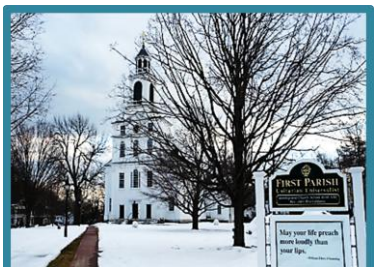
The Bedford We Want: Shaping Our Future

Comprehensive Plan

APPENDICES



Bedford Planning Board

December, 2013

APPENDICES

Land Use

Economic Development

Natural & Cultural Resources

Transportation

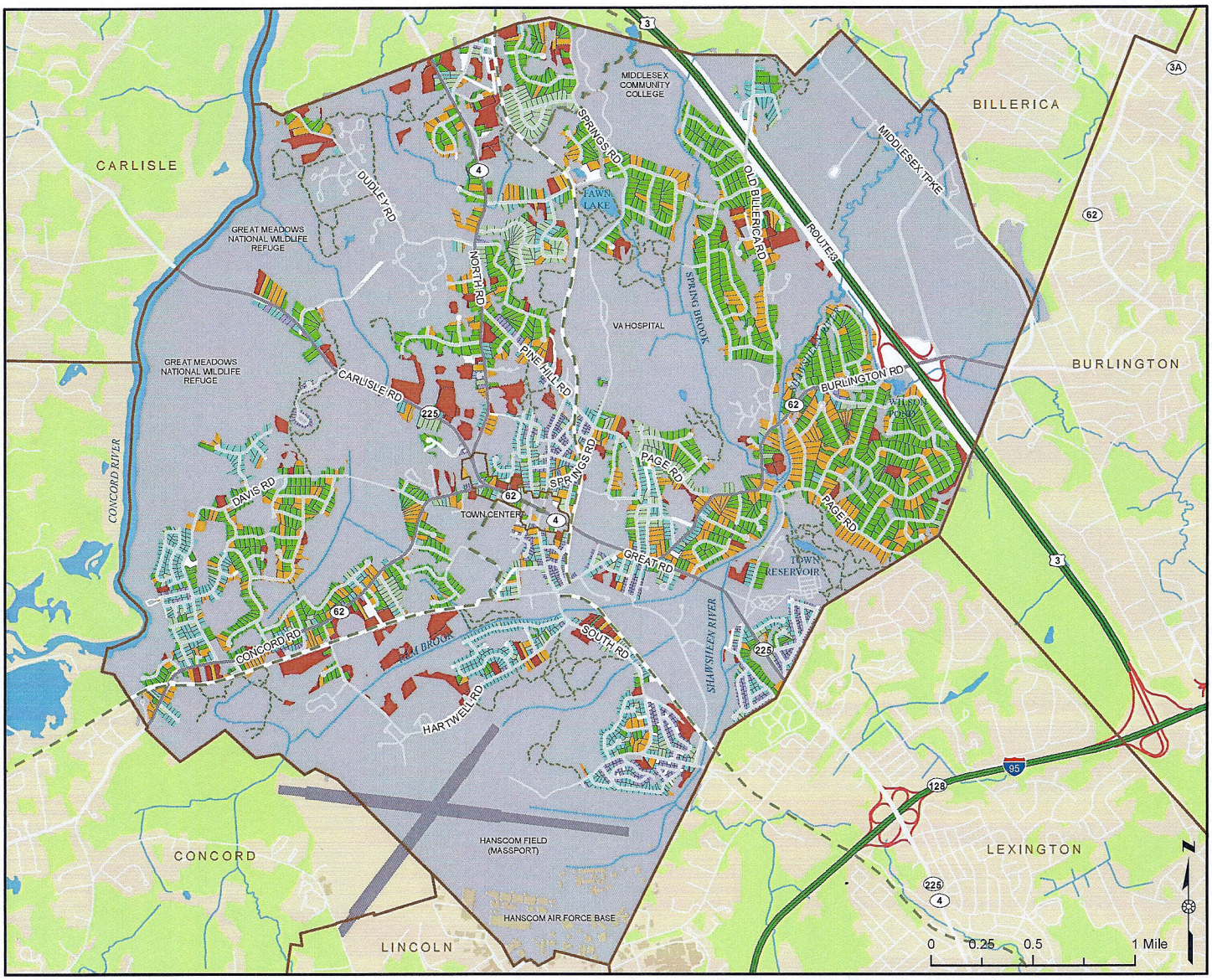
Housing

Services, Facilities
Recreation and Energy

The Appendices contain major amounts of additional data and information that weren't included in the main Comprehensive Plan document. There is a great deal of useful information in these Appendices that adds dimension and understanding to each topical element and which should prove useful to interested parties. Note: the appendix material does not have the same editorial cohesiveness with everything accompanied by explanatory text as in the main document; graphics are in mostly unedited original format.

APPENDIX: LAND USE-- *ADDITIONAL DATA AND INFORMATION*

The map on the next page breaks down all residential parcels by whether they are less than, at or more than the required minimum lot size under the zoning bylaw. Parcels with less than the required area are typically lawful non-conforming properties, those that are above the minimum (actually, at least twice the minimum) are theoretically further divisible into one or more additional lots. The reddish-brown parcels on the map represent properties that are at least 200% of minimum lot size. Most fall into the 3 to 10 acre range. Most of these lots are clustered off Carlisle, North and Concord Roads. While totaling an estimated 100 acres, this land is scattered in perhaps 75 separate lots. Many would require the building of costly access roads to allow further residential development, others have no practical means of providing street frontage, and many are environmentally constrained by the encroachment of wetlands. Moreover, many property owners have no desire to further develop their land. These factors together limit development potential. Some lots will be developed (there are recent and pending proposals before the Planning Board), but the larger subdivisions that were a factor through the mid-2000's are likely a thing of the past.



Residential Parcels, by Percent of Zone Minimum Lot Size

Percentage of Minimum Lot Size

- Less Than 50%
- 50% to 75%
- 75% to 95%
- 95% to 110%
- 110% to 200%
- Greater Than 200%
- Unknown / No Data
- Restricted from Development

Reasons Include:
Not Zoned Residential
Conservation Restrictions
Government-Owned
Wetland and No-Build Buffer
Already Developed
Education / Religous Use

- Road
- Trail
- Town Boundary

NOTE: Boundary of Town Center shown is the extents of the Historic District.

Map by Bedford Public Works
November 2013

The information displayed on this or any other map produced by the Town of Bedford is for reference purposes only. The Town of Bedford does not guarantee the accuracy of the data. Users are responsible for determining the suitability for their own individual needs.

All information is from the Town of Bedford's Geographic Information System (GIS) database. Any questions or concerns should be addressed to the Town GIS Analyst.

For a mature suburb that is mostly built-out, Bedford enjoys a notable balance in the land use patterns that were established since the mid-20th century. The town has approximately 13.7 square miles of land area, 13.9 with water surface. Utilizing Bedford Assessor data as it is employed for valuation purposes, which is not always identical to similar studies done for mapping and spatial analysis, it is shown that nearly 30% of the town's area is covered by single family homes, and another 8.5% by other residential types, meaning that more than 3300 acres are in developed residential use. That figure edges slowly upward over time as new development and redevelopment occurs. Approximately 8.4% of the town or 743 acres is devoted to developed industrial, office and commercial use, although additional acreage is zoned for these uses and could be developed in the future. Governmental uses at all jurisdictional levels occupy 15.7% or 1380 acres.

Open space of all types and governmental levels—including residual land at Hanscom, the Harvard University research parcel and Middlesex Community College—totals nearly 35% of the town's area, although it should be kept in mind that this is land that is assessed for taxation purposes as open space, and is not all permanently protected land. Roughly 2100 acres would fall into that category.

Table 1: LAND USE—2011/12 BREAKDOWN—ASSESSOR'S DATA

(Developed Properties)

LUC Number	LUC Description	Sum (sq ft)	Sum (acres)	#Parcels
1	**Mixed Use**	**3,210,977**	**73.71***	23
			74	23
2	**Residential - Single Family**	**111,402,161**	**2,557.44**	3336
3	**Residential - Multi-Unit >4**	**25,094,934**	**576.10**	28
4	**Residential - Two and Three Family**	**7,650,517**	**175.63**	325
	Sub-Total		**3309**	3689
5	**Vacant Land on part-developed Sites (involving different zoning districts)**	**6,176,233**	**141.79**	6
	Sub-Total		**142**	6
6	**Business / Retail**	**5,531,648**	**126.99**	
7	**General Office**	**23,133,992**	**531.08**	
8	**Industrial**	**3,720,669**	**85.41**	
	Sub-Total		**743**	149
9	**Agriculture / Horticulture**	**2,340,498**	**53.73**	6
	Sub-Total		**54**	6
10	**Governmental**	**60,106,688**	**1,379.86**	
	Sub-Total		**1380**	NA
11	**Open Space—local public**	**42,688,800**	**979**	
12	**Other Governmental Open Space**	**88,784,169**	**2,038.20****	
13	**Recreation/OS - Private**	**2,306,385**	**52.95**	
	Sub-Total		**3070**	93

14	**Institutional – Private-Developed Area**	**3,679,421**	**84.47**	
	Sub-Total		**84**	NA
			8782 acres	

** Mixed Use could be counted as 80% residential and 20% commercial.*
*** Such as Great Meadows, protected OS at Bedford VA, state land.*

Development Highlights from Past 25 Years

Some of the major development trends were as follows:

- ----Conventional and cluster subdivisions such as Revolutionary Ridge (86 lots), Governor Winthrop & Hayden Highlands (58 lots), Sweeney Ridge (25 lots), Huckins Farm (119 units), Freedom Estates (55 lots), Page Hill (60 lots).
- ---- Multi-family and townhouse developments such as The Village at Taylor Pond (200 units) and Hartwell Farms (75 units); this does not include the numerous Chapter 40B developments that were permitted as Comprehensive Permits or Local Action or Initiative units; these are documented in the Housing Appendix and elsewhere.
- ----Business developments such as the mixed office and restaurant building at 213 Burlington Road (Bamboo, Flatbread, etc.); the Blake Block mixed use project in the town center; mixed office and restaurant uses at 54 Middlesex Tpk., the Mitre campus building expansions off Burlington Road, the Millipore expansion on Wiggins Avenue, and a number of small industrial or office expansions such as Progressive Software and F.W. Webb, and the opening of I-Robot in an renovated building in 2008.

Within the Planning Department data base, there are tables containing a list of development and redevelopment projects that occurred between 1989 and 2011, in which the Planning Board had review jurisdiction by means of special permit authority, subdivision control or site plan review. This is not a 100% development list because some projects occur by other regulatory means, principally a Zoning Board of Appeals special permit or occasionally one that just required wetlands approval before the building permit. Nevertheless, those tables serve to provide a 22 year history of most development in Bedford. There are also newer lists in the data base that update development from 2011 to fall of 2013. This data was far too lengthy to include in these Appendices but is available in the Planning office.

APPENDIX: ECONOMIC DEVELOPMENT-- *ADDITIONAL DATA AND INFORMATION*

COMMERCIAL ACTIVITY IN BEDFORD

Bedford role in the metropolitan region is further documented below in ED Appendix Table 1, providing additional detail from the related data in the main document. There are 16 standard employment sectors in the Boston/Cambridge/Quincy NECTA (New England Cities and Towns Area, US Office of Management & Budget, Bureau of Labor Statistics, using the North American Industry Classification System). Bedford's role is also significant within the entire Commonwealth. The Boston NECTA covers 116 cities and towns in eastern MA between the coastline and an area beyond Route I-495.

Table 1: Bedford's Role in the Regional & State Economy, 2011, By Employment Sector (full and part-time)	**Avg monthly empl., Bos-Cam-Quin NECTA, 2011***	**Avg monthly employ., Bedford, 2011**	**Location Quotient, Bedford to NECTA**	**Avg. monthly employ., MA 2011**	**Location Quotient, Bedford to State**
Industry Totals	***2,251,724***	***19,818***		***3,191,604***	
23 - Construction	81,116	304	0.43	121,528	0.40
31-33 - Manufacturing **	169,002	2,328	1.57	254,018	1.48
42 - Wholesale Trade	84,786	929	1.24	123,509	1.21
44-45 - Retail Trade	219,467	914	0.47	343,688	0.43
48-49 - Transportation and Warehousing	66,298	296	0.51	96,296	0.50
51 - Information	74,304	1,973	3.02	89,853	3.54
52 - Finance and Insurance	134,816	408	0.34	168,207	0.39
53 - Real Estate and Rental and Leasing	31,307	299	1.09	40,100	1.20
54 - Professional and Technical Services	221,558	4,619	2.37	261,268	2.85
55 - Management of Companies and Enterprises	47,766	166	0.39	58,702	0.46
56 - Administrative and Waste Services	120,715	386	0.36	163,022	0.38
61 - Educational Services	221,297	1,293	0.66	326,199	0.64
62 - Health Care and Social Assistance	364,808	2,669	0.83	531,448	0.81
71 - Arts, Entertainment, and Recreation	36,195	139	0.44	54,669	0.41
72 - Accommodation and Food Services	180,779	768	0.48	266,294	0.46
81 - Other Services, Ex. Public Admin	90,457	215	0.27	137,221	0.25

* NECTA = **N**ew **E**ngland **C**ity and **T**own **A**reas, US Office of Management & Budgeting, Bureau of Labor Stats

The employment level within all the town's job centers is in the vicinity of 19,000 at annual peak employment and including full and part-time labor and contractual workers, according to the most

state data.[1] While it is not possible to be more precise using available data, it can be estimated that at least 2 out of 3 jobs can be characterized as being office or lab-based, rather than manual labor, in nature. A substantial number of jobs are in the defense industry, many based at MITRE Corporation's large campus in Bedford. The Other & Public Administration category is at 10.6%. Manufacturing constitutes 11.7%, but this includes both durable and non-durable goods, the latter including food, medicine, paper products and other "soft" goods. Trade, Transportation and Distribution is at 6%, followed by Retail at 4.6%, and Leisure and Hospitality at 4.5%. The smallest aggregation is Miscellaneous Services and Construction at 2.6%.

