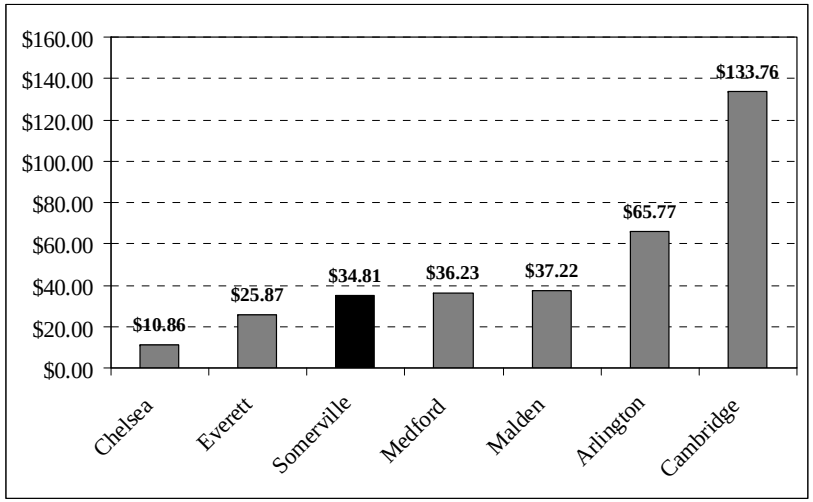
Level of Protection	Total Area (acres)	Number of Parcels	Total Open Space (%)
In Perpetuity	111.72	34	63.08
Open Space Protection	5.81	13	3.28
None	59.58	28	33.64
Totals	**177.11**	**75**	**100**

7. *The City of Somerville dedicated approximately 1.92% of its FY2008 annual budget to open space.*

Compared to its neighbors, Somerville's commitment to fund open space and recreation is high. Among Somerville's neighbors, Somerville ranks third in spending in FY2008 budget for "Culture and Recreation" (the closest category kept by the Department of Revenue for comparative purposes), having spent nearly $2.7 million out of a $140 million general fund budget.

However, on a per capita basis, Somerville falls behind not only Cambridge but also Arlington, Malden and Medford. Interestingly, even though Medford contains more than ten times the amount of open space that Somerville does, its per capita investment on upkeep is nearly equivalent to that of Somerville.

Figure 6-11: FY2008 Culture & Recreation Expenditures Per Capita[14]

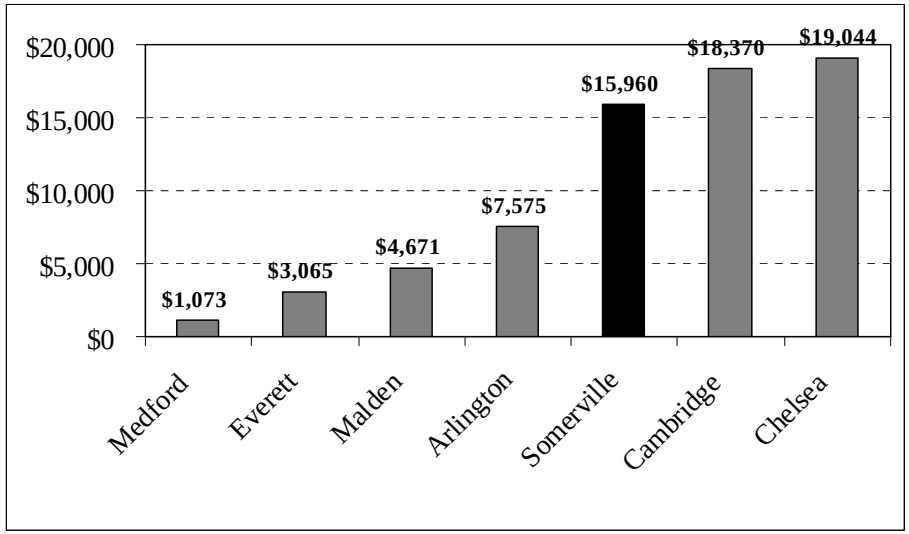


[13] *Somerville Open Space and Recreation Plan 2008-2013.*

[14] *Massachusetts Department of Revenue.*

On a per acre basis, Somerville spent just under $16,000 per acre of open space for maintenance and upkeep. Somerville only falls behind Chelsea and Cambridge in the amount of general fund dollars spent per acre of open space. Chelsea spent the most dollars per acre of open space because it has so little open space provided. The cities of Medford, Everett, Malden, and Arlington spend far less per acre of open space than Somerville.

