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PROJECT BACKGROUND:

Our project was to conduct a Cost of Community Services Study (COCS) for the town of Williamstown. COCS studies use a case study approach to determine the public costs incurred and the revenues generated by different types of land-use. This involves analyzing budgets and land-use conditions with assessors' maps, tax data and financial reports. By distributing revenues and expenditures according to land-use, the study provides a ratio that shows how much the community spends on public services for every dollar raised by each type of land-use. COCS studies are most useful to communities that rely heavily on property taxes to generate revenue, such as those in Massachusetts. They provide a baseline of information to help local officials and citizens make informed land-use decisions (Gardner, 2005).

Dozens of COCS studies have been conducted for towns all over the country; they have demonstrated that the generally accepted wisdom about land-use and tax revenues—that residential development leads to a net increase in revenues—is erroneous. Eighty-four studies conducted by the American Farmland Trust, which pioneered COCS studies, found that farm, forest and open lands pay for themselves while residential land never even breaks even (Gardner, 2005).

Problem Identification and Scoping:

Our client, Leslie Reed Evans, of the Williamstown Rural Lands Foundation, wanted us to do a COCS study to evaluate to what extent open space is an asset to or burden on the town. Williamstown residents are conflicted by both being drawn to the town's rural character and worrying that perhaps the cost of open space exceeds the benefits. This study will reveal to what extent such a concern is supported by fiscal reality.

COMMUNITY CONTEXT AND PROFILE:

Population:

Williamstown is a small college town in north-western Massachusetts. The total population is 8,424 residents, 2,000 of whom are college students, and 1,400 of whom are

seasonal residents. The median household income is \$63,011, which is well above the national median (Table 1). There are many high income and low income jobs available, with fewer middle income possibilities, which create a stratified community.

Table 1: 2004 Households by Income						
Median Household Income	\$63,010	\$48,124				
HH Income Under \$50K	41.8%	51.7%				
HH Income \$50K-\$100K	27.2%	31.0%				
HH Income Over \$100K	31.0%	17.4%				
2004 Average Home Value	ZIP 01267	National				
	\$271,995	\$206,430				

In Williamstown, 24.5% of the population has achieved a Bachelor's degree, which is significantly above the national average of 15.5%. In addition, 29.1% of residents have some form of graduate or professional degree. The high level of education in town can be attributed to Williams College, which draws many highly educated people into the Williamstown community.

The College dominates the town's economy, as demonstrated by 51.3% of employed residents working in education, health or social services. Arts, entertainment, recreation, accommodation and food services businesses employ 11.3% of residents. The percent of residents employed in agriculture, forestry, fishing, hunting and mining is shockingly small at only 1.1%. This number includes 42 people, only 8 of whom are involved in agriculture, forestry and fishing. Considering Williamstown's history as a farming community, this number emphasizes the huge shift over time to a more service sector based community.

In the past 5 years, 12.8 houses have been built each year in Williamstown. This number has decreased over the past few decades, and the composition of houses has also changed; those currently being built are generally second home or vacation homes. The increase in real estate values makes it hard for renters or low/middle income individuals to find affordable housing. Williamstown is 164 units of affordable housing below the 292 units required by chapter 40B of Massachusetts state law. Thus, according to this regulation, a developer would be able to come to Williamstown and build affordable

housing units without complying with the town's zoning bylaw. There are many potential sites for affordable housing developments recommended in the master plan, among them are: the Carol Cable Mill, the Photech Mill, and the Lowry property. The lack of affordable housing may lead to an even less socioeconomically diverse community in the future.

Land Observations and Challenges:

Over the past century, Williamstown land-use has shifted significantly. In 1900, 70% of land was used for agriculture; today, there is currently less than 10% farmed (Williamstown Open Space and Recreation Plan, 2003, 12). However, the town still maintains its strong rural character, due in large part to the open space remaining, which many see as one of the most appealing features of the town. The town's need for affordable housing and the push for further economic development, however, threatens some open space. Currently, less than seven acres of land is available and zoned to accommodate major commercial development. This has led to increased pressure to develop the town's open lands.