Table 2: Detail of major employment sectors in Bedford, 2011

Note: Italicized items are sub-sets of the boldface headings and do not necessarily add up to those headings. These italicized sub-sets are included as detail that conveys a deeper understanding of Bedford's economy.

NAICS sector*	Notable sub-sectors	Description	No. of Establish-ments	Average Monthly Employment	Average Weekly Wages
		Manufacturing			
31-33		**Manufacturing**	**35**	**2,328**	**$2,293**
	325	*Chemical and pharmaceutical manufacturing*	*5*	*209*	*$1,810*
	334	*Computer and electronic product mfg*	*17*	*1,644*	*$2,513*
	339	*Miscellaneous manufacturing*	*5*	*35*	*$1,822*
		Trade, Transportation and Distribution			
42		**Wholesale Trade**	**41**	**929**	**$2,379**
	423	*Merchant wholesalers, durable goods*	*15*	*774*	*$2,501*
	424	*Merchant wholesalers, nondurable goods*	*3*	*27*	*$1,268*
	425	*Electronic markets and agents/brokers*	*23*	*129*	*$1,855*
48-49		**Transportation and Warehousing**	**15**	**296**	**$819**
	481	*Air transportation*	*4*	*15*	*$1,090*
	485	*Transit and ground passenger transport*	*5*	*147*	*$431*
	488	*Support activities for transportation*	*4*	*83*	*$1,252*
		Retail			
44-45	*441*	*Motor vehicle and parts dealers*	*4*	*57*	*$976*
	443	*Electronics and appliances stores*	*3*	*15*	*$1,036*
	444	*Building material & garden supply stores*	*3*	*50*	*$694*
	445	*Food and beverage stores*	*9*	*469*	*$594*

[1] Different state and federal surveys and agency data vary in methodology, inclusion of part-time jobs, sample sizes, and so on, with the numbers falling in the 15,500 to 20,000 range, but the number of 19,818 from the MA Executive Office of Labor and Workforce Development provides the most current and reliable data.

	447	*Gasoline stations*	*4*	*26*	*$500*
	451	*Sporting goods/hobby/book/music stores*	*4*	*20*	*$459*
	453	*Miscellaneous retailers incl.office supplies*	*6*	*55*	*$393*
		Information, Publishing, Data			
51		**Information**	**29**	**1,973**	**$3,588**
	511	*Publishing industries*	*14*	*1,037*	*$3,253*
	518	*ISPs, search portals, & data processing*	*4*	*90*	*$2,173*
		Professional, Financial, Business Services			
54		**Professional and Technical Services**	**178**	**4,619**	**$2,227**
	5411	*Legal services*	*9*	*27*	*$918*
	5415	*Computers systems design and related services*	*73*	*1,484*	*$2,724*
	5416	*Management & technical consulting svc*	*41*	*229*	*$2,060*
	5417	*Scientific research and development svc*	*23*	*369*	*$2,005*
	5419	*Other professional & technical services*	*7*	*12*	*$2,202*
56		**Administrative and Support Services**	**38**	**386**	**$1,094**
52		**Finance and Insurance**	**29**	**408**	**$1,712**
	522	*Credit Intermediation & Related Activity*	*13*	160	$1,032
	524	*Insurance Carriers & Related Activities*	*10*	112	$1,788
53		**Real Estate and Rental and Leasing**	**14**	**299**	**$1,355**
55		**Management of Companies and Enterprises**	**5**	**166**	**$1,764**
		Education and Health Care Services			
61		**Educational Services**	**14**	**1,293**	**$1,044**
	6111	*Elementary and Secondary Schools*	*3*	*497*	*$1,267*
	6115	*Technical and Trade Schools*	*3*	*84*	*$646*
62		**Health Care and Social Assistance**	**49**	**2,669**	**$1,116**
	621	*Ambulatory Health Care Services*	*25*	*469*	*$1,015*
	624	*Social Assistance (incl. child day care)*	*12*	*349*	*$421*
		Leisure and Hospitality			
71		**Arts, Entertainment, and Recreation**	**12**	**139**	$262
72		**Accommodation and Food Services**	**46**	**768**	**$414**
	721	*Accommodation*	*8*	*204*	*$600*
	722	*Food Services and Drinking Places*	*38*	*564*	*$346*
		Miscell. Services/Construction			
23		**Construction**	**51**	**304**	**$1,202**
	236	*Construction of buildings*	22	114	$1,310
	238	*Specialty Trade Contractors*	26	144	$1,156
81		**Other Services, Exc. Public Admin**	**67**	**215**	**$852**
	811	*Repair and Maintenance*	*14*	*58*	*$991*
	812	*Personal and Laundry Services*	*19*	*71*	*$453*
	814	*Private Households*	*28*	*31*	*$437*

		Other incl. public admin			
		Other including public admin **	**18**	**2,112**	**$1,705**

** NAICS employment sectors = North American Industry Classification System, US Census Bureau*
*** Sectors not specifically reported, calculated as remainder from total*

The wage value of these aggregated employment sectors—as measured by total average weekly wages— varies greatly, due to big differentials in pay rates as well as different quantity of jobs between sectors. The Professional/Financial/Business class pays out $12.1 million weekly, followed by Information/Publishing at $7.1 million, Manufacturing at $5.3 million, Education/Health Care at $4.3 million, and Other/Public Administration at $3.6 million.

Table 3: Weekly Payroll, By Employment Sector	
Manufacturing	$ 5,338,104
Trade, Transport., Distribution	$ 2,461,515
Information, Publishing, Data	$ 7,079,124
Retail	$ 510,012
Professional, Financial, Business Services	$ 12,105,262
Education and Health Care Services	$ 4,328,496
Leisure and Hospitality	$ 354,370
Miscel. Services/Construction	$ 548,588
Other& Public Administration	$ 3, 600,314

EMPLOYERS

The ten largest employers in Bedford underscore the kind of economy that has been discussed in Economic Development; they include: the MITRE Corporation, the long-established defense contractor with a 13 building campus on Burlington Road; The Edith Nourse Rogers Veteran's Administration Hospital; RSA Laboratories and RSA Security (EMC network computer security); The Air Force Research Laboratory; Data Direct Technologies, software design and government contractors; Instrumentation Laboratories, medical testing devices; Middlesex Community College; Progress Software; and Spaulding and Slye real estate investment and development. Raytheon, the large defense contractor, moved out of Bedford and is no longer on the list; Instrumentation Labs took over their facility. Millipore, the large bio-sciences corporation, still has a facility in Bedford but moved some of the operation to Billerica and is no longer in the top ten. The Boston Globe reported in July, 2013, that MITRE and the Air Force each employ approximately 2,000 people in Bedford, but were being significantly affected by the automatic budget cuts known as sequestration.

Table 4: Largest Employers in Bedford, 2012, EOLWD (InfoGroup, Omaha, NE)

Company Name	Address	City	Number of	NAICS

			employees	Code
MITRE Corp	Burlington Rd	Bedford	1,000-4,999	8133
Rogers VA Medical Ctr	Springs Rd	Bedford	1,000-4,999	6221
Data Direct Technologies	Oak Park Dr	Bedford	500-999	5415
Instrumentation Lab	Hartwell Rd	Bedford	500-999	3345
Middlesex Community College	Springs Rd	Bedford	500-999	6111
Progress Software Corp	Oak Park Dr	Bedford	500-999	5415
RSA Security Inc	Middlesex Tpke	Bedford	500-999	4236
Carleton-Willard Village Nurse	Old Billerica Rd	Bedford	250-499	8133
Continental Resources Inc	Middlesex Tpke # 1	Bedford	250-499	4234
Hologic Inc	Crosby Dr # 101	Bedford	250-499	3391
Town of Bedford	Mudge Way	Bedford	250-499	6111
Army & Air Force Exchange Svc	Grenier St # 1515	Hanscom Afb	100-249	4529
Doubletree	Middlesex Tpke	Bedford	100-249	7211
Empirix Inc	Crosby Dr	Bedford	100-249	5182
Frank Webb's Bath Ctr	Middlesex Tpke	Bedford	100-249	4441
FUJIFILM RECORDING MEDIA USA	Crosby Dr	Bedford	100-249	4431
GSI Group Inc	Middlesex Tpke	Bedford	100-249	3345
I Robot Corp	Crosby Dr	Bedford	100-249	3339
Medica Corp	Oak Park Dr # 1	Bedford	100-249	3391
Nashoba Learning Group Inc	Oak Park Dr	Bedford	100-249	6111
Pre-Owned Electronics	Middlesex Tpke	Bedford	100-249	5416
R R Donnelley	South Rd	Bedford	100-249	3231
RNK Telecom	Great Rd # 2	Bedford	100-249	5179
Sound Bite Communications Inc	Crosby Dr	Bedford	100-249	5179
Spire Biomedical Inc	Patriots Park	Bedford	100-249	4234
Super Stop & Shop	Great Rd	Bedford	100-249	4451
Toxikon Corp	Wiggins Ave	Bedford	100-249	3391
Whole Foods Market	Great Rd # 2	Bedford	100-249	4451
Hanscom Primary/Middle/High Schools	Ent Rd	Hanscom Afb	100-249	6111
Anika Therapeutics Inc	Wiggins Ave	Bedford	50-99	3391
Aware Inc	Middlesex Tpke	Bedford	50-99	5417
BD Biosciences	Oak Park Dr	Bedford	50-99	3391
Bedford VA Hospital	Springs Rd	Bedford	50-99	6221
Boston Med Flight	Robins St # 1727	Bedford	50-99	6211
Cafe Luigi	Great Rd # 2	Bedford	50-99	7225
Cardinal Health	Wiggins Ave	Bedford	50-99	4242
Diversified Technologies Inc	Wiggins Ave	Bedford	50-99	5413
F W Webb Co	Middlesex Tpke	Bedford	50-99	4237
Jet Aviation	Hanscom Dr	Bedford	50-99	4881
Marshalls	Great Rd	Bedford	50-99	4521
Mettler-Toledo Ingold Inc	Middlesex Tpke	Bedford	50-99	3345
Micro E Systems Corp	Middlesex Tpke	Bedford	50-99	3341
Mind Leaf Technologies Inc	Crosby Dr # 330	Bedford	50-99	5415
Minuteman Senior Svc	Crosby Dr	Bedford	50-99	8133
New England Life Flight	St Hangar 1727	Bedford	50-99	6219

RISI Inc	Alfred Cir	Bedford	50-99	5111
Spire R&D	Patriots Park	Bedford	50-99	5417
Sterimatics Corp	Park	Bedford	50-99	3345
Tecolote Research Inc	Middlesex Tpke # 1110	Bedford	50-99	5419
US Post Office	Great Rd	Bedford	50-99	4911
Acme Packet Inc	Crosby Dr # 1	Bedford	20-49	5179
Bamboo-Bedford Fine Asian	Burlington Rd	Bedford	20-49	7221
Bedford Charter Svc	Railroad Ave	Bedford	20-49	4855
Bus-Tech Inc	Crosby Dr # 100	Bedford	20-49	4234
C E Floyd Co	South Rd # 4	Bedford	20-49	2361
Corporate Limousine Svc Inc	Hanscom Dr # 204	Bedford	20-49	4853
East Coast Aviation	E Ramp	Bedford	20-49	4881
Executive Flyers Aviation Corp	Hanscom Dr	Bedford	20-49	6113
First Light Bio Sciences	Oak Park Dr # 2	Bedford	20-49	5417
Firstbest Systems Inc	Burlington Rd # 120	Bedford	20-49	5619
Flatbread Co	Burlington Rd # 111	Bedford	20-49	7221
Goodwill Janitorial Svc	Grenier St # 1813	Hanscom Afb	20-49	5617

Commercial Space Vacancy and Absorption

Vacancy rates, according to two 2012 commercial real estate surveys[2] fall into a range of 11 to 14.4 %, down considerably from 2011 rates well in excess of 20%. The fall, 2012 average for the Route 128 North market segment was 15.6%. It is important to note that there has been a steady stream of new occupants moving into Bedford, especially to Crosby Drive locations. Entegris renovated 80,000 square feet at 9 Crosby; the firm is involved in advanced materials for various filtration and purification devices in electronics and semiconductors. Acme Packet moved to 40 & 100 Crosby Drive and is involved with technologies to control various voice-over-internet applications. ConforMIS recently established its headquarters at 28 Crosby Drive to design and manufacture medical devices such as replacement knee joints. A specialized sheet metal fabrication company from Lowell moved to 39 Crosby as well. Finally, 1366 Technologies moved to 6-8 Preston Court (off DeAngelo Drive), with an operation that designs and manufactures solar chips and panels.

Bedford Residents Employment Profile

Bedford enjoys lower unemployment than the State or Middlesex County. Bedford's rate peaked at 6.3% in 2009, while the County's hit a high of 7% in 2009 and 2010, and the State's peaked at 8.5% in 2010. Bedford's rate, as of September, 2012, was down to about 5%, while the State figure was around 7.3%.