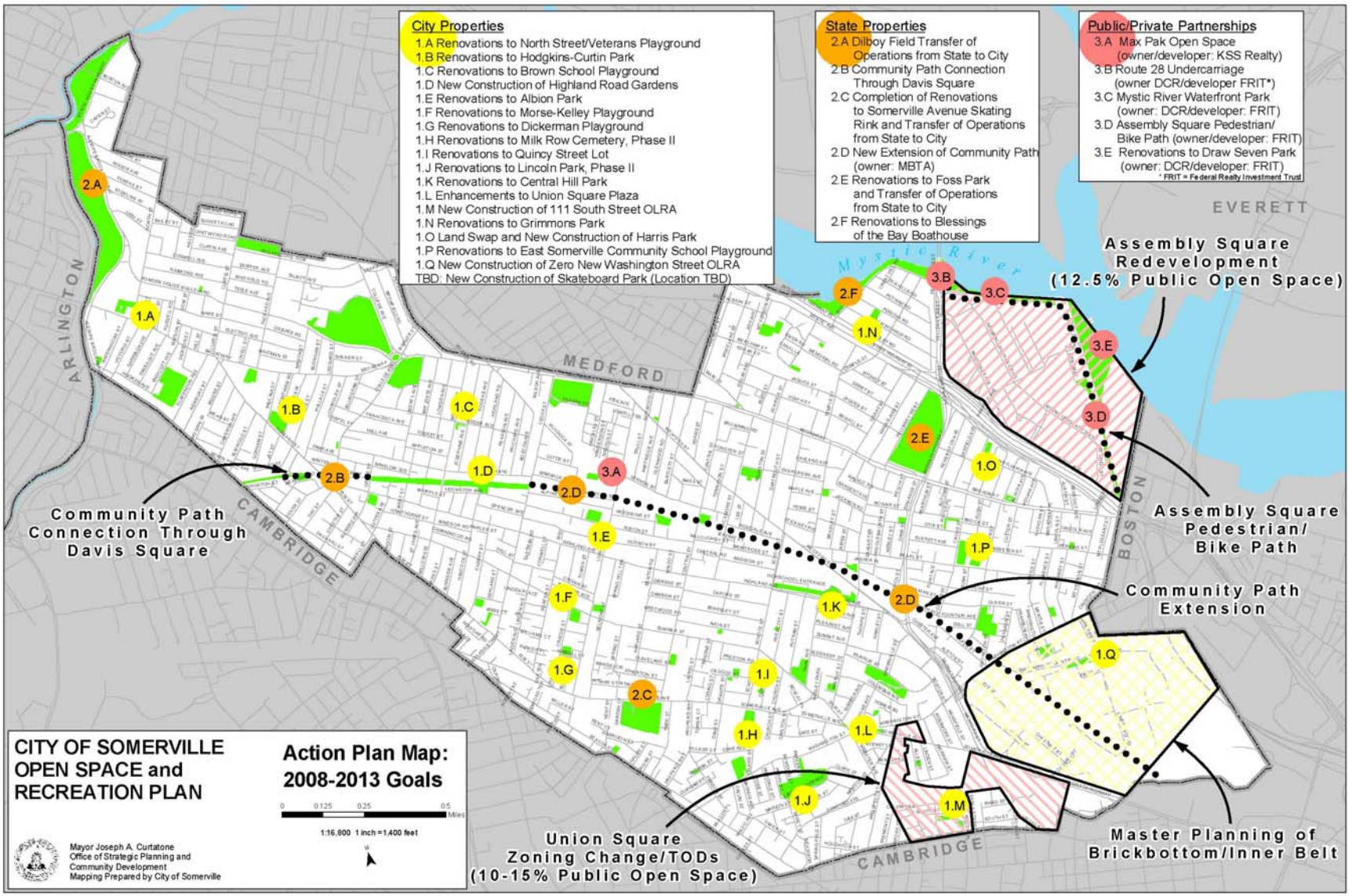
Figure 6-12: FY2008 Culture & Recreation Expenditures Per Acre[15]