The 2000 Williamstown Build-Out Analysis calculated that 81% of lands in town are under development restrictions. These constraints include: lands within the Rivers and Wetlands protection act buffer zones, permanently protected open space, lands in the Upland Conservation Overlay District, and lands sloped over 20%, this alone eliminates 55% of the town's land (Appendix 1, Map 4). In addition, heightened taxes both lead to and result from more private land-owners enrolling in tax benefit programs, such as Chapter 61, 61A and 61B, whose enrollment has doubled since 1994 (Open Space and Recreation Plan, 2003, 31). Many people fear that preservation of open space will cause a further decrease in tax revenues by limiting economic development and decreasing the potential tax contributors, as well as limiting the amount of taxable land (because most open space is owned by state, town, or non-profits, and therefore tax-exempt).

TOWN OPINION AND INTERVIEWS

Recognizing the changing dynamics of Williamstown and the increasingly high demand for its limited resources, the Planning Board, with the approval of the Selectmen,

appointed the Master Plan Steering Committee in the summer of 2000. The goal of the committee was to "develop a long-range, comprehensive plan that would accurately reflect community values and preferences and serve as a practical decision-making guide for local officials" (Williamstown Master Plan, 3). The first goal of the Committee was to gather the collective values and preferences of the townspeople. A survey was mailed to all households in the spring of 2001. Approximately 35% of households responded to the survey—a high response rate for a survey of this nature.

The issues of greatest importance to the respondents were education, recreation/natural resources, housing, and economic development (Figure 1).



Figure 1. Respondents' 1st and 2nd Priorities from Master Plan Survey, n=450

The respondents were then asked to rate the supply, from 0 to 5 (0=no supply, 5=abundant supply) and importance, from 0 to 5 (0=not important, 5=extremely important) of different issues pertaining to recreation and housing. The survey showed that the Williamstown residents who responded to the survey value recreational options, but believe that they are too scarce (Figure 2).



Figure 2. Recreation Issues from Master Plan Survey, 2001, n=450

The housing portion of the survey further highlighted the sentiment of the community that supply of estate homes and second homes exceeds demand; respondents do not want to see Williamstown become only a vacation town or retiree community (Figure 3). It also showed that townspeople want more starter housing, elderly housing, moderately priced housing, multi-family housing, and housing within walking distance to Spring Street.



Figure 3. Housing Issues from Master Plan Survey, 2001, n=450

The importance of economic development was surveyed by asking respondents to rate the importance of, on a scale from 0 to 5 (5 being very important), (1) a diversified local economy; (2) expanding existing businesses; and (3) new commercial development. Responses revealed considerable support for expanding and diversifying the local economy, by both expanding existing businesses and attracting commercial development, to provide a greater variety of job opportunities (Figure 4).



Figure 4. Importance of Economic Development from Master Plan Survey, 2001, n=450

Finally the importance of land-use and natural and cultural resources were rated by importance (0=not important, 5=very important). Respondents felt that enhancing the business district as a residential site was not important (mean response~1.5). All other issues however were rated as highly important, especially protecting natural resources, preserving vistas, and preserving open space for recreation (Figure 5).



Figure 5. Importance of Land-use/Natural and Cultural Resource Issues from Master Plan Survey, 2001, n=450

The Master Plan Survey, due to its large response rate, provides a good picture of the town's public opinion on matters of land-use and town needs.

Community Research Results:

We relied mostly on public opinion gathered in the last couple of years from the Open Space and Recreation Plan (2004) and the Williamstown Master Plan (2002). The Open Space and Recreation Plan states that the natural setting of Williamstown is an essential element of the quality of life here. It also acknowledges that the open spaces that surround the village (mountains, farmland) offer a variety of recreation opportunities. The report highlights three major goals:

- To provide recreation opportunities for all groups and promote the use of open spaces
- To preserve and maintain the scenic and rural character of Williamstown
- To protect natural resources and unique environments

The responses to a town survey conducted for the Williamstown Master Plan indicate that cultural, natural and historic resources are among Williamstown's most recognized and appreciated assets. The Master Plan states, "We want to preserve our working landscapes (e.g., forests, agricultural landscapes, etc.) so they continue to contribute to the economic vitality and rural character of the town."

Interviews were conducted to assess what informed community members believed to be the costs and benefits of different types of land-use (Table 2), and they gave us a sense of how well (or poorly) the interviewees thought Williamstown was balancing economic development and land preservation.