[2] Richards, Barry, Joyce Partners—Fall, 2012 Route 128 North Market Survey;
Newmark, Grubb, Knight, Frank, summer 2012 Vacancy Survey

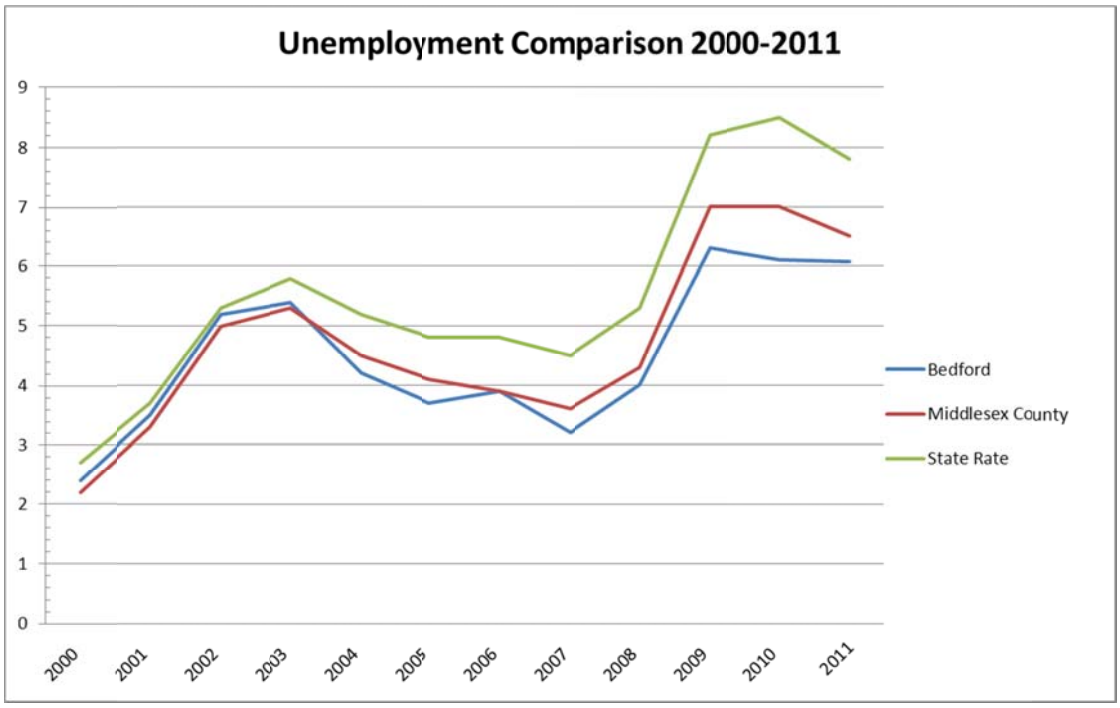


Table 5, Labor Force and Unemployment

	Labor Force			*Employment*			*Unemployment*			*Rate %*		
	SEP 2012	**AUG 2012**	**SEP 2011**	**SEP 2012**	**AUG 2012**	**SEP 2011**	**SEP 2012**	**AUG 2012**	**SEP 2011**	**SEP '12**	**AUG '12**	**SEP '11**
Mass.	**3,466,400**	**3,493,500**	**3,447,500**	**3,242,900**	**3,271,200**	**3,197,100**	**223,500**	**222,200**	**250,400**	**6.4**	**6.4**	**7.3**
Bedford	**7,014**	**7,059**	**6,937**	**6,661**	**6,720**	**6,519**	**353**	**339**	**418**	**5**	**4.8**	**6**

(Data not seasonally adjusted) **Source: MA Exec Off of Labor & Workforce Development**

Earnings are much higher for residents with a bachelor's degree than those without. Men earn more on average than women, which is likely to be partly a reflection of more part-time employment among women. Typical earnings in different sectors of employment in Bedford vary widely, being low in retail, leisure and hospitality, and trade, transportation and distribution; highest in information, publishing and data; high in professional and technical services, wholesale and manufacturing; and intermediate in administrative, support and financial services, education and healthcare and construction. *(source: MA Exec Off of Labor & Workforce Development, 2011)*

Table 6: Median Earnings by Educational Attainment 2010			
Population 25 Years and over	Total	Male	Female
	9,182	4,318	4,864
Median Earnings for:			
Population 25 years and over with earnings	$59,542	$84,453	$47,888
Less than high school graduate	$53,041	$54,054	$12,344
High school graduate (includes equivalency)	$42,175	$55,223	$7,328
Some college or associate's degree	$42,344	$44,712	$41,000
Bachelor's degree	$71,667	$105,625	$45,400
Graduate or professional degree	$82,247	$101,258	$61,343

Source: America Community Survey 5-year Estimates, 2010

TAX BASE

Table 7: Bedford Tax Base Distribution, 2003-2012 (Assessed Valuation by Use)			
USE CATEGORY YEAR >	**2003**	**2007**	**2012**
Commercial, Office, Industrial (In Dollars)	516,830,068	565,499,009	493,126,548
	23.4%	20.7%	18.5%
Residential Property	1,687,152,932	2,162,403,691	2,175,568,303
	73.20%	79.3%	81.5%
TOTAL	2,203,985,004	2,727,904,807	2,668,694,651

Table 8: Fiscal Comparison of Bedford and Surrounding Towns

	2010 Pop.	Avg Single Family Tax Bill	MA-DOR Income Per Capita	Total Ass'd Value	% of Total Val.		Total Tax Levy	% of Total Levy		Tax Rate		
		(2012)	(2008)		RES	NON-RES	2012	RES	NON-RES	RES	NON-RES	CIP
Bedford	13,320	7,883	48,858	2,756 M	79.0	21.0	52.3 M	63.32	36.68	15.21	11.40	33.21
Billerica	40,243	4,366	30,920	5,300 M	76.0	24.0	96.7 M	57.99	42.01	13.92	0.0	31.93
Burlington	24,498	4,403	34,468	4,599 M	64.1	35.9	85.1 M	40.0	60.0	11.55	0.0	30.95
Carlisle	4,852	11,900	92,848	1,258 M	98.0	2.0	21.6 M	97.96	2.04	17.14	0.0	17.14
Concord	17,668	11,564	108,299	5,090 M	90.7	9.3	69.1 M	90.68	9.32	13.58	0.0	13.58
Lexington	31,394	10,441	77,120	8,027 M	86.9	13.1	134.3 M	77.73	22.27	14.97	0.0	28.45
Lincoln	6,362	13,322	94,249	1,770 M	96.2	3.8	24.7 M	95.0	5.0	13.81	0.0	18.17
Waltham	60,632		30,021	8,443 M	66.9	33.1	150.9 M	42.14	57.86	13.35	0.0	31.27
Wilmington	22,325	4,343	34,516	3,530 M	74.4	25.6	57.8 M	55.20	44.80	12.14	0.0	28.64

Table 9: Zoning Summary—Non-Residential and Mixed Use Districts	
Business Districts	0.5 FAR, 25-37 ft height
Limited Business (A)	Residential, mixed use, hotel; s**mall-scale:** retail (<2000 s.f.), office, manuf., R&D; The Great Road (TGR) frontage, Albion Rd
General Business (B)	Mixed use, hotel, retail, service, office; s**mall-scale:** manuf., R&D; TGR plazas, Middlesex Tpk.
Commercial	Office, R&D, manuf., auto sales; Loomis St/Depot area
Industrial Districts	0.5 FAR, 42-45 ft. height
Industrial (I)	Warehouse, manuf., R&D; **w/SP:** mixed use; Wiggins, Oak Park Dr.
Industrial (C)	Warehouse, manuf., research; **w/SP:** mixed use, hotel, restaurant; Crosby Dr.
Industrial Park (IP)	Same uses as IC district; Hanscom area, Wiggins, Middlesex Tpk
Overlay Districts	
North Road Mixed Use	Balanced mix of res., small-scale retail, office/R&D uses, design standards, pedestrian amenities
Town Center Mixed Use	
Depot Area Mixed Use	

APPENDIX: NATURAL AND CULTURAL RESOURCES
-- *ADDITIONAL DATA AND INFORMATION*

OPEN SPACE OVERVIEW—PROTECTED LAND

Bedford's town-owned conservation land totals approximately 978 acres, of which 103 acres are further protected by state-approved Conservation Restrictions under MGL Chapter 184. These properties have been acquired by a combination of purchases, donations, and requirements in conjunction with developments such as cluster subdivisions. Another 60 acres of Town land are designated for wellhead protection. privately-owned sites with state-approved CRs add another 323 acres. The federal Great Meadows National Wildlife Refuge occupies 774 acres within town bounds. This means that approximately 2075 acres or 23.6% of Bedford's land has been protected in the modern suburban era, most of it open for public access and recreation; this figures decreases slightly to 23.3% if surface water area is not counted. In addition to this, there are approximately 318 acres of open land set aside in conjunction with developments but with a lesser degree of protection such as an individual deed restriction following regulatory approval. Adding in these scattered small parcels would push Bedford's protected open space to 25%, or one acre in four in the community.

TOWN OF BEDFORD CONSERVATION AREAS—A BRIEF HISTORY

Bedford's principal efforts to preserve natural areas date back to the early 1940's, when acquisition began on the Hartwell Town Forest through private gifts of land; 33 years later, the area totaled 118 acres, still the town's largest conservation area. In 1959, purchase of lots began for Wilderness Park off Springs Road, which ended up with 74 acres 24 years later. Spring Brook Park's 21 acres were purchased in 1966, and Fawn Lake's 41 acres were acquired in 1979.

The aggressive protection efforts have never stopped, spurred by the efforts of the Conservation Commission, as well as the Trails Committee and other groups. The town acquired 47 more sites through 2011, ranging in size from the 75 acre Princeton Properties conveyance as part of a residential development off Concord Road (which awaits further legal protection) to 0.6 acres at the new two lot subdivision off North Road called Wellington Way. Since the 2002 Comprehensive Plan, 201 acres of open space have been added to the inventory. Several of these newer sites were in the 16 to 22 acre range and have considerable biodiversity and environmental value, such as the Altmann parcel off Dudley Road, the Hughes site at Harvard Drive and the Valente wellhead (Old Reservoir) site on Shawsheen Road.

In all, more than 900 acres, or about 21% of Bedford's land area, have been designated as town conservation area, preserved either by outright purchase with state grants, town appropriations and bond issues, Community Preservation Act funds or other resources, or gained by means of the regulatory process in cluster-type subdivisions and occasionally in non-residential development projects. There was also a significant incidence of private land donations. Many parcels are protected by state-approved Conservation Restrictions under MGL Chapter 184. The town has been opportunistic in preserving these resources and unhesitant in employing every available device in the tool kit for doing so.

The Town of Bedford owns 978 acres of conservation land in many parcels, of which 103 acres are subject to Conservation Restrictions. The largest Town-owned conservation parcels are:

Over 50 acres: Hartwell Town Forest, Wilderness Park Conservation Area, Old Reservoir, Springs Brook Park

Over 20 acres: George Jordan CA, Cerasuolo property, Hartwell Brook CA, Pine Grove Farm CA, Fawn Lake CA, Murray York CA, Brown/ Page CA, Lantern Lane CA, Peppergrass Brook CA, White Cedar Swamp CA, Minnie Reid CA, Mary Putnam Webber Wildlife Preserve

Fawn Lake is often considered the most scenic of the sites, with a well-preserved 12 acre pond allowing canoeing and kayaking, and 25 acres of woodlands liberally traversed with trails. It traces its Bedford origins to a 19th century mineral springs resort.

Springs Brook Park is a natural area in part, but devoted much more to active recreation, featuring the town swimming hole, sprinklered water park, picnic areas, active sports facilities and woodlands.

Hartwell Forest, the town's largest conservation area, offers a fully managed forest under state standards and a popular trail network; the area also buffers heavily developed neighborhoods from Hanscom Field.

George Jordan Conservation Area, adjacent to Hartwell Forest, adds to this Hanscom buffer and features Bedford's community gardens; Massport is working cooperatively with the town to construct trails here as well.

Wilderness Park and the adjoining Capadonna parcel provide 85.5 acres with a good trail system, high wildlife habitat value and protection along some of the Springs Brook stream bank.

Shawsheen River 28 acres of open space parcels buffer a major stream system that is heavily encroached upon in other parts of Bedford.

OTHER OPEN SPACE AREAS

Great Meadows National Wildlife Refuge, federally owned and operated by the US Fish and Wildlife Service, includes land bordering the Concord River in Bedford. This is the largest area of protected open space, at 774 acres.

Privately owned land protected by Conservation Restrictions totals 323 acres. Most of this is land set aside in conjunction with developments.

A few other privately-owned parcels have lesser forms of protection such as time-limited restrictions.

Other open areas owned by the Town but not protected as conservation land are the Shawsheen Cemetery, wellfield protection areas and playing fields. Cemeteries and wellfields total 105 acres.

Large institutional properties in the town contain land that is currently open but not protected: Middlesex Community College, VA hospital, Massport's Hanscom airfield, and Harvard University's field station. A portion of Massport land has a time-limited agreement for protection.

WALKING TRAILS

Of the major open space sites, the following ones contain the most extensive networks of primary and secondary walking trails

Altmann Conservation Area

Fawn Lake Conservation Area

Hartwell Town Forest

Murray York Conservation Area

Valente

Wilderness Park

In the northern and western sectors of the town, where the greatest concentration of open space lies, there are nearly 16 miles of walking trails, some of which are open to mountain bikes.

