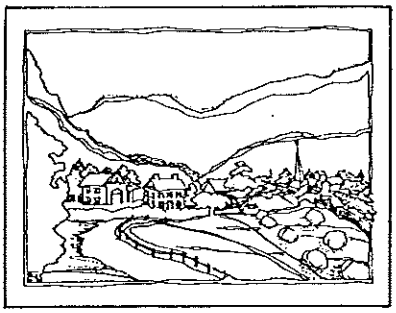


The Tax Base and The Tax Bill

Vermont League of Cities and Towns

Vermont Natural Resources Council

Dear Vermonter:

Providing Vermont's citizens with essential services, such as education, police and fire protection, safe and efficient transportation systems, and environmentally sensitive disposal of our society's wastes has traditionally been the responsibility of local government. Towns are also responsible for making land use decisions that have dramatic impacts on our economic and environmental well being.

Because towns depend primarily on the property tax to pay for services, and because the services they must provide are largely determined by the use of the land, property taxes, land use and municipal budgets are intrinsically interrelated. Tax revenues per acre are low for forests and farmlands; but such lands also require little in the way of public services. Current and potential residential development generates more tax revenue; but it requires more municipal services and educational expenditures. Commercial and industrial uses generate the highest tax revenues per acre; they also demand the highest levels of municipal services and, through job creation, often spawn residential development.

The Vermont League of Cities and Towns (VLCT) and the Vermont Natural Resources Council (VNRC) recognize that Vermont's present property tax system is inadequate to meet towns' financial needs. As the only source of revenue directly available to communities, the property tax does not supply towns with enough money, overburdens taxpayers, and in some instances affects local development decisions.

Early in 1989, VLCT and VNRC began discussing ways in which the two organizations could agree to approach and address the sensitive issue of property tax reform. From these discussions the organizations realized towns were often operating without adequate means for determining the real tax consequences of development. This workbook is designed to aid communities in understanding the cost/revenue impact of development decisions.

With generous support provided by the Windham Foundation, we have been able to work with Deb Brighton and Jim Northup, two of Vermont's leading experts on the topic of property taxes.

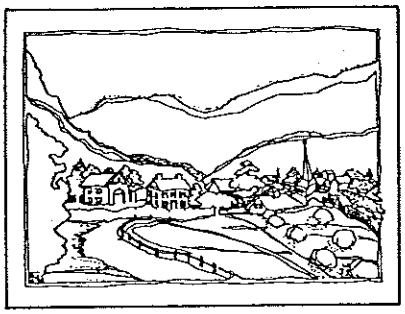
It is our intention for Vermont's selectmen, planning commissioners and citizens to take advantage of this important new fiscal planning tool. There are few hard-and-fast rules that apply to the interrelationship of taxes and development. We hope this workbook provides the user with the factual information needed to make the independent and individualized choices that each community faces and must make for itself.