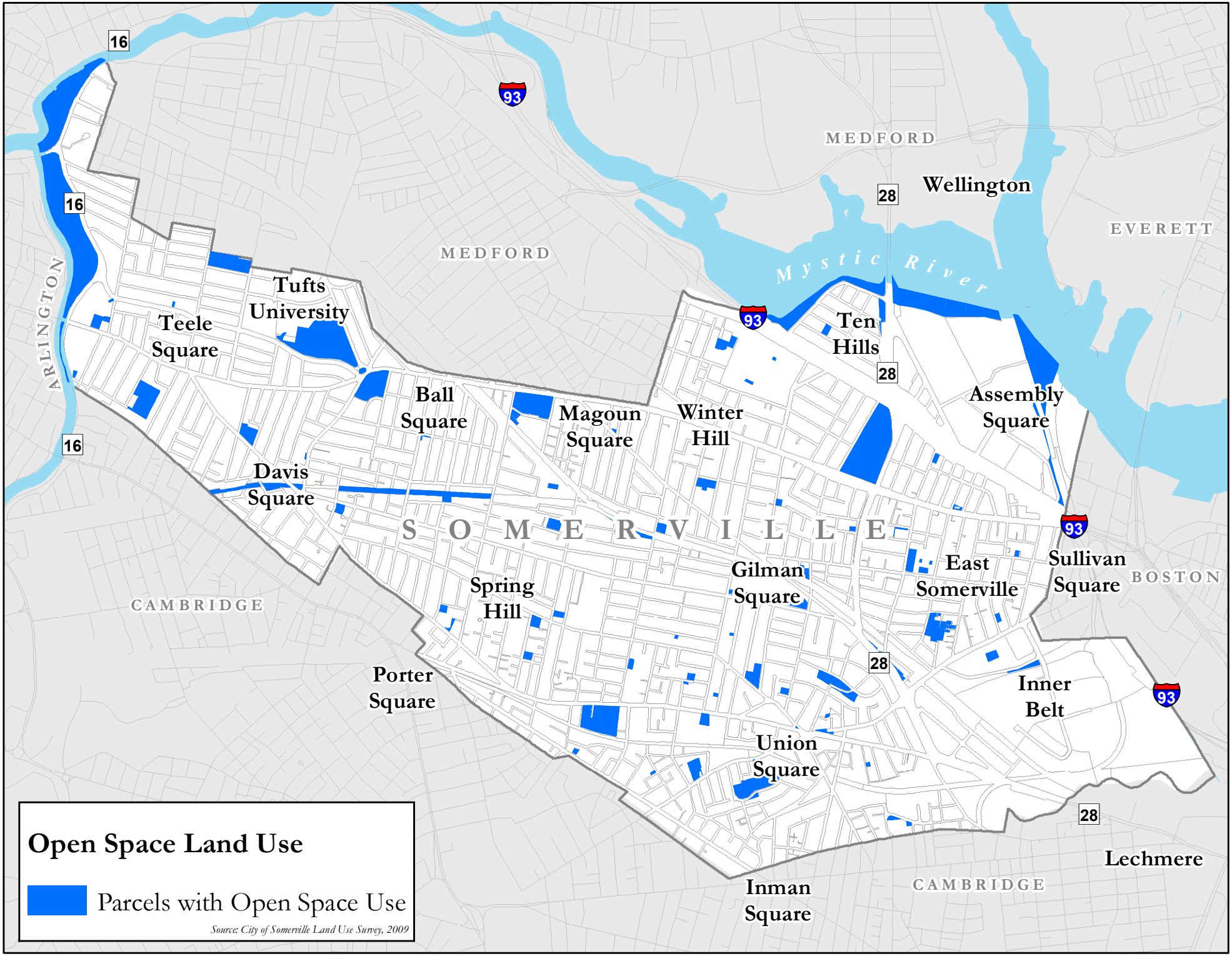


Note: Calculated with year 2000 Open Space acres.