RAIL TRAILS

Bedford is the regional leader for bicycle trails, with three regional trails traversing the town and converging near the restored Depot Park area.

The heavily-used Minuteman Bikeway opened in 1993 is fully paved for a 12 foot width, running 10.5 miles from Alewife MBTA station to the Bedford Depot. It was constructed on the bed of the old Lexington Branch, which ceased operating in 1977. 1 mile in Bedford, goes 10.5 miles to West Cambridge (paved with asphalt).

Passing in close proximity to the Minuteman at Bedford Depot is the north-south running Narrow Gauge Trail, paved for only a short segment of its three mile length, and covered in stone dust the rest of the way; it is built on the bed of the country's first two-foot-gauge common-carrier railway, the Billerica & Bedford Railroad. A project has been proposed for some time to construct a wide connecting sidewalk between the two trails. Billerica would also like to extend an improved Narrow Gauge segment for a five mile length, which would then create an 18.5 mile uninterrupted path from Cambridge to Billerica, although not fully paved. 3 miles to Billerica town line, (paved from Loomis Street to Great Road, stone dust surface from there to Billerica).

The east-west running Reformatory Trail, built on an old Boston and Maine local line, runs for four miles from Bedford to Concord, starting in the Great Meadows/Concord River wetlands, passing near the Depot and terminating near Lowell Road in Concord. It is entirely unimproved so will accommodate only off-road bicycles. 2 miles in Bedford, goes 4 miles to Lowell Road near Concord center (unimproved).

BAY CIRCUIT TRAIL

The regional trail around Boston has two alternative routes on the northwest side, one of which is dedicated as a trail within Bedford; it follows the Reformatory Branch and Narrow-gauge Trails, with connecting portions through the Municipal campus and Middlesex Community College.

DECREASING SUPPLY OF OPEN SPACE

The protection of open space offers quality of life, aesthetic, recreational, public health and even fiscal benefits to help offset the impacts from prolonged and extensive land development. However, as the land supply dwindles, the urgency of adding to these substantial assets grows. During the past six decades, in the era starting around 1950, Bedford's population grew (in round numbers) from a little more than 5,200 persons, to the 2011 total of more than 13,900, according to the town census.[3] This represented a net gain of more than 2200 new single family

[3] There are always some discrepancies between the annual town census and the decennial US Census, as well as confusion as to whether or not some Hanscom Air Force Base units and their resident population were counted for a period of time in from the late 1950's to 1990, when all base housing was transferred to the Town of Lincoln. But over the course of time, the two census programs have generally supported a similar arc of population growth.

homes, 330 attached and multi-family dwelling units, and a handful of group or other residences. At the same time, the number of individual private properties developed for commercial/industrial/office uses increased from an estimated 30 to 120. Governmental and Institutional uses at the local, state and federal levels increased significantly, with new and expanded buildings involving the Town of Bedford, the Veteran's Administration Hospital, Middlesex Community College, Hanscom Airfield (Massport and the Air Force Base), and other uses.

This growth in the post-World War II suburban era involved wholesale consumption of land. The development of land for residential purposes is estimated to have used about 1540 acres, while non-residential uses consumed about 850 acres. The governmental/institutional development has covered roughly another 200 acres. This means that 2590 acres of the 8768 acres constituting Bedford's land, or 29.5% % of the area, were developed in the modern suburban vernacular, at relatively low densities. Prior to this era, no more than 10% of Bedford was developed. It is useful to compare the record of land consumption with that of land preservation.

Climate Change (also see Climate Change Discussion in the Services and Facilities Element)

A burgeoning body of scientific research is demonstrating that there is a continuing trend toward global warming, and, in spite of controversy, increasingly strong data showing that human activity in industrial uses, heating and air conditioning and use of internal combustion vehicles are among the major causes. There are profound impacts occurring on natural resources, effecting watershed and flood-prone areas, wetlands systems and water courses and bodies, native vegetation and forestry, agriculture, street trees and park landscaping, all of which will eventually require mitigation or replacement.

Low impact development site planning techniques can reduce runoff from impervious surface, increase groundwater recharge rates and add attractive features to the landscape such as rain gardens and bio-vegetated swales. Woodland preservation and street tree planting can help somewhat to offset emissions by absorbing carbon dioxide.

HISTORIC ASSETS

Adaptive reuse of public buildings and sites: The Old Town Hall has been fully restored to economic and public use, while the Town Center building renovation has provided first class expansion area for town government offices and event space for outside groups. The completion of Depot Park, situated at the center of Bedford's early industrial and 19th and 20th century railroad history, has provided a prominent focal point for the community, with its preserved B & B railroad car, the freight house museum and attractive pedestrian spaces, all near the convergence of the three bike trails. The restoration of the Wilson Mill site near the Burlington line and Routes 62 and 3 has moved well toward completion and will provide a small multi-purpose area which combines old industrial history with active recreation and a location on Vine Brook. The Job Lane House from 1720 and operated by the HPC has undergone extensive restoration.

NATIONAL REGISTER:

Five Historic Districts:

- Old Bedford Center (Great Road)- contains 18th and 19th century buildings (including 2 churches), parks, and old burying ground, 1730
- Dudley Road/ Two Brothers Rocks – associated with John Winthrop, 1st Governor of Massachusetts Bay Colony, and Thomas Dudley, Lieutenant Governor
- Old Billerica Road – includes home of Jonathan Willson, Captain of Bedford Minutemen Company, killed on the Battle Road
- Wilson Mill/ Old Burlington Road, 1675 – mill site in ravine with mill pond
- Bedford Depot – 19th century railroad remains and buildings

Five other individual buildings (houses from 17th and 18th century):

- Job Lane House, 1713
- Nathaniel Page House, by 1720
- Christopher Page House, c.1730
- Bacon-Gleason-Blodgett House, c. 1740
- David Lane House, 1781

One other site: Shawsheen Cemetery, 1848 with Civil War monument

LOCAL HISTORIC DISTRICT – OLD BEDFORD CENTER

Along Great Road, within the National Register district, from North Road/ Carlisle Road to Hillside Road/ Bacon Street

Town-wide, there are seven buildings dating from before Bedford's founding in 1729, a further 18 from before the Revolution in 1776 and at least two more before 1790. Some later residential neighborhoods have historic/architectural character, for example Victorian houses on South Road.

Other sites of historic interest include: remains of a mill, a farm homestead, and a spa spring resort; railroad corridors; remnants of a cart path and of the former Concord town boundary, and war memorials.

APPENDIX: TRANSPORTATION-- *ADDITIONAL DATA AND INFORMATION*

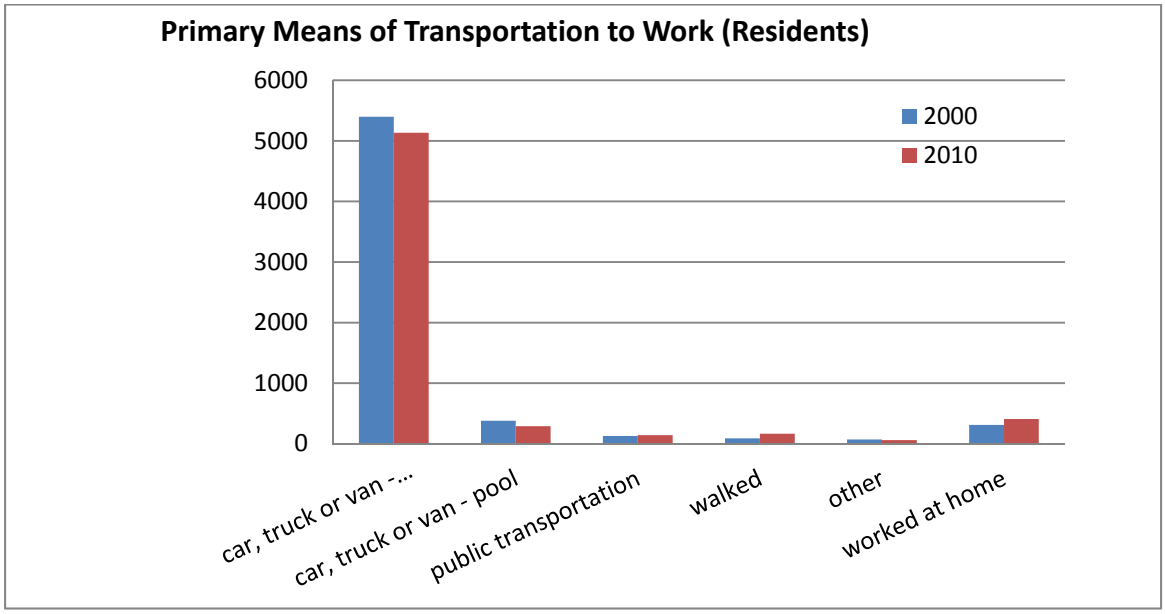
COMMUTING DATA

The American Communities Survey (ACS), one of the series conducted in between decennial census years on various trends, suggests that there were 15,498 full-time commuters travelling to jobs based in Bedford in 2010. The Massachusetts Department of Labor and Workforce Development offers 2011-12 statistics which suggest a number for total Bedford jobs (not *commuters* per se) in the 17,000 to 18,000 range, but this includes limited part time employment and jobs held lawfully by under-16 workers.

Table 1: Means of transportation to work (people working full-time in Bedford), 2010

	Number	%
car, truck or van - ***drove alone***	13503	87.3
car, truck or van - pool- ***multiple***	1200	7.7
public transportation	95	0.6
walked or other	293	1.8
worked at home	409	2.6
Total Employees in Bedford	15,498	100

(Source: American Community Survey estimates, 2006-2010)