Land-use	Benefits	Costs		
Commercial/	• source of taxes	• increases traffic		
Industrial	 self-sustaining community 	• parking problems		
	• source of pride for community	• appropriate scale of commercial		
Residential • "Mc Mansion" residents pay		• services needed		
	high property taxes	• costs of public education		
	• Provide homes	_		
Open Land	• beauty	• raises property values around it		
	 maintaining history of town 	• preventing town from being		
		economically stable		

Table 2: Benefits and Costs of Different Land-uses from our Interviews

Interviews with Jack Madden, a Williamstown selectman, Dr. Anne Skinner, a former selectman, and Attorney Stan Parese, Town Moderator, provided us with opinions on the economic costs, intangible costs, and benefits of the three land-uses. All the interviewees felt strongly that a balance needs to be struck between commercial development and open space. They stressed the challenge of such a balancing act while voicing avid support for providing economic stability for Williamstown.

Commercial/Industrial land-use was viewed positively by all interviewees. Commerce and industry both provide goods and services to the town members, making the community more self-sustaining, while also generating revenues for the town by way of taxes. Selectman Madden voiced his concern about Williamstown's, "ability to raise the money to do what people in town want done. We need to improve the tax base so that the revenue is not completely dependant on residential [taxes]." Dr. Skinner stressed the benefits of having, "a store one mile rather than ten miles away." Economic diversity is a goal of the Williamstown Master Plan but there are several barriers to such diversity. Williamstown is physically isolated. There are limited roadways and airports that make business transactions and distribution difficult. There were little costs to commercial development discussed. The most significant was the increase in traffic flow.

Residential land was viewed to have little economic benefit for the town. Selectman Madden did raise the unique characteristic of Williamstown as a growing retiree community. This results in the town gathering property taxes on these highly valuable lands, but not needing to provide many expensive services, especially education, because the retirees do not have school-aged children. Dr. Skinner is concerned that trying to attract this type of development will ultimately harm the community. She believes that the town should promote an affordable living style for families with children to avoid turning Williamstown into a retirement community. Stan Parese stated that he thought Williamstown's middle class was being squeezed out. He stated that, "population size to income is linear, usually, but in Williamstown it is a U shape. People who work in Williamstown cannot afford to live in Williamstown. Housing provides people and people provide an economy. Value of housing is more social than economic. My fear for Williamstown is that it will become Disneyland. Populated by college, the Clark, and tourists. It will become an unreal place. That dynamic is dictated by land use."

Farm and open lands benefits and disadvantages are the most difficult to assess. All interviewees noted the aesthetic and environmental reasons for preserving open space. However, all emphasized the need for balancing open space with development. Dr. Skinner was adamant that land should not be preserved solely to maintain a nice view if there are beneficial development options. However, it is often difficult to qualify and quantify the benefits of open space. For example, preserving a watershed may also maintain a vista that is important to residents and tourists. Open space is also vital to maintaining the agricultural history of our community. Preserving land does not come without its costs. Often property values adjacent to open space are higher, reducing the affordability of housing in Williamstown.

In our discussions with both Selectman Madden, Dr. Skinner, and Stan Parese many issues arose about the future of Williamstown and how land-use plays a part in this. The following issues are for further discussion and thought:

• How should Williamstown attract commercial development?

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- How should the town's isolation be mediated, so as to make commercial development more feasible?
- Should Williamstown be prevented from becoming a retiree and second-home community, and how?
- How can we make Williamstown affordable for families with children?
- What should be the College's role with respect to assisting the town financially? Should they contribute PILOTs?

Law and Policy:

Although there are no laws pertaining specifically to Cost of Community Services Studies, there are a number of applicable laws and regulations regarding development and the preservation of open space. The most relevant include:

- Zoning regulations
- Chapter 61
- Chapter 61A
- Chapter 61B
- Conservation Restrictions
- Agricultural Preservation Restrictions
- Slope Restriction
- Upland Conservation District (Overlay Zone)

Zoning is important to keep in mind when determining the best course for development. A commercial center must be placed in a commercially zoned area and affordable housing must be built in an appropriately zoned residential area, unless a township is not in compliance with Chapter 40B, which is the case in Williamstown. These constraints could limit the options of a developer wishing to initiate construction in Williamstown.

Chapter 61 provides tax benefits for forested lands but does not put protective restrictions on the land; it is more a tax abetment program than a preservation program. Chapter 61 applies to all forest land that is at least ten contiguous acres. The town's assessor classifies the land as "forest land" following a written application filed with the state forester. Such application is accompanied by a forest management plan (General Laws of MA, Ch. 61, Section 2).