[15] *Massachusetts Department of Revenue.*

Figure 6-13: 2008-2013 Open Space Action Plan




16
93
MEDFORD
Wellington
28
EVERETT
16
MEDFORD
Mystic River
ARLINGTON
Tufts
University
Teele
Square
93
Ten
Hills
28
Ball
Square
Magoun
Square
Winter
Hill
Assembly
Square
16
Davis
Square
S O M E R V I L L E
93
Sullivan
Square
BOSTON
Gilman
Square
East
Somerville
Spring
Hill
CAMBRIDGE
28
Porter
Square
Inner
Belt
93
Union
Square
28
Lechmere
Inman
Square
CAMBRIDGE
Open Space Land Use
Parcels with Open Space Use
Source: City of Somerville Land Use Survey, 2009

7. OTHER LAND ATTRIBUTES

A. INTRODUCTION

Somerville's physical landscape is characterized by a series of drumlins, or glacial hills, with relatively steep sides and outcroppings of slate. Three of the most prominent drumlins can be found at Powderhouse Park, Spring Hill (western edge), and Winter Hill (northern edge). These hills rise from the floodplain of the Mystic River and Alewife Brook, and generally run west to east, providing panoramic views of the Metropolitan Boston area.

The Mystic River and Alewife Brook form the city's western and northern boundaries, respectively. Formerly a tidal estuary before the construction of the Amelia Earhart Dam in the 1960s, the Mystic River is now a slow-moving urban river with open parklands and riparian vegetation along its banks.

Within the city's boundaries, soil types range from sandy loam in the more elevated areas of West Somerville to dense clay in the Ten Hills neighborhood and around the former Miller's River estuary near Union Square and Beacon Street. Much of the southern and eastern portions of Somerville are part of the Cambridge Floodplain, which fills the lower valley of the Charles River from Watertown to the Boston Harbor. Somerville's clay deposits were formed 14,000 to 15,000 years ago and contain fossilized shells of the saltwater Leda clam, extensive beds of which were created with the retreat of the glacier.

When the glacial waters receded from the Boston Basin, the clay-lands were replaced with forest and then a layer of peat. Several millennia later, when Europeans settled in Somerville, the clay was exposed only in nearby streams or tidal creeks. At that time, marshes could be found at the eastern, southern and northern edges of the then-named Charlestown mainland, while meadowland and grassland interrupted by marsh grew at the western edge near the Alewife Brook. Until the late 19th century, the relatively flat tract between Charlestown Neck and Alewife Brook was used largely for agricultural purposes. Before the onset of intense development in the early 20th century, large tracts of forested land could still be found in isolated upland regions in and around the city.

Somerville's water supply and sewage disposal systems are supplied by the Massachusetts Water Resources Authority (MWRA). Water supplies are transported from surface reservoirs in western and central Massachusetts by pipeline. Sewer services consist of a series of sanitary/stormwater lines that convey effluent to a regional treatment plant at Deer Island, operated by MWRA. City records do not indicate that any private water supplies or sewage disposal systems are in use.

Surface water resources – shared with Medford and Arlington – consist of the last mile of the Alewife Brook and the last mile of the lower Mystic River to the Amelia Earhart Dam. Both the Alewife Brook and the Mystic River are part of the Mystic River watershed, which encompasses approximately 70 square miles of land, and nearly 400,000 persons live across 19 municipalities: Arlington, Belmont, Boston, Burlington, Cambridge, Chelsea, Everett, Lexington, Malden, Medford, Melrose, Reading, Somerville, Stoneham, Wakefield, Watertown, Wilmington, Winchester and Woburn.

B. SOMERVILLE'S LAND RESOURCES

Watersheds

1. With better regional watershed-level planning and increased efforts to improve stormwater management and land use requirements at the municipal level, there is progress at improving the condition of the Mystic River Watershed's resources.