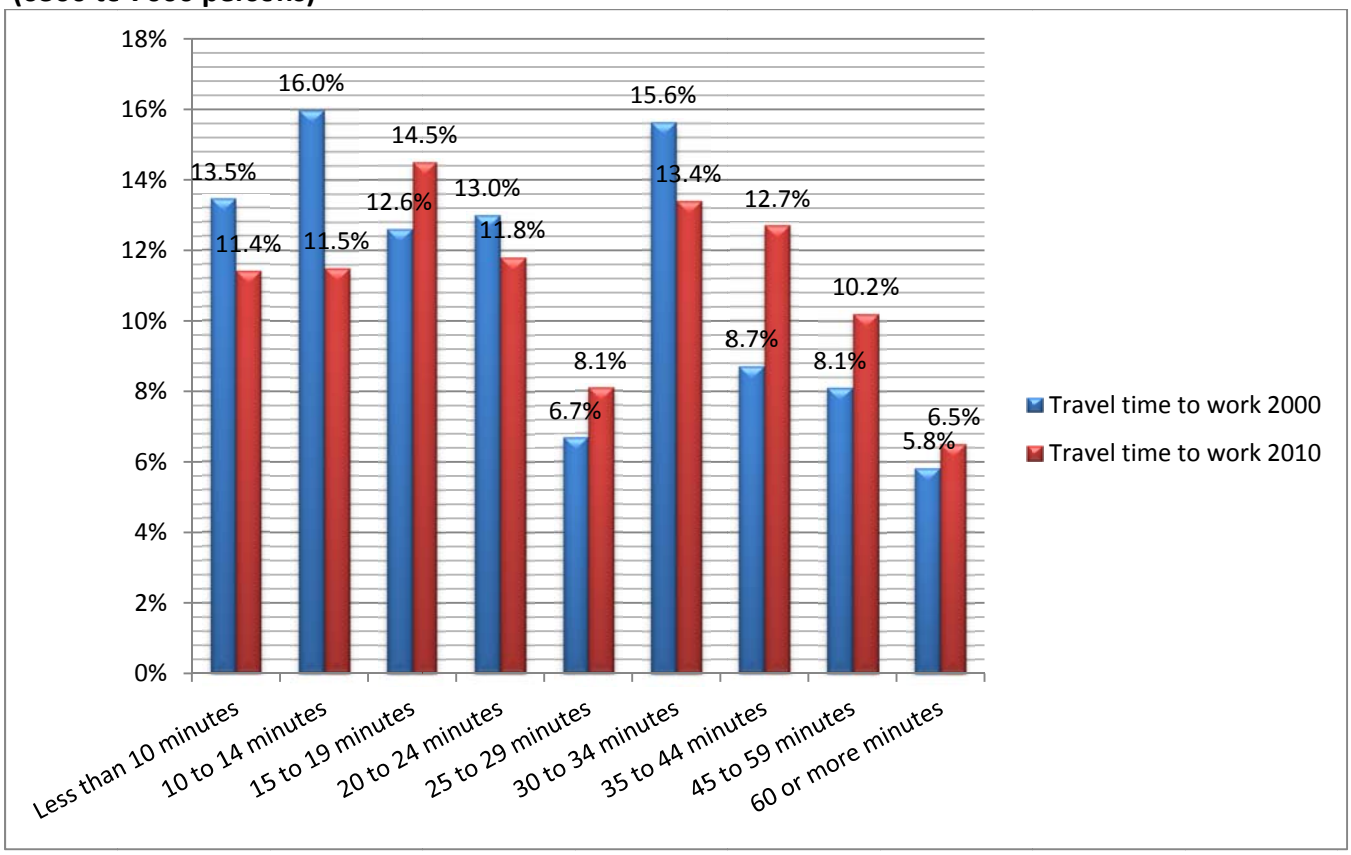


(Source: American Community Survey estimates, 2000-2010

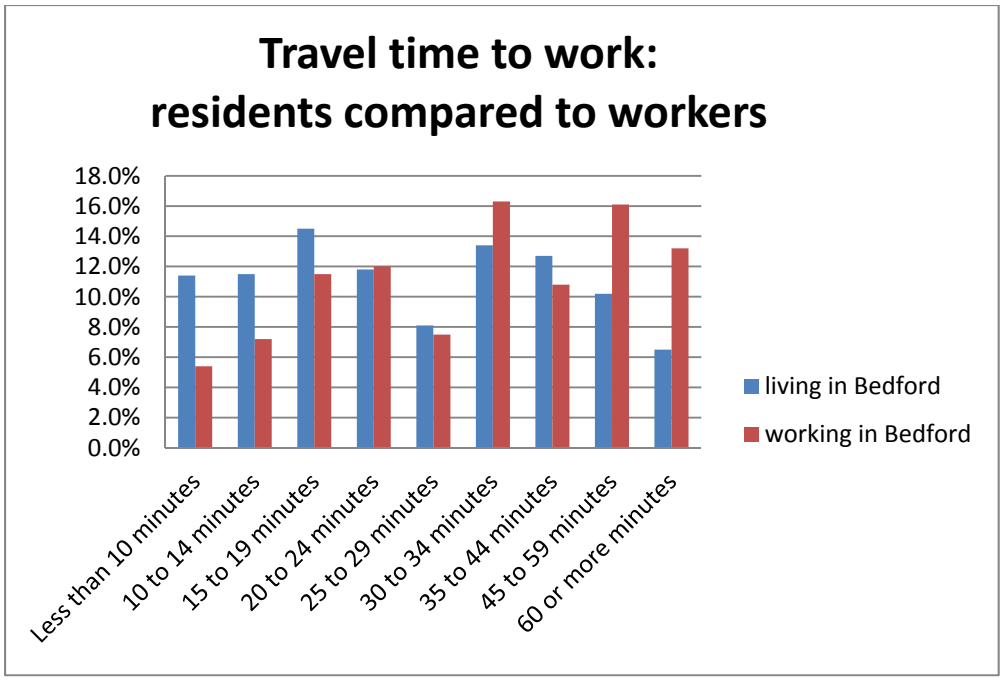
Table One above and the accompanying figure Primary Means of Transportation come from the American Communities Survey of the US Census. Between 2000 and 2010, there were some modestly encouraging but very small gains in trip reduction; the number commuting alone dropped slightly and home occupations increased as did walkers, but these were improvements that occurred on the smallest of baselines. On the other hand, paradoxically, multi-occupancy vehicle commuters went down slightly, perhaps due to the small improvements in home employment, walking commuters and a tiny increase in transit ridership. The basic pattern of automobile dependency remained on an overall basis between the two comparison years.

The figure below shows that commuting times increased for Bedford workers in these years, perhaps due to the recession having an effect upon the whole economy and forcing people to seek employment over a bigger radius. The figure Travel Times, Residents vs. Workers shows that in-commuters who live elsewhere have longer commutes than Bedford residents. Table two breaks down vehicle ownership levels among employed people in town and all people working in Bedford.

Bedford Workers Commuting Times, 2000 to 2010, as percentage of work force (6300 to 7000 persons)



(Source: American Community Survey estimates, 2000-2010



(Source: American Community Survey estimates, 2006-2010

Table 2: Vehicles available to:		
	Residents who work	***People working in Bedford***
0 vehicles	*1.9*	*1.6*
1 vehicle	*13.9*	*19.9*
2 vehicles	*55.4*	*50.7*
3 or more vehicles	*28.8*	*27.8*

(Source: American Community Survey estimates, 2006-2010

TRAFFIC COUNT SUMMARY: VEHICLE LOAD AT KEY INTERSECTIONS

The following data have been gleaned from several development traffic impact studies and the 2011 Great Road Master Plan, with the counts ranging in time from 2003 to 2011. MA DOT does not conduct an ongoing, systematic program of traffic counting in Bedford, so there is less than optimum consistency in the dates or methodology of the different sources. The data to follow are therefore approximate in nature, providing a general snapshot of conditions rather than a precise analysis. There is evidence that traffic has stayed generally level since 2002, which helps in flattening the curve between widely differing count years.

Table 3: Traffic Counts at Key Locations					
Location	**Avg, Daily Volume, If available**	**Peak Hour Count [PM hour unless otherwise indicated]**		**Turn Movements (only if separately delineated)**	**Total High Peak Hour Count**
285 Great Road, 220' west of Great Road Shopping Center site drive	20,250 (2011)	1390 Weekday AM	1450 Saturday Mid-day	(included in data to the left)	1450 (7.1% ADV) PM
		Through-traffic & Turns			
TGR Shop. Ctr. Site Dr.	NA	653 E 647 W		1099 in and out of Shop. Ctr., multi-directional	1752 PM
The Great Road at Loomis Street	23,260 (2005) 20,275 Saturday mid-day	1571 Weekday AM	1675 Weekday PM	(included in data to the left)	1675 (8.3% ADV) PM
		Through-traffic & Turns			
Middlesex T'Pike at Crosby Drive	NA	468 NB 514 SB Through-traffic only		751 Middlesex ↔ Crosby	1265 PM
North/ Carlisle Roads	NA	North Rd. N & S through traffic = 695 AM; Carlisle Rd. to North Rd S = 630 AM; Carlisle to North Rd. N = 85		North to Carlisle W = 180 AM; North Rd. other turns = 28;	1618 AM peak
Concord Road at North Rd. & The Great Rd. (TGR)	NA	Concord Rd. to TGR-E = 265 AM; TGR to Concord Rd. = 265; North Rd. to Concord W = 500; North Rd. to TGR E = 850; TGR to North Rd. = 285; Concord Td. To North Rd. N = 185		(included in data to the left)	2350 vehicles AM peak
The Great Road (TGR)at Mudge Way	NA	1735 Through-traffic only, E and W		425, into and exiting Mudge Way	2160 PM
TGR/Fletcher/Elm	NA	1860 Through-traffic only, E and W		200 turns & cross traffic on Fletcher & Elm St.	2060 PM
TGR/Springs/South	NA	1230 Through-traffic only, E and W		840 turns & cross traffic on Springs & South Rds.	2070 vehicles AM hour
Burlington Rd. E of Rt. 3	20,800 (2001) 21,100 (2008)	NA		NA	NA

Traffic congestion is closely associated with safety issues. The table to follow shows historic trends at various intersections in town where traffic accidents occur with relative frequency. It is not surprising that The Great Road at Springs Road in the heart of the Town Center is the number one location in Bedford, followed by TGR at Brooksbie, Burlington Road eastbound at Route 3 northbound ramp, and TGR at Ashby.

Table 4: Vehicular Accidents at Selected Intersections in Bedford From 2002 - 2010

Intersection	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
The Great Road & North Road				8	8	6	5	4	4	35
The Great Road & Springs Road	4	9	12	7	9	5	3	5	7	61
The Great Road & Fletcher Road							6	6	2	14
The Great Road & Hillside Avenue	4	5	8	6	6	6				35
The Great Road & Ashby Road	5	4	6	4	4	5	7	4	2	41
Page Road & Old Billerica Road	6	6	3							15
Burlington Road & Ramp-Rt 62 Eb To Rt 3 Nb	7	5	3	4	10	4	6	4	6	49
Burlington Road & Hemlock Lane							3	5	5	13
Page Road & Brooksbie Road				5	7	5				17
Page Road & Old Billerica Road							2	4	6	12
Burlington Road				0	2	11				13
The Great Road & Shawsheen Avenue	6	5	2							13
North Road & Carlisle Road	4	5	3	4	2	7	6	6	5	42
The Great Road & Brooksbie Road	4	6	1	3	7	6	5	13	6	51
The Great Road & Shawsheen Road	2	7	2							11
The Great Road & Loomis Street				7	3	3	7	4	5	29
North Road & Pine Hill Road	5	1	3	-	-	-	-	-	-	9
Total	47	53	43	48	58	58	50	55	48	460

Source: Massachusetts Traffic Records Analysis Center, via Bedford Police Department

Table 5: Public Transit Ridership--ADDITIONAL DATA

		2002	2010	% change
MBTA Bus Route 62 Analysis	**Route 62 Total Daily Ridership**			
Daily Total		1,128	1,609	42.6%
Peak Morning	AM PEAK 07:00AM-08:59AM	255	335	31.4%
Peak Evening	PM PEAK 04:00PM-06:29PM	251	379	51.0%
	Route 62 Bedford Stops Only			
Daily Total			65	
Peak Morning	AM PEAK 07:00AM-08:59AM		35	
Peak Evening	PM PEAK 04:00PM-06:29PM		30	
MBTA Bus Route 351 Analysis*				
Daily Total		138	246	78.3%
Peak Morning	AM PEAK 07:00AM-08:59AM	69	68	-1.4%
Peak Evening	PM PEAK 04:00PM-06:29PM	28	111	296.4%
MBTA Bus Route 76 Analysis**				
Daily Total		595	626	5.2%
Peak Morning	AM PEAK 07:00AM-08:59AM	163	284	74.2%
Peak Evening	PM PEAK 04:00PM-06:29PM	165	342	107.3%
Bedford Local Transit (BLT)				
	Average Monthly Ridership	546	554	1.5%
	High (April)	658	645	-2.0%
	Low (December)	470	429	-8.7%
	Total Yearly Ridership		6,647	
"The Ride" Trip Counts for Bedford				
	Total Yearly Ridership	2,278	6,954	205.3%

Source: MBTA

Lowell Regional Transit Authority Route 14***				
Daily Total			362	
Peak Morning	AM PEAK 07:00AM-08:59AM		93	
Peak Evening	PM PEAK 04:00PM-06:29PM		83	

Source: LRTA

*Route 351 runs express from Alewife station with three stops along the border of Bedford/Burlington
**Route 76 runs to Lincoln Labs and the Civil Air terminal at Hanscom airfield
***LRTA route 14 stops at Bedford Springs Apartments, the MITRE Facility, and Sun Micro

Current & Related Bedford Area Transportation Projects Funded by MA DOT, 2002-2018

Table 6: HISTORICAL PERSPECTIVE: MAJOR HIGHWAY AND ROAD PROJECTS		
Name	**Description/Cost**	**Status**
Middlesex Turnpike Widening, preliminary phase; Middlesex Turnpike and Burlington Rd. Rt. 62	Widening and traffic signals; $6.97 mil	Completed 2002.
Middlesex Turnpike Widening, Phase One Crosby Drive	Major widening, reconstruction; $4.1 mil	Completed 2007.
Middlesex Turnpike Widening, Phase Two Mitre Ext. from Route 62 to north of Plank Street; Billerica/Bedford/Burlington	Major widening, reconstruction; $12.6 mil	Completion Spring, 2013.
Middlesex Turnpike Widening, Phase Three Crosby Dr. north to Manning Road; Billerica/Bedford/Burlington	Minor widening & reconstruction; 7.3 mil	Construction begins winter 2017-18.
Route 3 Add-a-Lane project, Burlington to NH line	The Rt. 3 ROW has width to add a 4th lane, but the project is only theoretical at this point; it would be new construction at $385 mil.	Not officially in design phases. Project is of uncertain status.
Route 3 guard rail & fencing, Bedford to Chelmsford	$1.264 mil	Construction begins winter, 2012-13.
Route 3 corrective design actions, Burlington to Tyngsborough	Miscellaneous minor upgrades; $2.51 mil	Ends spring 2014.
Depot Park Site Improvements & Freight House Rehab: South/Railroad/Loomis	Site enhancements & building reconstruction; $1.3 mil	Work carried out and completed, 2003-2009.
Bridge Replacement, Page Rd. at Shawsheen river	Bridge replacement; $1.92 mil	Completed spring 2010.
	Total Value = $37.8 mil (not including .Add-a-lane)	

APPENDIX: HOUSING-- *ADDITIONAL DATA AND INFORMATION*

HOUSING STOCK

As of 2010, there were an estimated 5,046 housing units in Bedford, according to the US Census[4]. This figure is supported by the Assessor's 2012 data base, which uses a different methodology and includes congregant housing, shows 5,332 units. Over two thirds of the housing is single-family detached dwellings, while the other third fell into some multi-family (MF) classification. Excluding congregate housing, 76% of the housing units in Bedford were owner-occupied as of 2010.