Chapter 61A provides tax benefits to agricultural and horticultural parcels greater than five acres. The law defines agricultural land as land that is used primarily and directly for raising animals and/or for the purpose of selling such animals or a product derived from such animals in the regular course of business. Land is considered to be in horticultural use when primarily and directly used in raising fruits, vegetables, berries, nuts and other foods for human consumption, feed for animals, tobacco, flowers, sod, trees, nursery or greenhouse products, and ornamental plants and shrubs for the purpose of selling such products in the regular course of business (General Laws of MA, Ch. 61A, Section 1).

Chapter 61B provides similar tax benefit to lands devoted to recreational uses. Land not less than five acres in area is considered recreational land if it is retained in a substantially natural, wild, or open condition or in a landscaped condition in such a manner as to the preservation of wildlife and other natural resources, including but not limited to, ground or surface water resources, clean air, vegetation, rare or endangered species, geologic features, high quality soils, and scenic resources (General Laws of MA, Chapter 61A).

Conservation Restrictions and Agricultural Preservation Restrictions (APRs) "permanently" protect open and agricultural lands from development. A conservation restriction is a legally binding agreement between a landowner (grantor) and a holder (grantee), which is usually a public agency or a private land trust, whereby the grantor agrees to limit the use of his/her property for the purpose of protecting certain conservation values. The conservation restriction may run for a period of years or in perpetuity and is recorded at the Registry of Deeds (it runs with the title)(General Laws of MA). Certain income and estate or real estate tax benefits may be available to the grantor of a conservation restriction (Soper, 2003). The APR Program is a voluntary program which is intended to offer a non-development alternative to farmers and other owners of "prime" agricultural land who are faced with a decision regarding future use and disposition of their farms. The program offers to pay farmers the difference between the "fair market value" and the "agricultural value" of their farmland in exchange for a permanent deed restriction, which precludes any use of the property that will have a negative impact on its agricultural viability (MDAR, 2005).

There are also a number of development constraints in addition to the restrictions and regulations listed above. As with all development, river and watershed protection must be taken into account. Additionally, development is prohibited on land sloped over

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20 percent, which eliminates 55 percent of Williamstown's land from the net usable land tally, and land in the Upland Conservation District Overlay Zone.

METHODOLOGY:

Materials:

- 2004 Williamstown Schedule A
- 2004 Williamstown assessment spreadsheet of taxable lands, excluding Ch. 61, 61 A and 61B lands.
- 2004 Williamstown breakdown of Ch. 61, 61A and 61B lands.
- Annual Department Reports (Police)
- 2004 Williamstown Census

1. Dividing Williamstown's assessed value by land-use:

To calculate the COCS ratios, we began by using the 2004 Williamstown Tax Assessment, which we obtained from Bill Barkin, the town assessor. This spreadsheet included the following information: map number, parcel number, state land-use classification code, acreage, land value, improved value (the value of any buildings on the property), commercial/industrial/exempt value, and total value. The commercial/industrial/exempt category lumped together the value of exempt lands and the value of commercial/ industrial lands. In Williamstown, all commercial/industrial land has a set land value of \$1,000 and any value beyond that, including "improved value," is lumped into one sum under the Commercial/Industrial/Exempt heading.

We sorted the assessment spreadsheet first by state classification code so that we could know how each piece of land was used. We tabulated the taxable value each land-use contributed to Williamstown's total assessed value (Appendix 1).

a) Commercial/Industrial Calculation: For commercial/industrial land, we summed up the taxable value of all commercial/ industrial land.

b) Residential Calculation: With the residential land (all land with a 1## state class code), we separated out all parcels smaller than 10 acres. We summed the entire assessed value for these parcels, and put this value in the residential category. With all residential parcels 10 acres or larger, we wanted to separate out the land actually supporting residents from open space that was part of the residential property. To do this, we divided the land value by the number of acres to calculate the dollar value per acre.

We then multiplied this value by two, on the assumption that approximately two acres of the parcel would be covered by buildings or used for residential purposes. We added this number to the improved value to get the total residential value for the property.

c) Farm/Open Space Calculation: The remaining acreage from the residential calculation of residential plots exceeding 10 acres was then multiplied by the value per acre (calculated as part of the residential calculation) to get the value of the open space that was on the residential property, and this was counted as open space/farmland. We summed the values of all lands in the Ch. 61, 61A and 61B spreadsheet and added this value to the open space/ farmland category.

d) Tax-Exempt Land Calculation: Finally, we summed the total value of all taxexempt land to find out what percent of the town's value was tax-exempt.