A watershed is a land area draining to a river or other body of water. Ridges on the horizon often define the boundaries of a watershed. The Mystic River Watershed covers 76 square miles or roughly 1% of the land area of Massachusetts. Its headwaters begin in Reading, MA and form the Aberjona River, then flow into the Upper Mystic Lake in Winchester. From the Lower Mystic Lake, the Mystic River flows through Arlington, Somerville, Medford, Everett, Chelsea, Charlestown, and East Boston before emptying into Boston Harbor. There are 44 lakes and ponds within the Watershed, with Spot Pond being the largest standing body of water at 307 acres in size.

The system was formed in large part by retreating glaciers more than 10,000 years ago, and is relatively flat. Originally, the system was tidal all the way up to the Lower Mystic Lake. Construction of the Craddock Dam in 1908 near Medford Square prevented the flow of salt water to Alewife Brook and the portion of the Mystic River upstream of the dam. The Amelia Earhart Dam was constructed in 1966 between Everett and Somerville, just below the confluence of the Malden and Mystic Rivers. This dam created a freshwater basin that enhanced public recreation opportunities and provided for flood control. The dam again altered the Watershed's hydrology and separated the Watershed into a freshwater system above the dam and a saltwater system below the dam that empties into the harbor. As land uses in the Watershed have developed, substantial portions of the waterbodies have been straightened and sometimes culverted. In some locations, the rivers and streams are no longer visible, and alteration of the river courses has profoundly affected their characteristics[1].

The Mystic River Watershed is a heavily urbanized watershed that suffers from a long history of industrial pollution, urban nonpoint-source pollution, and combined sewer overflows (CSOs). The Mystic River and its tributaries (Chelsea Creek, Malden River, Alewife Brook, and the Aberjona River) flow through some of the most densely-populated and industrialized communities in Massachusetts. The Watershed is home to many low-income, immigrant and minority environmental justice communities, and has suffered significant neglect in the past.

Restoration and protection efforts are complicated by the status of the lower part of the Watershed as a designated port area. The waterbodies suffer from problems typical of urban, industrialized areas including: (1) bacterial contamination (both dry- and wetweather) from aging sewer systems, combined sewer systems, and stormwater runoff; (2) high nutrient levels throughout much of the watershed; and, (3) leaching of toxic metals and organic compounds from hazardous waste disposal sites and contaminated sediments.

Open space and access to the waterways are severely limited in many of the adjacent communities, and many residents no longer see the rivers as assets and are often even unaware they exist. At the same time, the Watershed has significant assets to preserve and build on, including state-owned parklands along much of the waterfront and in the Middlesex Fells and Belle Isle Marsh. Many elements of an integrated landscape of parks and pedestrian and bike paths are in place, and only need linking to create a superb urban waterfront

[1] *Somerville Open Space and Recreation Plan 2008-2013.*

resource for public access, commuting and recreation. The Watershed is blessed with numerous local groups that advocate for the health and restoration of specific parts of the watershed. Major problems with urban run-off are beginning to be addressed through EPA and DEP Mystic River Watershed – Satellite Photo Mystic River Watershed Assessment and Action Plan Executive Summary regulatory action and the Phase II Stormwater regulations. And the principles of Low Impact Development are beginning to be applied by municipalities in their local land use decisions[2].

Wetlands

2. *Somerville has few remaining wetland resources, but they are critical the city's natural habitat and recreational amenities.*

Most of Somerville's wetlands were lost due to extensive development during the first half of the 20th century. The wetlands that remain are restricted to the 100-foot buffer zone on the shores of the Alewife Brook and the lower Mystic River and provide landscape diversity, natural habitat and recreational enhancement. Specifically, the Mystic River Reservation on the northern shore of the Mystic River in Medford is a vital and much used habitat and recreation area. An inspection by the Conservation Commission in 2007 determined there were no other existing wetlands within the city[3].