Table 1: Dwelling Units from Assessor's Database, FY13

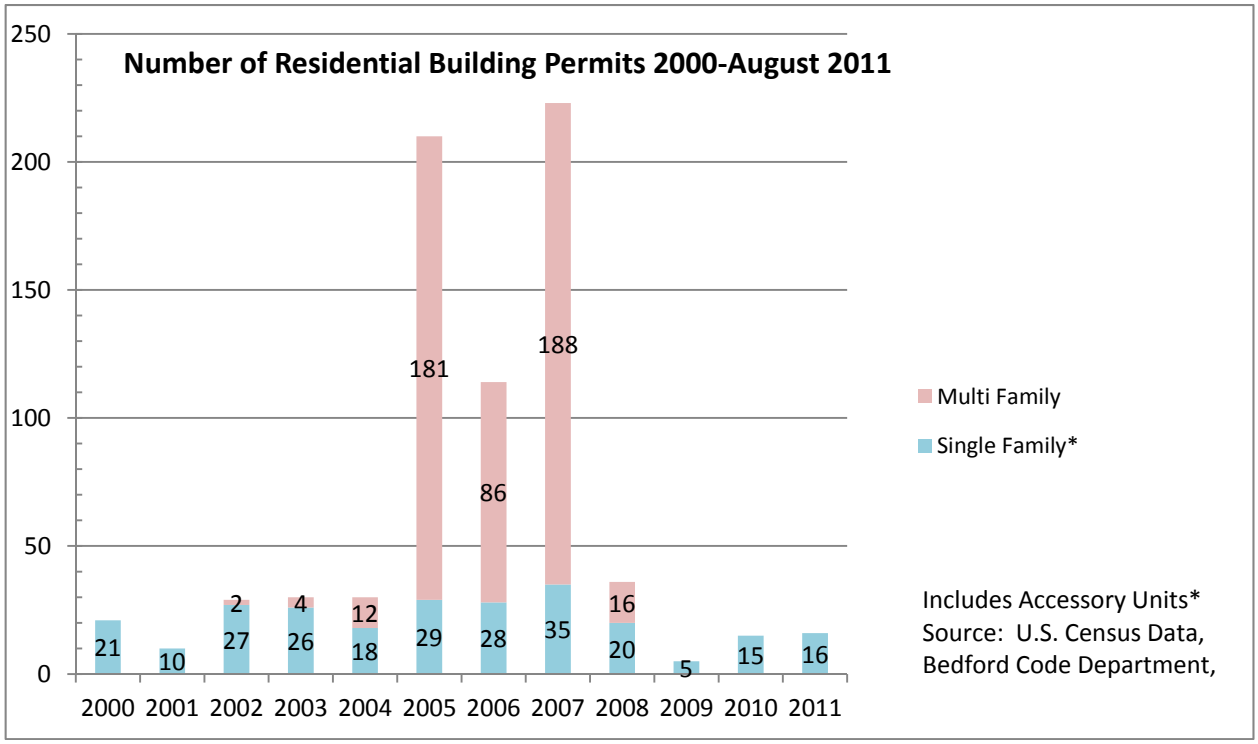
LUC	Housing type	No. of Units	Comments
101	Single family residential	3,425	some other categories may also be deemed SFR
102	Condominiums	480	unit counts used
104	2 family houses	386	= assessment parcels [193]x 2
105	3 family houses	24	assessment parcels x 3
109	Multiple houses on a parcel	30	estimated as parcels x 2
112	>8 apartment units	640	unit counts used
121	Boarding houses	9	
125	Congregate housing (Carleton Willard)	324	unit counts used
931	Wheeler Drive (on town land)	14	
	TOTAL	5,332	

Note: Single Family Residential (Land Use Code 101 + 109) = 3,455 or 65% of total

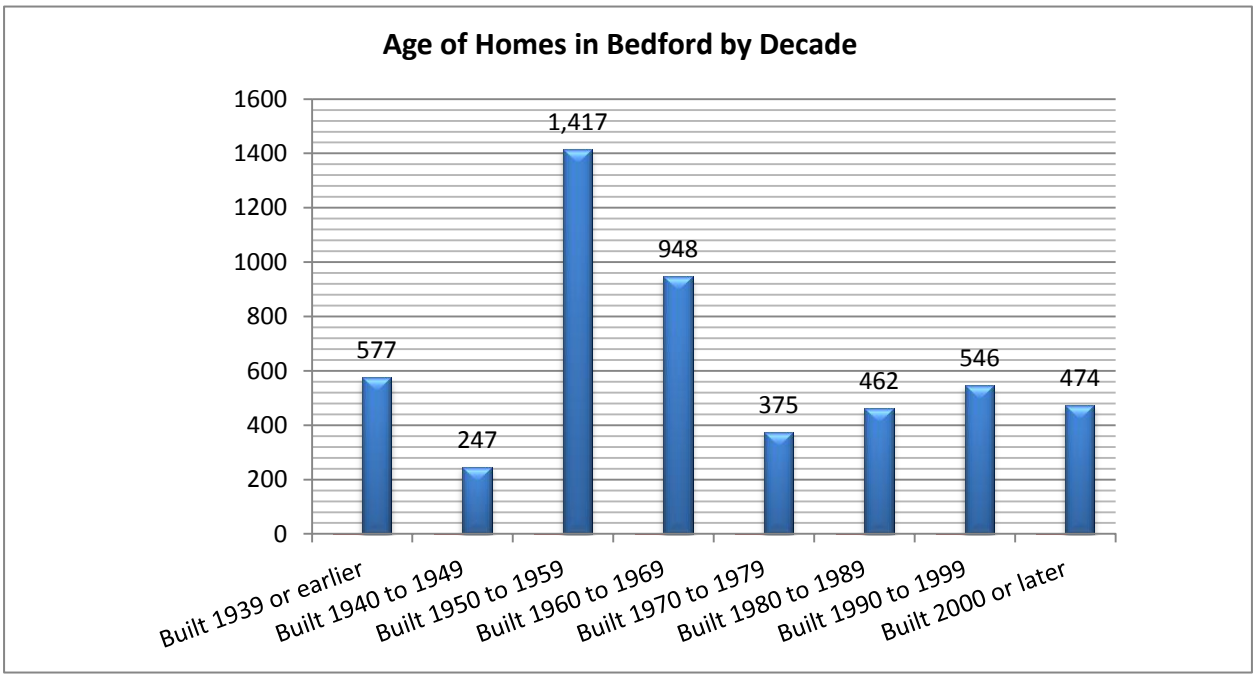
Note: Code Enforcement counts 42 authorized accessory apartments; the Assessor's office does not separately assess these units so they are likely included within other categories, such as two family houses.

Building permit records indicate that 758 dwelling units of all types were added during the years from 2002 through December 5, 2012 (the period since the last Comprehensive Plan. The pace of residential construction since 2002 has followed the boom/bust cycle of the economy, with 72% of all new residential construction occurring in just 3 years, 2005, 2006 and 2007 (See Figure 1, Residential Building Permits 2000-2011). There was a steep decline in home-building

in 2008. A substantial proportion of the units permitted in the past three years involved the Pulte Homes project at Hartwell Farms, a 75 unit townhouse project.



The age of the dwellings is also pertinent as an indicator of historic growth patterns and aging of the housing supply. Only 8.5% of the present stock was built before World War II, while 48% was constructed between the post-WWII era and 1970, when the town more or less reached its present population level (birth rates were much higher then). In the following 30 years, 1970 to 2000, 30% of the current supply was built, and since 2000, 14.5% of the housing supply was constructed.



HOUSING MARKET

Sales patterns and trends among sold houses have fluctuated significantly and do not appear always to be linked to the overall state of the residential real estate market. Transactions went down during certain robust economic years and increased in some years that were not stalwart.

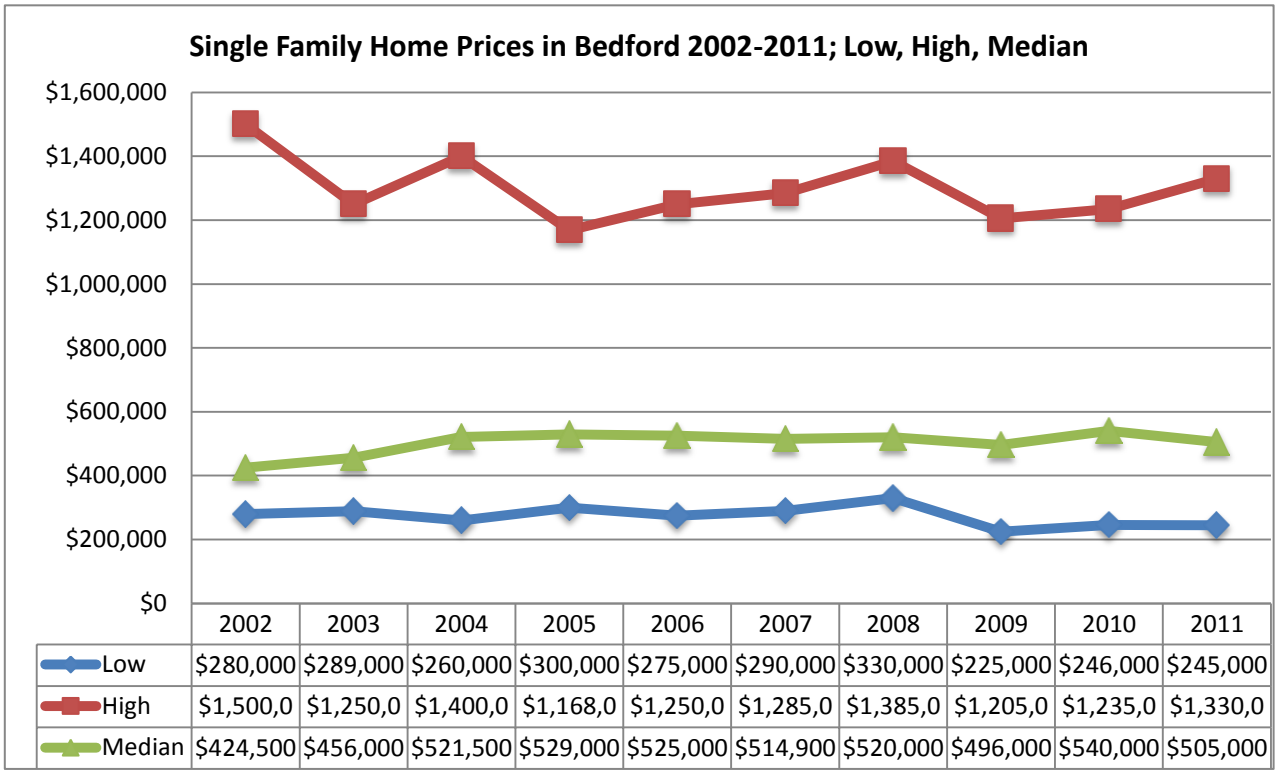
Table 2, Annual Sales

Annual Sales Level in No. of Units		% Change
2002	126	-22.2%
2003	142	12.7%
2004	149	4.9%
2005	115	-22.8%
2006	148	28.7%
2007	172	16.2%
2008	131	-23.8%
2009	92	-29.8%
2010	109	18.5%
2011	75	-31.2%

COST AND AFFORDABILITY

The 2010 median sales price for a dwelling in Bedford was $534,900, a 38% increase in real numbers over the $332,200 median price point in 2000. The real estate downturn slowed the rate of increase in housing costs (with home prices dropping in 2011 and recovering in the past year). On the household income side, the 2010 median income of $107,639 also represents a significant slowing of the 30 year rate of increase, but it still involved a gain in real dollars of nearly $20,000 since 2000.

The median home sales price offers a quick indicator of housing costs in a community, but the median encompasses a wide range of price points in home sales. To convey some idea of this range, the lowest home sale in the robust year of 2002 was $280,000 and the high was $1.5 million. The low and high range in 2008 was $330,000 and $1.365 million. But in 2009, the numbers plummeted to $225,000 and $1.205 million. They came back a little in 2011, with a low of $245,000 and a high of $1.33 million.



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Low	$280,000	$289,000	$260,000	$300,000	$275,000	$290,000	$330,000	$225,000	$246,000	$245,000
High	$1,500,0	$1,250,0	$1,400,0	$1,168,0	$1,250,0	$1,285,0	$1,385,0	$1,205,0	$1,235,0	$1,330,0
Median	$424,500	$456,000	$521,500	$529,000	$525,000	$514,900	$520,000	$496,000	$540,000	$505,000

The significance of the housing cost and income data is depicted in Table 5, Affordability of Housing, which shows the ratio of housing cost to income. Household earnings have increased a little more than three-fold since 1980, but housing costs have gone up about seven-fold over the course of that 30 year period. Even with the housing market downturn, the slowing of

earnings has only widened the gap. Expressed as ratios of housing cost-to-income, the number more than doubled from 1980 to 2010, rising from 2.47 to 4.97.