2. Calculating Fallback Percentages:

We used the land use calculations to determine the percent of Williamstown's tax base each land-use contributed, and from these numbers, we generated four sets of percentages known as fallback percentages (Table 3).

	Total	Percent of Total Property Value	Percent of Total Tax Revenue	Res/Comm Fallback	Adjusted Fallback
Taxable Properties					
Residential	\$611,900,302	0.5405	0.8005	0.8786	0.8396
Comm/Industrial	\$84,524,000	0.0747	0.1106	0.1214	0.1160
Farm, Forest, Open	\$67,936,598	+0.0600	+0.0889	+0.0000	+0.0444
Total Taxable Value	\$764,360,900	0.6752^{1}	1.0000	1.000	1.0000
Total Tax Revenue	\$10,808,063				

Table 3: Total Assessed Values and Fallback Percentages

The first set includes the percent of total property value contributed by residential, commercial/industrial, farm/open space, and tax-exempt land. The second set looked only at the percent of taxable value contributed by residential land, commercial/industrial land, and farm/open space. The third set calculated the percent value contributed by residential

¹ This number does not equal 1 because it excludes the value of lands in town attributable to tax-exempt lands.

and commercial/industrial lands. The fourth set we called "adjusted fallback," and it was the average of the second and third set of fallback percentages. We calculated this final set to address the challenge of distributing the department of public works expenditures on roads. While we could not use only the residential and commercial/industrial fallback percentages here, because open space demands road access as well, road expenditures are mostly incurred by residential and commercial/industrial land-uses, and so we did not believe using the residential, commercial/industrial, farm/open space fallback percentages accurately represented the situation either. We decided that the average of the two percentages was the closest estimate we could make.

3. Calculating percent acreage occupied by each land-use.

We used the acreages from the 2004 Williamstown Tax Assessment to calculate how much of the town's land each land-use occupied (Table 4).

Class ²	Class ² Use		Percent Total
0	mixed use	30	0.089%
1	residential	3,970	11.902%
1a	open space in residential zone	12,857	38.547%
2	zoned as open space	0	0.000%
3 and 4	commercial/industrial	960	2.879%
5	personal property	0	0.000%
<i>6</i> , <i>7</i> , <i>8</i> Ch.61, 61A, 61B		3,820	11.454%
9	<i>9</i> tax-exempt		35.128%
Total		33,354 ³	100.000%

Table 4. Land-use breakdown

• Source: 2004 Williamstown, MA Tax Assessment

Additionally, we broke tax-exempt land into use categories to explore how much acreage and value each tax-exempt class contributed to Williamstown (Table 5).

²"Class" is the class code used by tax assessors to classify land by use.

³ The 2000 Williamstown Build-Out Analysis states that Williamstown encompasses 30,005 acres (46.8 square miles). The total acreage calculated in Table 3 comes from data in the 2004 Williamstown Tax Assessment. We do not know why there is a discrepancy between the two numbers.

Use	% Land Acreage	% Value of Exempt Land
US Gov	0%	0.16%
MA	54.02%	3.54%
Counties	0%	0%
Municipalities/Districts	17.26%	12.39%
Colleges/Schools (private)	20.71%	73.94%
Charitable Organizations	7.81%	6.63%
Religious Establishments	0.11%	2.26%
121A Corp	0.04%	0.33%
Housing Authority	0.05%	0.75%

Table 5: Tax-exempt Land Breakdown

We also created three maps of Williamstown's land-use breakdown, tax-exempt land, and utilities so as to provide a visual impression (in addition to the numeric one from the previous calculations) of how Williamstown's land is used (Appendix 1, Map 1-3). These breakdowns help create a context for our final ratios. For example, if one land-use is very expensive, such as residential land, it is helpful to know what percentage of town acreage and value the land occupies so as to fully understand the fiscal impact each landuse has on the community.