Seth Bongartz

Seth Bongartz
Associate Director, VNRC

Steven E. Jeffrey

Steven E. Jeffrey
Executive Director, VLCT



The Tax Base and The Tax Bill

Tax Implications of Development: an Overview

Vermont League of Cities and Towns

Vermont Natural Resources Council

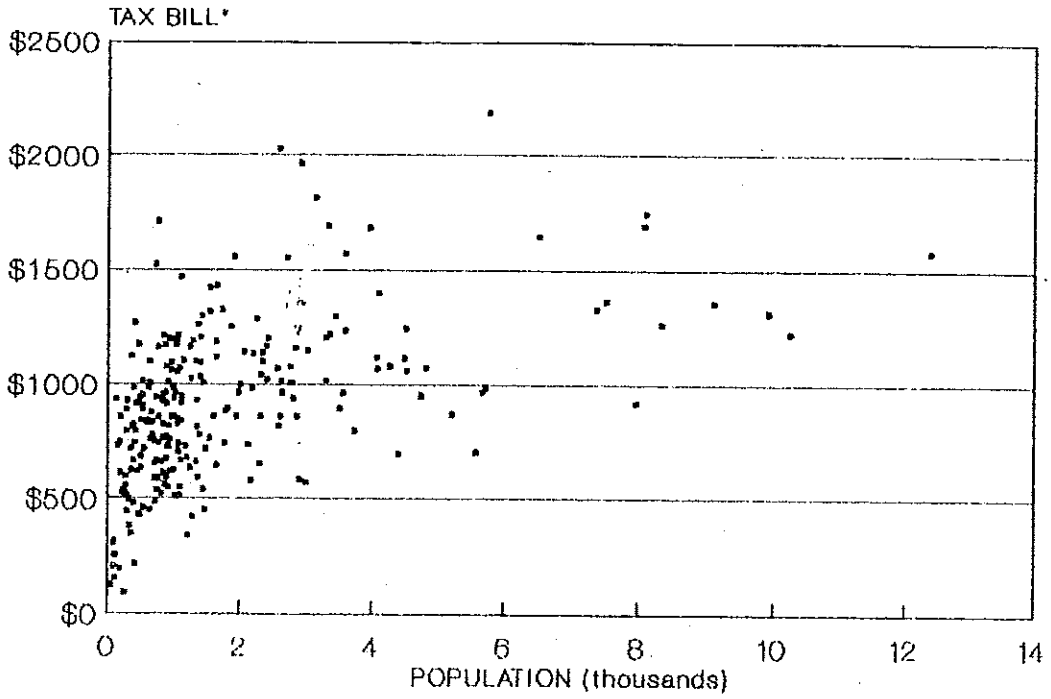
About the only way a Vermont town can fund its schools, police department, highway work, recreation program, and general government is through the property tax. And, if the recent rejection of 40 school budgets is an indication, the property tax is overburdened. Responsible town officials, attempting to offer their citizens a balanced program of services without exorbitant taxes, often strive to increase the tax base by enticing developers to locate within their boundaries. As the theory goes, a larger tax base means the budget is divided among more properties, keeping the tax rate down.

While local officials may be considering the tax consequences of new development, some Vermonters are complaining of ugly strip developments and inappropriate land use decisions which they attribute to the quest for tax base. After listening to Vermonters across the state, the Governor's Commission on Vermont's Future summarized their impressions this way: "Most towns, confronted with the rising cost of services, compete for development to increase their tax base. This competition conflicts with the planning process. Towns are forced to waive zoning requirements, make improper siting decisions, and, in general, pursue short-term objectives at the expense of long-term goals."

The Vermont League of Cities and Towns (VLCT) and the Vermont Natural Resources Council (VNRC) recognize the bind towns are in. Both organizations are calling for property tax reform, but, in the meantime, they believe town officials will be able to make better decisions if they have better information. VNRC and VLCT have cooperatively undertaken this project to bring local officials more information on the tax implications of growth.

While the general trend is that tax burdens increase with growth, there are many exceptions (Figure 1). Each town's situation is different, and the impact of a development on the tax rate depends on many factors including the type of development, the capacity of themunicipal and educational infrastructure in place, the services necessitated by the development, the services desired by the voters, and the role of state aid to education.

1. Population and Residential Tax Bills



* Tax bill on the average house with less than six acres; 1987

This overview outlines the major findings of research on property taxes and growth. A workbook is also available from VLCT or VNRC which will help town officials calculate how a specific development would affect their tax rate.

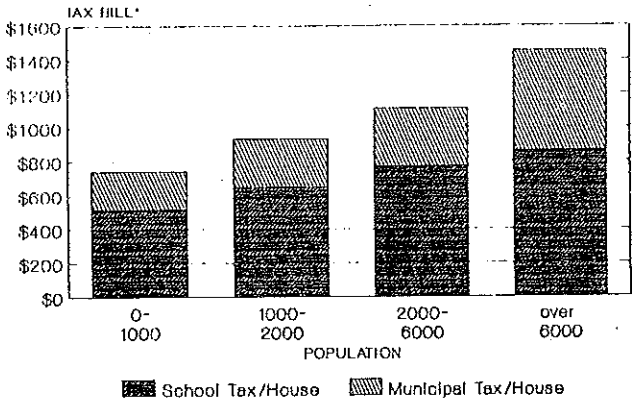
Although the study focuses on the property tax effects of land use decisions, we do not want to give undue importance to the tax rate as a factor in deciding how a town should grow. Nor do we want the study to prove that certain types of development are better than others. The real purpose is to clear up some of the misconceptions and mystery about property taxes so it can be more accurately factored into decisions.