Aquifer Recharge Areas
Somerville's only aquifer recharge area is a small piece of a larger aquifer recharge area located mostly in Medford. This aquifer is classified by DEP as a "medium potential aquifer unlikely to be used." Somerville obtains its drinking water from the MWRA Quabbin Reservoir and therefore contains no drinking-water supply aquifer recharge areas.

Water Pollution
Water pollution is a critical issue to the fulfillment of Somerville's full open space and recreational potential. Point and non-point sources, from within and outside the city, combine to degrade the portions of the Alewife Brook and the Mystic River bounding Somerville. Several regional pollution problems are manifest in Somerville's water bodies due to their location near the mouth of the Mystic River.

Point-source pollution originates primarily from CSOs upstream from and outside the City's jurisdiction, as well as two remaining CSOs in Somerville, which make water bodies unusable for days following heavy rains. CSO impacts are magnified by the presence of illegal sewer hookups to stormwater collection systems. These problems are shared by most of Somerville's neighbors, although work is underway throughout the watershed to correct the problem.

Non-point source pollution issues arise from Somerville's urbanized development, particularly its expansive impermeable surfaces, such as paved residential yards and commercial lots. These impervious surfaces generate large volumes of stormwater runoff, which is commonly contaminated with road and highway dirt, auto leakage, animal waste, trash, and other contaminants. As mentioned above, Somerville shares these non-point water pollution issues with most neighboring communities.

[2] *Somerville Open Space and Recreation Plan 2008-2013.*
[3] *Somerville Open Space and Recreation Plan 2008-2013.*

Floodplains

3. Most of Somerville's 100-year floodplain falls in parkland areas; the city's riverfront greenbelts are well-planned and limit flood impact to private land.

Within Somerville, the 100-year floodplain - or the estimated lateral extent of floodwater that would theoretically result from the statistical 100-year frequency storm event - is restricted to the banks of the Mystic River and the Alewife Brook. Along the Mystic River north of the Amelia Earhart Dam, the floodplain boundary parallels the western and southern bank. South of the dam, the floodplain boundary extends west approximately 100 feet into DCR's Draw Seven Park (See Figure 7-1). Along Alewife Brook, the floodplain area is larger, extending at its widest point approximately 500 feet from the bank (See Figure 7-2). DCR parklands in both of these areas serve to provide water storage capacity during flood events.

Somerville's historical floodplain was likely much larger than the areas noted above. However, the filling of marshlands to make way for rail yards and other industries, combined with the channeling of Miller's River, consumed most of the City's flood storage capacity. The Amelia Earhart Dam, located at the confluence of the Mystic and Malden Rivers, has also reduced the area's flood storage potential. The dam is used to eliminate tidal influence upstream and to lower the river level in anticipation of coming storms[4].

Figure 7-1: FEMA Flood Map – East Somerville [5]

[4] *Somerville Open Space and Recreation Plan 2008-2013.*

[5] *FEMA Map Service Center, 2010.*

Figure 7-2: FEMA Flood Map – West Somerville[6]

[6] *FEMA Map Service Center, 2010.*

Stormwater

4. Somerville experiences drainage problems due, in large part, to the construction of dams and the filling of the historic Millers River with heavy rail infrastructure.

Much of the city's lower elevation neighborhoods - including Union Square, Somerville Avenue, historic rail beds, and parts of Davis Square - suffer from localized stormwater flooding during sudden heavy storm events, because of large amounts of impervious surfaces, the piping of the Miller's River and the filling of its floodplain, and other alterations[7].

Much of Somerville's drainage system pre-dates the construction of two dams: the Amelia Earhart Dam on the Mystic (1967) and the New Charles River Dam (1978)[8]. As a result, the storm drains lay lower than the current level of the receiving waters - specifically the Mystic River along the city's northeastern border and the Charles River to the southeast. Due to the construction of these two dams, the receiving waters are maintained at constant levels well above their historic low levels. This causes flooding when the low-lying stormwater system cannot drain correctly. Most of the city's stormwater has to be routed to the MWRA and pumped through their sewer system due to the extent of combined sewers plus the general low elevation of the city's drainage system relative to the receiving waters.