4. Making Sense of Schedule A.

Once we calculated how both the town's acreage and value were composed of different land-uses, we turned to the 2004 Williamstown Schedule A, which tabulates all of the town's revenues and expenditures (Appendix 2). We went through the fourteenpage excel spreadsheet line by line with Chuck St. John, the town accountant, and found out what all the entries in the spreadsheet were. We asked questions such as "In Part I, line 38, \$113,264 were attributed to 'Other Charges.' What are these other charges?" Once we figured out where all the money in Schedule A came from or went to, we attributed it to each land-use. For certain services we were able to obtain a detailed breakdown of percent time or money spent on each land use. For example, we interviewed Kyle Johnson and Andi Bryant from the Police Department and acquired an annual summary of their call log. When multiple land-uses incurred an expense or generated a revenue and specific breakdowns could not be made, we used the fallback percentages that included only the land-uses responsible for that expense or revenue to distribute the funds between them. As part of the allocation process, we looked at three land-uses in addition to residential, commercial/industrial, and open space: public education, private education, and other. We put all money whose origin or destination we still did not know in "other." We put all monies associated with the public schools in "public education," and all monies associated with private schools, principally Williams College, in "private education." The College complicates the study because it composes such a large part of the town's acreage and exempt land value, so we thought it was necessary to look at private education as its own category. Meanwhile we set public education aside because some criticizers of COCS studies want to see the ratios with educational expenses excluded. By setting them aside at the beginning of the calculations, we could easily move the sums of money associated with these two uses around as desired.

Because COCS ratios only make sense when a land-use generates both revenues and incurs expenditures, we excluded all tax-exempt land from our calculations. Therefore, both our percent acreage and percent value calculations for open space include only lands enrolled in Ch. 61, 61A and 61B, as well as open space that is taxed as residential land. All open space owned by tax-exempt establishments is included in the tax-exempt category, and is not used to calculate the farm/open space fallback percentages, its COCS ratio, or the percent town acreage it occupies.

Once we had allocated all expenditures and revenues to each land-use, we summed them up and calculated the COCS ratios by dividing expenditures by revenues. Our final ratios have all revenues and expenditures attributable to public education included in the residential ratio and all those attributable to private education excluded from all ratios.

RESULTS - COCS RATIOS:

COCS ratios represent the average ratio of dollars generated by a particular landuse to the cost of the services required by that land-use. Our calculation of ratios by landuse are: 1 : 1.115 for residential, 1 : 0.424 for commercial/industrial uses, and 1 : 0.248 for open space (Table 6b).

Table 6. Cost of Community Services Ratios

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				Public	Private		
Table 6a	Residential	Commercial	Open Space	Education	Education	Other	Total
Total Revenues:	14,325,224	2,334,503	1,416,261	1,039,367	126,277	0	19,241,632
Total Expenditures:	7,535,158	988,879	351,664	9,595,025	88,281	0	18,559,007
Ratio:	0.526	0.424	0.248	9.232	0.699	0.000	0.965
Table 6b							
Public Education Cor	nsolidated With	n Residential					
	Residential	Commercial	Open Space				
Total Revenues:	15,364,591	2,334,503	1,416,261				
Total Expenditures:	17,130,183	988,879	351,664				
Ratio:	1.115	0.424	0.248				

Source: 2004 Williamstown Schedule A (Appendix 2)

Some opponents of COCS studies argue that including the cost of public education in the residential ratio skews the study in favor of commercial/industrial lands and open space. However, a COCS study investigates the town's expenses as a result of a particular land-use. The town only pays for schooling because its residents demand it; without residents, there would be no demand for schools. Therefore, COCS studies include the revenues and expenditures that result from public education in the calculation of the residential ratios (Table 6b).

To further illustrate how public education effects the complete breakdown of revenues and expenditures we have separated it into its own ratio (Table 6a). Notice that if you separate out public education, the ratio for it is 1 : 9.23, which means that for every dollar that public education brings into the Williamstown Municipal Budget, the town spends \$9.23. State and federal funds supply the revenues included under the "public education" heading. Where do the rest of the funds demanded by education come from? Taxes from the residents.

The Ratios' Shortcomings:

There are a few problems with these ratios. First, we had to use fallback percentages to break down many of the revenues and expenditures because the town does not record its revenues or expenditures in terms of land-use. Fallback percentages are based on the property taxes the town generates; if residential properties generate 80% of the town's property tax, the residential fallback percentage is 80%. This does not perfectly depict how the town's finances are spent, but it is a close approximation. Secondly, the Fire Department's budget is not included in our calculation. The Fire Department is its own district and so handles its own finances; residents pay the Fire Department a tax directly, which is distinct from that they pay the town. These numbers might shift the ratios slightly, depending on whether each land-use pays the tax in proportion to the amount they use the Fire Department. If they do pay in proportion to use, this budget would not change our ratios because revenues and expenditures would balance each other out.