Growth and Taxes

At one time, many people believed new houses would help the tax rate because they would share the costs of schools, roads, and town government. By the late 1960's, however, people began to suspect mobile homes did not pay enough in property taxes to cover the costs of educating their children. The Legislature directed the Tax Department to conduct a special study and the results were somewhat surprising: it was true that mobile homes cost the town more than they brought in, but "standard" houses were even more of a drain. The reason was there were fewer children in mobile homes, perhaps because of rules at mobile home parks.

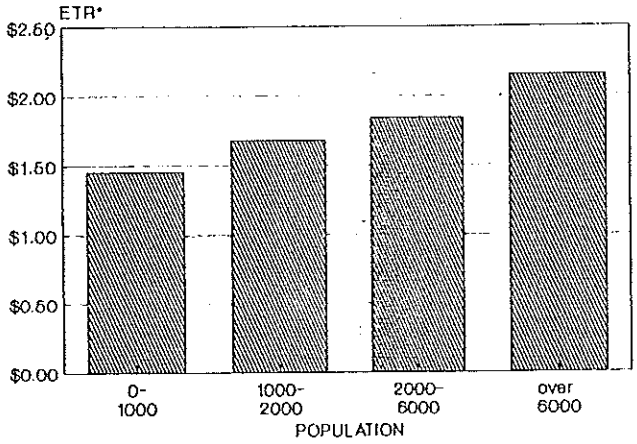
By now, it is fairly well accepted that residences cost the town. In fact, it takes about a century of property taxes on the average house to pay towns back for the schooling of two children from kindergarten through high school. Although the new foundation formula which distributes state aid to education changes the rules by buffering the impact of additional children on the school tax rate, the general trend is that tax burdens increase with population (Figures 2 and 3).

2. Population and Residential Tax Bills



* Tax bill on the average house with less than six acres; 1987

3. Population and Property Tax Rates

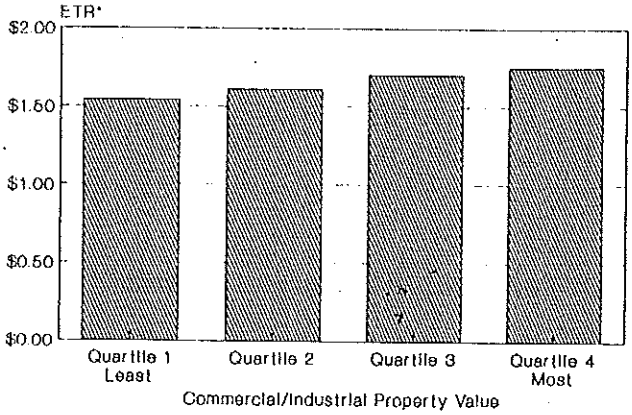


*Effective Tax Rate, 1987

To compare taxes between towns, we have used two measures: the effective tax rate, and the tax bill on the average house. The effective tax rate is the town's tax rate adjusted by the Division of Property Valuation and Review to compensate for the level of appraisal. Some people feel this measure hides the true tax burden in towns where property values are inflated. As a comparison, we also measure the tax bill on the average house (with less than six acres) in each town.

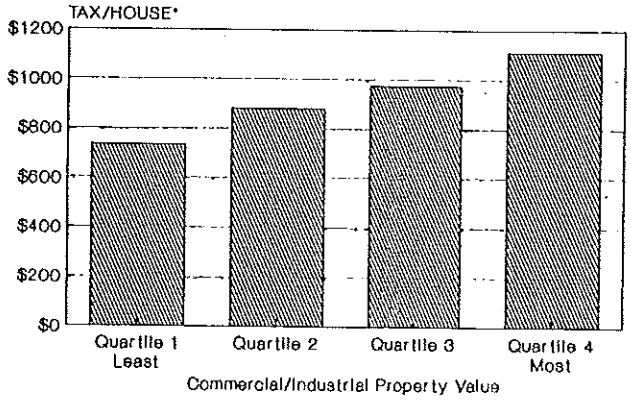
Towns have been looking instead for growth which does not add school children: industrial, commercial, or vacation properties. These childless developments would pay school taxes without increasing school costs. Because school taxes represent, on the average, about two thirds of the total tax bill, this contribution would be substantial, or so the thinking goes. However, the general trend is: the more commercial and industrial property value in a town, the higher the total tax burden (Figures 4 and 5).