Somerville's drainage problem is further exacerbated by the filling of its natural outlet to the Charles River. Once a 1,000 foot-wide tidal inlet separating Somerville and Charlestown, the Millers River was progressively filled to build train yards and industrial land. The only

[7] *Somerville Open Space and Recreation Plan 2008-2013.*
[8] *Sewer Assessment Report (Draft Report), Somerville, Massachusetts, February 2009 CDM*

visible evidence of the Millers River today is a small culvert running through the MBTA commuter rail yard. In the late 1920s, the State issued a permit allowing the Boston and Main Railroad Company (B&M) to fill in and develop the Millers River tidal estuary[9]. This marshy area once permeated the southeastern section of the city and served as a natural drainage conduit from Somerville to the Charles River.

When the B&M Railroad sold its property in the 1960s, it allowed the developers of what is now known as the Inner Belt Industrial Park to connect their drainage pipes into a poorly functioning and silt-clogged culvert, also referred to as the Old Stone Culvert, just off Inner Belt Road adjacent to the current Holiday Inn Hotel.

In 1990, the MBTA proposed replacing the old, non-functioning drainage system with a new, modern system to handle the flows from the Commuter Rail Maintenance Facility as well as track drainage in Somerville from the Fitchburg Line tracks and the New Hampshire Mainline tracks. To date, this drainage system has not been built. Instead, drainage was built only to Inner Belt Road and tied into the old existing and failing conduit. [10] As a result, the Inner Belt district often experiences flooding after a heavy rain.

Impervious/Pervious Surfaces

5. Compared to its regional neighbors, Somerville has a high percentage of impervious surface – 77% of the city's total land area[11].

Impervious surfaces are mainly man-made structures, such as roads, sidewalks, driveways, and parking lots that are covered by impenetrable materials (asphalt, concrete, brick, and stone.) Impervious surfaces are an environmental concern because the pavement materials seal the soil surface eliminating rainwater infiltration and natural groundwater recharge. In addition, they collect solar heat, and deprive tree roots of aeration, eliminating the "urban forest" and the canopy shade that would otherwise moderate the urban climate. The total coverage by impervious surfaces in an area, such as a city, municipality or a watershed is usually expressed as a percentage of the total land area. In rural areas, impervious surfaces can be 10% of total area, whereas in urban areas, they are generally over 50%. Impacts of impervious surfaces can be mitigated by using materials that function more like naturally pervious soils, such as porous pavements, green roofs and infiltration basins[12].

In looking at Somerville's historically transit-based infrastructure, it is apparent why Somerville is overburdened with a large amount of impervious surface - the city developed with a concentration of streets because as a streetcar suburb of Boston and the close-knit street grid allowed people to quickly walk from their homes to transit.

Figure 7-3 displays the percentage of impervious surface in each of Somerville's seven wards. Ward 1, the area around Sullivan Square, has 88% of its land as impervious surface. Figure 7-4 compares the percentage of impervious surface of Somerville with its regional neighbors. Somerville has more impervious surface, by a significant amount, than its closest neighbors, specifically Cambridge at approximately 65% and Boston at approximately 58%.

[9] *Such a permit would not be issued today due to environmental protection laws barring the filling of wetlands (US Clean Water Act of 1977, Section 404).*
[10] *Sewer Assessment Report (Draft Report), Somerville, Massachusetts, February 2009 CDM*
[11] *MassGIS 2005.*
[12] *Center for Watershed Protection, 2010.*

Figure 7-3: Somerville's Impervious Surface[13]