Additionally, because we used fallback percentages frequently, private education (primarily Williams College) seems to cost the town nothing, which is not indeed true. The College is tax-exempt, so its fallback percentage is 0%. However, it uses the roads, sewer, the police and fire departments, the town government, etc. It is not clear how to attribute some of the town's expenses to the College. Finally, the tax-exempt lands are categorized in the tax records by who owns the land, not how the land is being used. Thus our picture of what percentage of town land is involved in which land-use is skewed, because it is only based upon taxed land. We expect that breaking the tax-exempt land into land-uses will mostly increase the percent of the town classified as open space, because there are few tax-exempt residential and commercial/industrial uses.

The average COCS ratios, from the American Farmland Trust, put our results in context and reveal that our results are consistent with the results of professionally generated studies (Table 7). These averages are taken from other COCSs compiled by the AFT. These studies' methodologies had to comply with the AFT's standards but do not control for size or type of town.

Table 7: Summary of COCS from American Farmand Trust							
Land-use: Residential Commercial/Industrial Far							
Ratio (expenditures/revenues):	\$1:\$1.15	\$1:\$0.28	\$1:\$0.36				

Table 7: Summary of COCS from American Farmland Trust

Source: American Farmland Trust, Cost of Community Services Fact Sheet, 2004.

APPLYING THE RESULTS: OPEN SPACE VS. DEVELOPMENT:

A COCS study can tell you specific numbers for the costs or benefits of open space versus development, but there are other less tangible factors to consider. There are a number of benefits to open space that cannot be quantified monetarily. For example, community members require expensive public services and infrastructure, while open space (and privately owned working lands) enhance the character and quality of life without significant public expenditures (Freedgood, 2002). For Williamstown in particular, preservation of open space helps preserve the rural and agricultural history of the town. Open space also provides public goods and services: food, fiber, recreation, and natural hazard mitigation. It can also possess rare geological or biological features (Fausold and Lilieholm, 1996), and they provide ecosystem services, which include:

- Purification of air and water
- o Mitigation of droughts and floods
- o Generation and preservation of soils and renewal of their fertility
- o Detoxification and decomposition of wastes
- o Pollination of crops and natural vegetation
- o Dispersal of seeds
- o Cycling and Movement of nutrients
- o Control of the vast majority of potential agricultural pests
- o Maintenance of biodiversity
- o Protection of coastal shores from erosion by waves
- o Protection from the sun's UV rays
- o Partial stabilization of the climate
- o Moderation of weather extremes and their impacts
- Provision of aesthetic beauty
 - (Daily, 1997).

One way to estimate the value of these ecosystem services is to calculate the cost of damages that would result if the benefits were not provided, or the cost of the infrastructure that would have to replace it.

Development causes a number of additional problems. Economic development and housing reduce the amount of open space unless built in already developed areas, which is the case with infill development. This would include the development of vacant parcels within an already developed area, or the redevelopment of existing structures. This would help preserve open space and ecosystem services, which are otherwise disabled when large tracks of open land are developed. In the U.S., from 1992 to 1997, more than 11 million acres of open space were developed, and more than half of that conversion was originally agricultural land (Freedgood, 2002). Development and sprawl lead to traffic congestion, air and water pollution, extended public infrastructure and geographic separation of essential places, which increases dependency on automobiles. It is estimated that the annual infrastructure costs per car average from \$4000 to \$9400 (Freedgood, 2002).

Development, however, is necessary in many circumstances. The kind of development, however, can significantly impact the extent of the development's fiscal impact on the town. Thus we conducted two Fiscal Impact Analyses to explore the fiscal ramifications of different kinds of residential development.

FISCAL IMPACT ANALYSES:

A Financial Impact Analysis (FIA) is a tool used to evaluate the financial benefits and costs of development on a town's budget. There are three main differences between FIAs and COCS studies. The first difference is that FIAs apply to individual plots of land and not the town as a whole. In addition, FIAs look at land-uses that are more specific than the three general categories used in COCS studies, such as high density versus low density housing. Most importantly, FIAs look at future costs and benefits, and can consequently be used to predict fiscal impacts in years to come rather than COCS studies, which only look at the current status of a town's budget (Schulte, 2001).

To conduct an FIA for Williamstown, we used a computer program developed by the Commonwealth of Massachusetts in September 2002. We conducted two FIAs: one analyzed three scenarios that would use about the same amount of land area (20 single family homes, 50 apartment units and 10 single family homes, and 100 apartment units) and the other evaluated three scenarios that would house about the same population (60 single family homes, 30 single family homes and 50 apartment units, and 100 apartment units). All analyses showed net loses to the town from residential development (Table 8).