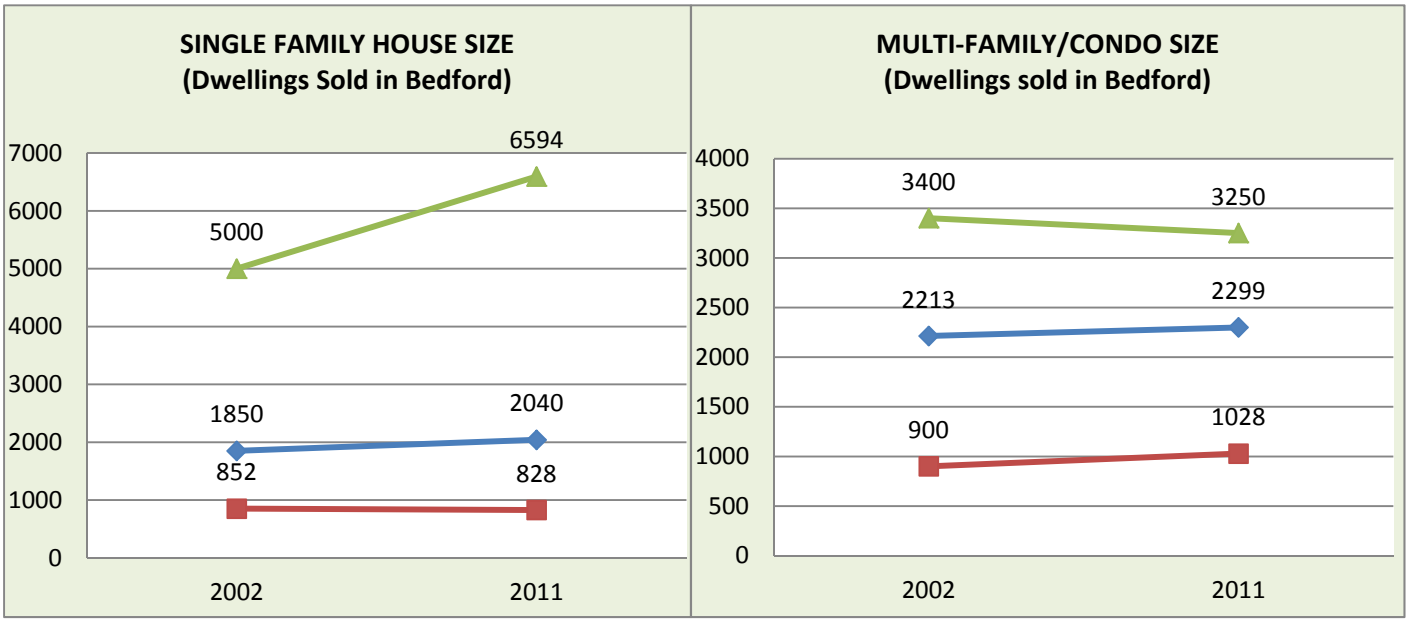
Table 3, Affordability of Housing

	1980	1990	% Change	2000	% Change	2010	% Change
Median Housing Price	$76,600	$228,100	298%	$332,200	146%	$534,900	161%
Median Income	$30,960	$57,561	186%	$87,962	153%	$107,639	122%
Cost/Income Ratio	2.47	3.96		3.77		4.97	

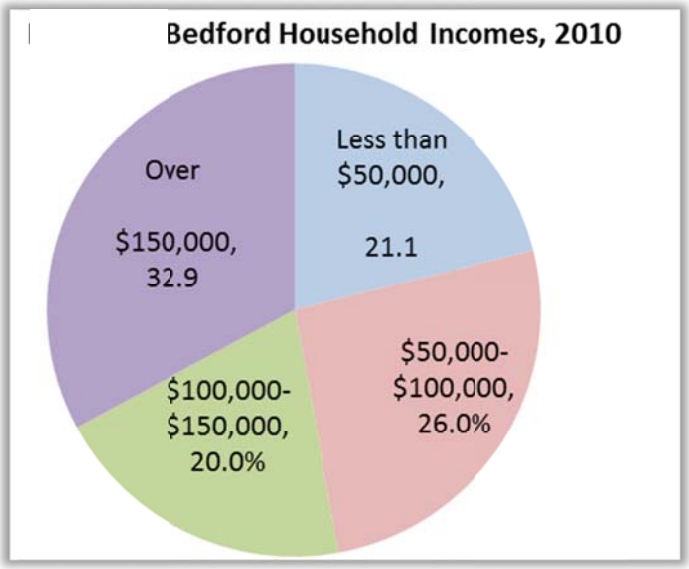
Source: MLS database

The increase in home prices reflects regional trends, and also Bedford's desirability as a residential community. In the geographic vicinity, Bedford's median housing cost is in the middle range. According to MLS data, Lexington and Concord are 38.8% and 38.6% higher, respectively. The Carlisle median is 27 % higher. Bedford is approximately 29% greater than Burlington and 44% than Billerica.

House size is also an indirect indicator of housing cost and affordability. The median floor area in Bedford among single family dwellings that sold in 2011 was 2040 square feet, an increase of 10.2% over 2002 (this figure includes older, smaller homes as well as larger, newer ones). The outliers among the biggest houses were 6,594 square feet in 2011, and 5,000 square feet in 2002.



While the large stock of single family detached housing theoretically has become less and less affordable to residents within the community, the expansion of other housing forms in the 2000's, including attached, multi-family, 2-family, and accessory units has acted to some degree as a balancing factor in the cost of housing. Bedford had a 2010 median household income of $107,639, ranking it 35th in the state (Dover was ranked #1, at $164,583; Lawrence was at #351, at $31,631). Nearly one household in three had a 2010 income in excess of $150,000, and another 20% fell into the $100-150,000 range, meaning that 53% of the town's households had at least six-figure incomes. But 21% had incomes below $50,000, a substantial part of them below $25,000. The remaining 26% of households had incomes that fell somewhere between $50,000 and $100,000. These income breakdowns do not mean that everyone in the lower income brackets are worse off than people in the higher ones (for example, a person with modest reported income could be comfortably retired and have a paid-off mortgage or a life insurance pay-out). But from a hypothetical perspective, many residents—perhaps 40% using standard percentage-of-income formulas--couldn't afford a dwelling in Bedford today.



AFFORDABLE HOUSING UNITS IN BEDFORD

Bedford's substantial stock of affordable units evolved from an unusually wide array of sources and initiatives. All told, there are 21 developments containing some percentage of affordable units, with a total of 878 units, town-wide[5].

- There are projects that the town or its state-authorized Housing Authority built under a variety of state housing finance programs administered by different MA agencies, and/or with federal funds coming through regional entities such as the HOME Consortium.
- There are ten Chapter 40 B projects, most of which were built in the 2000's, totaling 433 dwelling units, about 27% of which are below-market rate units.

- Approximately 84 units were counted toward the SHI by means of the Local Initiative Program and/or the Local Action Units program, at 9 different project locations built by private developers..
- Private non-profit organizations have contributed affordable units to the supply, such as the Greater Lowell Habitat for Humanity project off North Road.
- An estimated 219 (21%) contained in all projects with affordable units are ownership units.
- Between 85 and 90% of all occupants in affordable units are at the <80 AMI low income level

All of the Town's "40B's" were created in the 2000's, which represented a significant diversification of Bedford's housing. Approximately 75 of 433 units involve ownership, the remainder are rentals. When a 40B comprehensive permit project is all rental units, it is 100% counted toward the SHI, even when 75% of them are market rate units. Approximately 89% of the officially affordable units in these 40B developments are occupied by persons falling under the 80% of Area Median Income (<80% AMI) low income threshold, while the remainder fall into the moderate income classification over 80% AMI.

COMPREHENSIVE PERMIT PROJECTS (Ch. 40B)

Avalon At Great Meadows	Patriot Place
Bedford Meadows	Princeton Properties
447 Concord Road	Stephen Lane House
Heritage At Bedford Springs	Village At Bedford Woods
62 Old Billerica Road	Village At Concord Road

See Table 4 to follow.

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT CH40B SUBSIDIZED HOUSING INVENTORY

Bedford

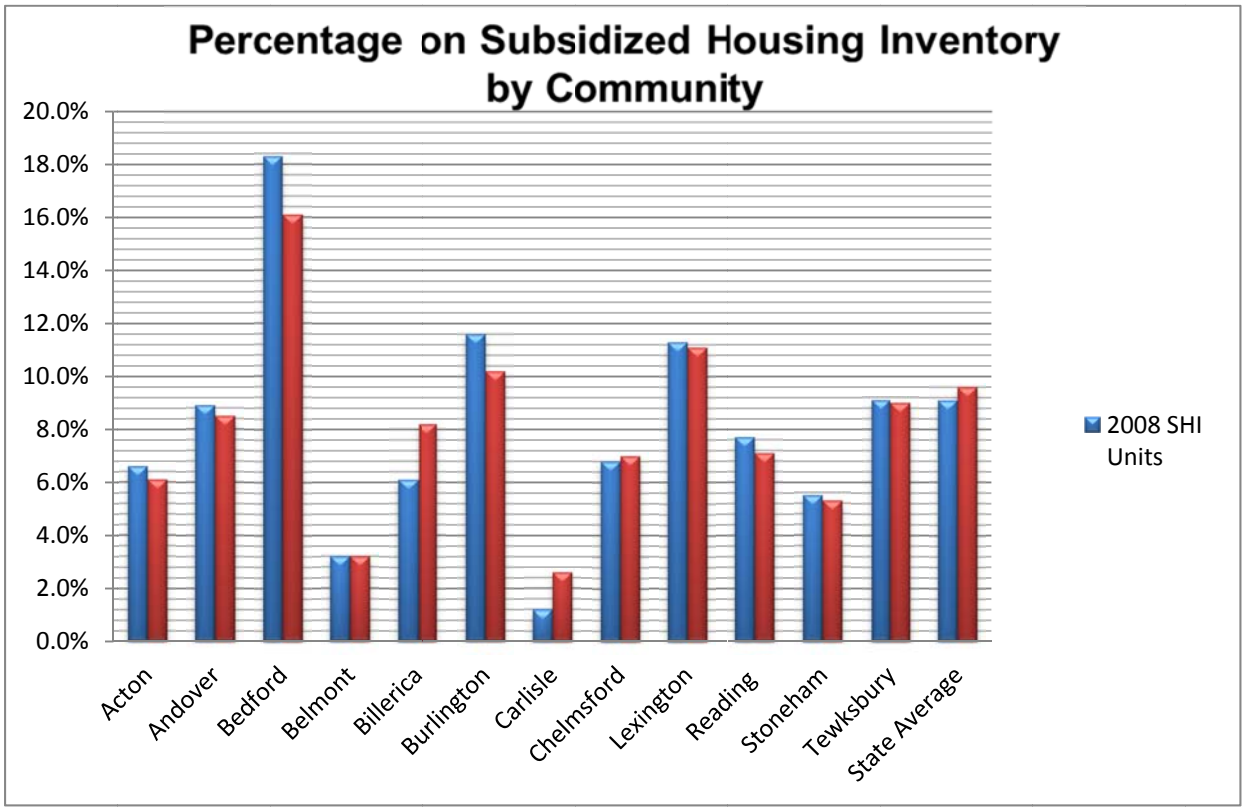
DHCD ID #	Project Name	Address	Type	Total SHI Units	Affordability Expires	Built w/ Comp. Permit?	Subsidizing Agency
256	n/a	20 Railroad Ave.	Rental	8	Perp	No	*DHCD*
257	n/a	Elm Street	Rental	12	Perp	No	*DHCD*
258	Ashby Place	Ashby Place/Ashby Road	Rental	80	Perp	No	*DHCD*
259	Bedford Village	12 Dunster Road	Rental	96	2018	Yes	*MassHousing*
260	Bedford Meadows	Route 225	Ownership	10	Perp	Yes	*DHCD*
261	Old Billerica	455 Old Billerica Road	Rental	4	2027	No	*DHCD*
3975	Springs Road	200 Springs Road	Rental	60	2034	No	*DHCD* *DHCD*
3976	Avalon at Great Meadow	57 Concord Road & 5 Davis Road	Rental	139	Perp	Yes	*MassHousing*
3977	Village at Concord Road	268, 268A, 268B Concord Road & 234 Hartwell Rd	Mix	14	perp	Yes	*DHCD*
3979	Patriot Place	18 Spring Road	Rental	10	Perp	Yes	*DHCD*
4206	DDS Group Homes	Confidential	Rental	55	N/A	No	*DDS*
4543	DMH Group Homes	Confidential	Rental	8	N/A	No	*DMH*
5312	Village at Bedford Woods	100 Albion Road	Ownership	8	Perp	Yes	*MassHousing*
5712	Summer Street	Summer Street	Ownership	2	02/26/2102	No	*DHCD*
6665	The Stephen Lane House	373 North Road	Ownership	2	perp	Yes	*DHCD*
7565	Heritage at Bedford Springs	48-50 Middlesex Turnpike	Rental	164	perp	Yes	*MassDevelopment*
8813	Vilage at Taylor Road	Middlesex Turnpike	Rental	188	perp	NO	*LIP*

This data is derived from information provided to the Department of Housing and Community Development (DHCD) by individual communities and is subject to change as new information is obtained and use restrictions expire.

Table 5: Affordable Housing Preservation Status			
20 Railroad Ave			Perpetuity
Elm Street	Housing Auth		Perpetuity
Ashby Place	Housing Auth		Perpetuity
Bedford Village	Current owner is IS Housing Limited Partnership which is related to S-C Management	1979	2018
Bedford Meadows**	Bedford Meadows LP		Perpetuity
Old Billerica			2027
Veterans SRO VA Hosp	Caritas Communities	2004	2034
Avalon At Great Meadow (now Avalon at Bedford Center) **	AvalonBay	2007	Perpetuity
Village at Concord Road **	Elderberry LP	2005	Perpetuity
Village at Concord Road **	Elderberry LP	2005	Perpetuity
Patriot Place **	Patriot Place, LP	2005	Perp; 2025
DMR Group Homes			NA
DMH Group Homes			NA
Village at Bedford Woods **	Middlesex Point LLC		Perpetuity
Summer Street	Bedford Housing Trust		Perpetuity
The Stephen Lane House **	Lane Farms LLC		Perpetuity
Heritage at Bedford Springs (now Thompson Farm) **	Heritage Middlesex Turnpike, LLC	2006	Perpetuity
Village at Taylor Road (now Village at Taylor Pond)	Criterion at Bedford LLC	2007	Perpetuity
447 Concord Rd *	447 Concord Rd LLC		Perpetuity
Hartwell Farms	Have-a-Hartwell LLC		Perpetuity
Habitat for Humanity	Habitat for Humanity Greater Lowell		Perpetuity