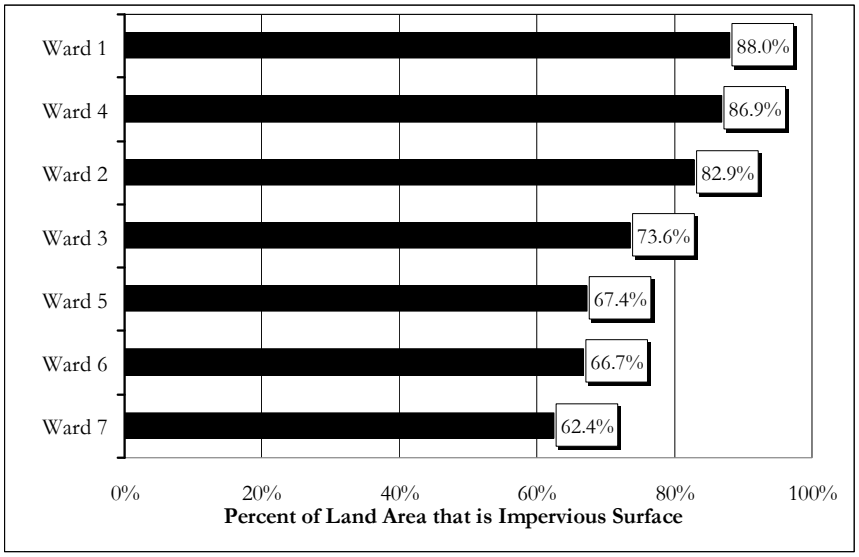
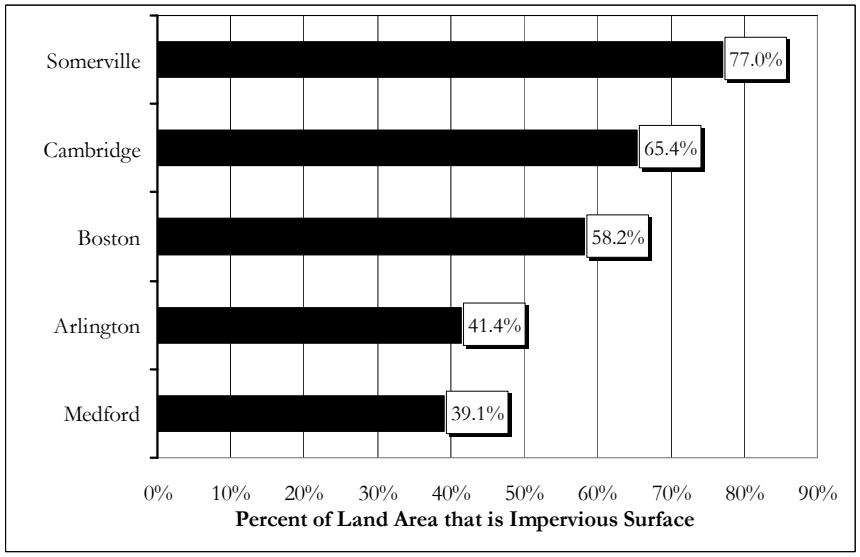


Figure 7-4: Regional Impervious Surface Comparison[14]



C. QUALITY OF SOIL CONDITIONS

Somerville's long history of industry has affected the quality of its land resources. "Brownfields" are properties where hazardous substances, contaminants, or other toxic materials can be found. Identifying the type and extent of contamination can be difficult and expensive, making most contaminated properties unattractive for redevelopment and expansion. Potential buyers of brownfield properties especially worry about the possibility of civil penalties and costly cleanup efforts under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Nevertheless, remediating and reinvesting in these properties protects the environment, reduces area blight, and takes development pressure off green space and other valuable land.

[13] *MassGIS 2005.*

[14] *MassGIS 2005.*

According to the Massachusetts Department of Environmental Protection (DEP), brownfield sites do not share a formal definition but do share common characteristics. Brownfields are typically abandoned or are perpetually for sale; they are likely to have a history of commercial or industrial use and become official when they are reported to the DEP. A site is first typically reported to DEP when a spill occurs or when contamination is found and reported on a particular site. Reporting requirements are described according to Massachusetts General Law Chapter 21E – Massachusetts Oil and Hazardous Material Release Prevention and Response Act.

Somerville contains approximately 466 known brownfield sites, e.g., properties on which environmental testing has occurred, reported to DEP and hazards identified (see Figure 7-5). Sites are primarily clustered in eastern portions of Somerville. The City is focusing economic development efforts in Union Square and two of the city's industrial areas, Inner Belt and Boynton Yards. All three of these target areas will require a thorough regimen of testing and cleanup activities.

Figure 7-5: Somerville Brownfield Sites