Based on land area	2008	2028
20 single family	-\$393,334	-\$1,308,171
10 single and 50 apartments	-\$654,273	-\$2,272,829
100 apartments	-\$936,934	-\$3,291,173
Based on population	2008	2028
60 single family	-\$1,217,839	-\$4,096,162
30 single and 50 apartments	-\$1,074,365	-\$3,695,014
100 apartments	-\$936,934	-\$3,291,173

Table	8:	Net	Effect	on	Town	Budget:
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Based on this analysis alone, if you focus solely on the portion concerning the area of land that would be used in the development, any residential development will end up costing the town more money than it already spends. However, depending on whether you look at the analysis based on land area or population, you come up with two different results for which kind of development would be preferable.

The land area FIA reveals that the 20 single-family homes will cost the town \$1,308,171 over 25 years, while both the combination of single-family homes and apartments and the 100 apartment units will produce an even larger cost (Table 8 and Figure 6).



Figure 6. FIA controlling for acreage

However, this analysis produces an inaccurate picture of the cost of each kind of development because it does not control for population. The 20 single-family homes house approximately 66 people, while the combination of housing and the 100 apartment units house 131 and 196 people, respectively. This difference in population greatly alters the cost of services demanded by these different developments, mainly because of the cost of public education.

The population FIA presents a more accurate picture of the cost of each kind of development (Figure 7). It controls for the same population in all three situations: 60

single family units, population 196; 30 single family units and 50 apartment units, population 198; 100 apartment units, population 199). In this case, the 100 apartment units come out as the most economically viable option, even though they still result in a net cost of \$3,291,173 to the town over 25 years.



Different land uses based on the same population (196-199)

Figure 7. FIA controlling for population

It is important to keep in mind with this example that although the scenarios have be equalized in terms of how many people are being added to the town, there are large differences in the amount of land that each of these development options encompasses. The single-family houses would take up much more acreage than the apartment complex, contributing to sprawl, and would demand significant expansion of infrastructure and increased cost to the town.

Now that we have all the numbers, it is important to look at the needs of the town, as well as other costs and benefits of these different options. Williamstown needs more housing, in particular, affordable housing. However, there is also a high demand for large single family houses on large lots. So, although the FIAs reveal that residential development is a drain on the town financially, such development is necessary.

CONCLUSION:

The purpose of our study was to tabulate the revenues generated by and expenditures demanded by residential, commercial/industrial and open lands. Our COCS ratios reveal that residential development costs the town \$1.115 for every \$1 it generates, while commercial/industrial development costs the town \$0.424 for every \$1 it generates and open space costs the town \$0.248 for every \$1 it generates (Table 6).

Is open space really the problem? Some people believe that open space costs the town money; because the land is not used for residential or commercial development, they believe it prevents the town from generating much needed revenues from property tax. It is easy to ignore the other side of the argument: while it is true that the town is not generating extra revenue from residential development, it is also not spending money providing services for the residents who would occupy that land. Our study reveals that open space actually benefits the town; it generates more revenue than it incurs in expenditures.

While these numbers do prove that open space is not a financial drain on the town and that residential development is, they do not imply that residential development is "bad" and open space is "good." A COCS Study is merely a snapshot of the town's finances for a one year period. It does not take into account indirect costs and benefits of different land-uses (such as commercial development providing jobs) and non-monetary benefits (such as affordable housing supporting socioeconomic diversity or open space providing habitat for endangered species or attracting tourists). Furthermore, a town needs to be a mix of all three types of land-use. Residents support commerce and visa versa, open space's beauty draws residents, and what's a town without residents?

Our Fiscal Impact Analyses elucidated the extent to which education is the most influential town expense. In the acreage FIA, the financially preferable kind of development was single family homes because it introduced the fewest number of new residents into the town. Meanwhile, when we fixed the size of the population increase, and therefore controlled for the expense of education, apartments were the financially preferable kind of development because it demands less land and less expansion of the infrastructure. This result supports infill development and preventing sprawl.

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This study can not reduce the complexity of the town's land-use needs and problems to a single solution. Rather, it can be used as a tool to better inform future land-use decisions. These decisions are multi-faceted and ever-changing, but hopefully this study will help illuminate one of the land-use debate's central misconceptions: open space benefits the town financially as well as aesthetically and environmentally.

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