Table 6: Affordable Project Characteristics

Development Name	Address	Rent / Own	Afford Units	Market Units	Total Units	SHI Units	Age-Rstr 60+	S R O	1 BR	2 BR	3+ BR
20 Railroad Ave	Railroad Ave 20	RENT	8		8	8					
Elm Street	59-70 Elm Street	RENT	12		12	12					
Ashby Place	Ashby Place/Ashby Rd	RENT	80		80	80	80		80		
Bedford Village	Dunster Rd 12	RENT	72	24	96	96			36	50	10
Bedford Meadows	Route 225	OWN	10	30	40	10					10
Old Billerica	Old Billerica Rd 455	RENT	4		4	4		4			
Veterans SRO	200 Springs Road, Bldg 5	RENT	60		60	60		60			
Avalon At Great Meadow (now Avalon at Bedford Center)	Concord Rd 57	RENT	35	104	139	139			13	22	
Village at Concord Road	Concord Rd 268,268A, 268B Hartwell Rd 234	RENT	3	9	12	12			2	1	
Village at Concord Road	Concord Rd 268,268A, 268B Hartwell Rd 234	OWN	2	6	8	2			1	1	
Patriot Place	Spring Rd 18	OWN	7	3	10	10			10		
DMR Group Homes	Confidential	RENT	55		55	55					
DMH Group Homes	Confidential	RENT	8		8	8					
Village at Bedford Woods	Albion Rd 100	OWN	8	24	32	8			3	5	
Summer Street	34-36 Summer St	OWN	2		2	2				2	
The Stephen Lane House	North Rd 373	OWN	2	6	8	2				1	1
Heritage at Bedford Springs (now Thompson Farm)	Middlesex Turnpike 48-50	RENT	33	131	164	164			11	19	3
Village at Taylor Road (now Village at Taylor Pond)	59 Middlesex Turnpike	RENT	47	141	188	188			28	19	
447 Concord Rd	447 Concord Rd	RENT	14	2	16	14				8	4
Hartwell Farms*	182-184 Hartwell Road	OWN	12	63	75	0				12	
Habitat for Humanity	130 North Road	OWN	8	0	8	4					8
Shawsheen Ridge*	45 Shawsheen Road	OWN	6	30	36	0				6	
TOTALS			**488**	**549**	**1,037**	**878**	**80**	**64**	**184**	**146**	**36**



HOUSING DEMAND

Table 7: Housing Demand/Population Characteristics

	Median Age	Under 5 years	Under 20 years	20 to 34 Years	35 to 64 years	65 years and over
Middlesex County 2000	36.4	6.3%	18.6%	22.4%	39.9%	12.8%
Middlesex County 2010	38.5	5.7%	18.4%	21.3%	41.5%	13.1%
MAGIC 2000	39.1	NA	28.0%	13.0%	45.0%	14.0%
MAGIC 2010	43.6	5.5%	23.0%	10.4%	48.0%	13.1%
Bedford 2000	42.1	6.7%	18.3%	12.0%	45.0%	18.0%
Bedford 2010	45.1	5.4%	19.7%	11.5%	44.8%	18.6%

Sources: Metropolitan Area Planning Council Data; U.S. Census Data

Table 8: Residential Rents in Bedford

Apartment community	Unit size (no of bedrooms)	Advertised rents ($/ month)*
Heritage at Bedford Springs	1	1,606-1,809
	2	1,648-2,383

	3	2,245-2,597
Village at Taylor Pond	1	1,750-1,915
	2	1,995-2,320[1]
Avalon at Bedford Center	1	from 1,970
	2	from 2,245
Village at Bedford Woods	2	1,945[1]

***** *Market rate rentals, not including affordable units*

1. Based on limited number of independently advertised vacancies

House Rents in Bedford

The December, 2012 average of three, 3 and 4 bed houses currently advertised = $2,367 per month based on three listed houses (*Sources: online, including websites for specific developments and advertising sites: trulia.com, mynewplace.com, themlsonline.com boston.com, wickedlocal.com*)

APPENDIX: SERVICES AND FACILITIES-- *ADDITIONAL DATA AND INFORMATION*

SCHOOLS

ENROLLMENT

The schools also have some programmatic demands, with expanded in-house Special Education (which cuts cost), and growth in English Language Learners (ELL) from 20 in 2007-2008 to 100 in 2012-2013.

While projections reflect cohorts of children from resident families moving through the age groups, there is some variability from year to year due to turnover in older housing stock and military families relocating, as well as growth from new developments. Anticipated housing developments are built into near-term projections; beyond that, enrollment will be affected by the development market, Planning Board decisions and zoning changes, and changes to the occupancy or schooling arrangements for the military housing.

RECREATION

ORASC REPORT/TURF MANAGEMENT

Report of the Outdoor Recreation Area Study Committee (ORASC), November, 2012:

"The fields in Bedford are significantly overused, which leads to poor conditions, higher maintenance costs and significant field closures…. recommended usage per grass field is 300 hours per year. The total availability of full-sized rectangular fields is 1,840 hours. The current demand is 2,860 hours."

The report suggests that three additional full size rectangular fields are required to support existing school teams in the fall, while two additional full-size fields are required to support existing recreation teams during spring evening hours. Bedford's ratio of teams per field is 2.7, while the schools in the Dual County League have an average ratio of 1.7 teams per field. Each of those other schools also has the use of (at least one) synthetic turf (field).[6]

The report also investigated best practices for turf management, such as field rotation, programmed reseeding with the proper varieties, aeration, nutrient feeding, soils testing, drainage, and more. The study concludes that these practices are impractical in Bedford, with the heavy field usage, favoring creation of one or more synthetic turf fields, as it requires much

[6] ORASC report, November, 2012.

less maintenance and lasts much longer than natural turf, and it would expand the town's field capacity immediately by being able to bear a much greater playing load than grass. The Committee weighed strongly concerns against synthetic field surfaces, including high initial capital cost, and issues regarding health, sanitation and injury, in evaluating the matter.

As a result of these analyses, the report's top priority recommendation was to replace the grass at the High School's Sabourin Field with synthetic material, at a cost of $1.1 million. After one failed try at annual town meeting in 2012, the measure passed at the fall town meeting later that year, in large part due to liberalized program regulations for the Community Preservation Act for improvements at existing facilities, which resulted in a total of $605,000 in CPA funds being made available to cover more than half of the project cost.

SAINT MICHAEL'S PROPERTY

This initiative was to construct two playing fields at the so-called St. Michael's property, which the town purchased from that church in 2004. This nine acre parcel is situated between St. Michael's and the High School and is adjacent to other fields in the school campus and related parking lots; it has both Mudge Way and Liljegren Way addresses. Due to the fact that there are impacted wetlands subject to the local bylaw on this site, the initiating action was a hearing before the Conservation Commission, which eventually resulted in an Order of Conditions that included a variance with a complex set of off-site mitigations: a Conservation Restriction (CR) on 2.5 acres at Pickman Meadow; a CR on 36 acres of land at the former Princeton Properties subdivision (now Lavender Lane) on Concord Road, and replication of 0.8 acres of wetland with invasive species control at Page Field as mitigation for the 0.8 acre loss of wetlands at the proposed athletic fields site. In addition to discussion over the playing surface, implementation was delayed by litigation brought by a resident of the new abutting Abbott Lane subdivision. Future playing fields on a limited portion of the Lavender Lane open space were also part of the approval.

Other issues falling under the heading of recreation are summarized as follows:

1. Institutional and private recreation facilities: The potential for private or institutional facilities to help with future Town needs has not been directly evaluated. The VA Hospital golf course is no longer available for Bedford use. The Town continues to need the leased playing fields at the VA Hospital to keep up with growing demand. The Edge Sports Center on Hartwell Road offers substantial facilities for ice skating and hockey, soccer and lacrosse.
2. Non-sports programs for pre-adolescents and teens: Participants in the Comprehensive Plan public workshop raised the issue that despite strong existing town programs, more could be offered in the non-athletic area.

3. An indoor swimming pool: This has been discussed for many years, with many favoring a location at the Town Center campus due to the proximity of intergenerational programs and the schools, but no tangible progress has been made.

ENERGY

BACKGROUND

Green Communities was passed by the legislature in 2008, initially using federal stimulus funds to provide local grants. As of February, 2013, 112 MA communities, representing 45% of Massachusetts' population of more than 6.6 million, have entered the Green Communities program, which is administered by the MA Department of Energy Resources within the Executive Office of Energy and Environmental Affairs. More cities and towns join each year, ranging from the western MA hamlet of Shutesbury to the City of Boston.

One of the most critical features of GC, the Stretch Code is an overlay of enhanced energy efficiency building standards based on the International Energy Conservation Code (Section 405 in 2009 IECC, with successive edition changes), which establishes a performance standard called the Home Energy Rating System (HERS). The HERS system involves a 100-scale index that affords builders considerable flexibility in the ways they choose to reach minimum HERS ratings in a given commercial or residential structure, rather than the traditionally more prescriptive code approach. This approach has been the subject of considerable controversy at the local level and before the MA Board of Building Regulations and Standards (BBRS), but has managed to prevail throughout the program's history.

MAPC conducted a study finding that the DPW property on Carlisle Road (the old landfill site used for salt and sand storage, composting and brush disposal, and some construction debris) might be suited for a large photovoltaic array. If the site's approximately 50 acres (the non-conservation part) could be reconfigured to accommodate present uses plus a solar "farm," a feasibility study would be in order. If the payback period and energy savings are favorable, the town could consider developing a facility, either through its own capital investment or through a power purchase agreement (PPA) with a private vendor.

OTHER SERVICES & FACILITIES CONCERNS

A variety of other issues and potential needs were identified in two rounds of interviews with key department and division heads and/or in the public workshops. These are summarized as follows:

- Interior building space repurposing might offer significant potential for addressing some space needs (examples: Police Station, Public Library, High School), with further exploration. Full building replacement is likely in the coming decade in at least one instance (the Fire Department).
- The Town's communication infrastructure is gradually becoming more out of date, which has particular impact on Police and Fire, as well as the Department of Public Works. The Town needs to make progress in the next several years in moving toward a modern communications infrastructure, beginning with a communications network feasibility study for a multi- department, Town-wide communications system with fiber optic cable, voice and data.
- A systematic program of traffic management improvements in the roadway system could help to improve traffic operations and safety.
- Streets lights energy upgrade/replacement; and possible consideration of dimming in limited locations could save money.
- More parking is needed at athletic fields.
- There may be opportunity for inter-town shared equipment and storage use.
- Post-storm event clean-up and repair creates increasing challenges.
- There is a need to provide sufficient youth programs and space for non-sports "hanging out".
- The Municipal Facilities Study committee should be reestablished before any consideration of building replacement or major additions.
- Capital and land use planning should reflect long-range climate change impacts.
- A segment of The Great Road is controlled by the State. The DPW Director has suggested that it would be beneficial for the segment to be improved in terms of curb alignments and sidewalks, and then put under Town control.

CLIMATE CHANGE

Researchers have shown that there is a long term trend toward global warming, and, in spite of controversy around the issue, increasingly strong evidence that human activity since the industrial revolution is a prime cause. While there is uncertainty about the pace, the potential consequences are severe and the case for responding at the community level strong.

Probably as a result of greenhouse gas emissions, the frequency of extreme weather events seems to be increasing. In the US, total average precipitation has increased 7% in the past

century, and the number of most extreme rainfall events has increased by 20%. Locally, prolonged heavy rain in March 2010 caused a full month of flooding in the Sudbury/Assabet/Concord River Valley, and a microburst in July 2012 felled many trees in Arlington. An October 2011 snowstorm caused massive tree damage around and beyond the I-495 belt. As a result of recent research, the FEMA flood maps are being revised to depict expanded flood-prone areas, which will affect the application of land use regulations.

Climate change can have significant impacts on town development and planning. Areas of flooding are likely to rise in elevation and expand spatially, hurting abutting properties. Demands on public and private stormwater management systems can overload capacity. Vegetation, street trees and agriculture can be adversely impacted. Wind damage from increased storm events can become more problematic. Pressures on the infrastructure can increase the capital investment burden.

Local planning can have a role in responding to these changes, and two themes frame the discussion:

Reducing contributions to climate change

Avoiding or mitigating effects

Possible steps to reduce greenhouse gas emissions include; a program to cut energy use in the town's own facilities and vehicle fleet; a program to help educate residents and businesses regarding climate change effects; construction of more energy efficient buildings that make fewer energy demands; planning for alternative/ green energy generation and encouragement of co-generation for combined heat and power advantages, and related measures. The town has already initiated some of these steps by means of adopting the Green Energy program in 2010.

In terms of long term land use planning that facilitates lower levels of vehicular travel, the town can consider mixed uses, central places, home businesses (recognizing that major change in travel patterns also depends on pricing of vehicle fuel, congestion/ road charging etc.). Transportation policy alternatives include planning to strengthen or retain public transportation (in conjunction with regional partners).

Low impact development site planning techniques can reduce runoff from impervious surface, increase groundwater recharge rates and add attractive features to the landscape such as rain gardens and bio-vegetated swales. Woodland preservation and street tree planting can help somewhat to offset emissions by absorbing carbon dioxide.

CAPITAL PLANNING

Short- range capital investment decision-making now faces the challenge of smoothly reconciling the new capabilities in computerized systems analysis with the more traditional and less structured practice of committee vetting.

The $3,372,924 FY14 capital article for annual town meeting 2013 covered a typically wide span of projects. It included $6,000 for ballistic vests for police, $5,200 for a security camera at the Facilities Department, and $10,000 for a leak detection program in the water distribution system. There is also $168,000 for classroom renovation, and $102,000 for school technology upgrades. It also includes $960,000 for a ladder truck replacement, $504,690 for the new equipment at the Dispatch Center, $500,000 for water main repairs and replacement, and $339,096 for energy efficiency and lighting replacement at multiple locations. These are just some of more than 30 projects of every size and type. In addition to the regular capital budget, there are Community Preservation Act-funded projects in the amount of $306,500, which include $125,000 for bicycle path refurbishing, $122,000 for landscaped grounds maintenance and $59,500 for a Town Hall mechanical/electrical/ plumbing study.