4. Property Tax Rates and the Value of Commercial/Industrial Property in Town



*Effective Tax Rate, 1987

5. Property Tax Bills and the Value of Commercial/Industrial Property in Town



*Tax on the average house with less than 6 acres, 1987

Development and the School Tax Rate

In Monkton, the planning commission held a public meeting to discuss the economics of growth. Citizens guessed what would happen to their school tax rate if a commercial development, assessed at $10 million, moved into town. There was a wide range of guesses, but most people estimated the effect would be quite substantial.

Those who were fairly knowledgeable about their town taxes quickly calculated that, at the town's effective school tax rate of $1.33, the development would bring in $133,000 in taxes, equivalent to one quarter of the town's share of the school budget. They guessed the tax rate would drop by more than 20 percent.

One cynic in the audience said the tax rate would never go down. "The state will take away all the extra," she said. Her guess was the closest of all. Because the town is heavily dependent on state aid, the addition to the Grand List would result in a $126,000 reduction in state aid. The $10 million development would only lower the school tax rate by one and one half cents.

And this discussion hadn't moved on yet to the other fiscal impacts — the costs of road maintenance, sewage treatment, water, police, fire protection, and the school addition required when more people with children move in to work at the new enterprise. With all those costs figured in, the municipal portion of the tax rate would increase. The net result would be taxes would go up — not down — if the new development materialized.

Monkton is not a special case. In the 180 towns which are "on the formula" (that is, they receive foundation aid to education), the amount of school taxes gained from a development will be matched by an opposite and approximately equal reduction in state aid. Only towns which already have a large grand list per pupil and which are not receiving formula aid will see a net gain equal to all the school taxes paid by a development. The state-aid formula was not designed to influence land use planning; its purpose is to ensure equal opportunities to a basic education, or to "allow a typical school district to provide each of its elementary pupils with an education meeting the requirements of the state board for approval of public schools."

Of course, the formula for state aid is a creation of the legislature and subject to change. The coefficients are adjusted annually and the formula itself may be reconstituted at any time. The ability of the state to meet its financial commitments has proven somewhat erratic. However, as long as schools are funded through the local property tax and state aid is based on the principle of assuring that children in property-poor towns receive funding for education, the effects will follow the patterns outlined here.

Development and the Municipal Tax Rate

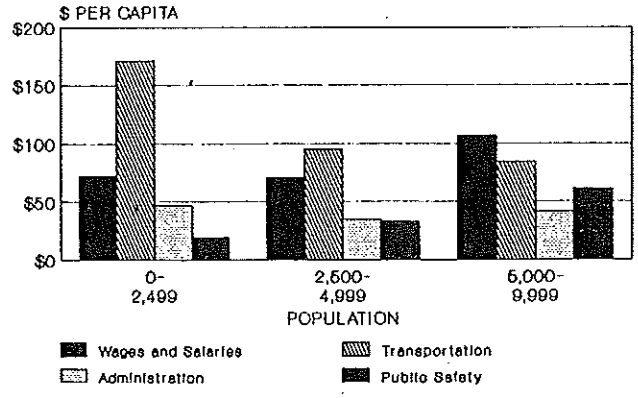
The other costs of development are paid for through the municipal tax. The reasons why nonresidential developments might raise the municipal tax rate would vary from town to town and from development to development. However, a generalization can be made: the more commercial and industrial development in a town, the higher the municipal taxes.

IBM's presence in Essex Junction has been an object of municipal jealousy. Yet the average residence in Essex Junction pays one of the highest tax bills for municipal services in the state ($523 for services in 1987).

"We're certainly blessed to have I.B.M. here," said William Dugan, Essex Junction village manager, "but we have a lot of costs to go along with it." He listed the following costs and problems local residents have to accept along with commercial and industrial development: additional traffic; a change in the character of the community; additional costs for water, sewer, roads and drainage; hazardous chemicals and other pollutants.

Some municipal budget items are influenced by economies of scale, and per capita costs actually decrease as the town grows. According to census data, the per capita costs of highways and financial adminstration decrease as town population increases (Figure 6).

6. Per Capita Costs for Some Municipal Services In Vermont Towns

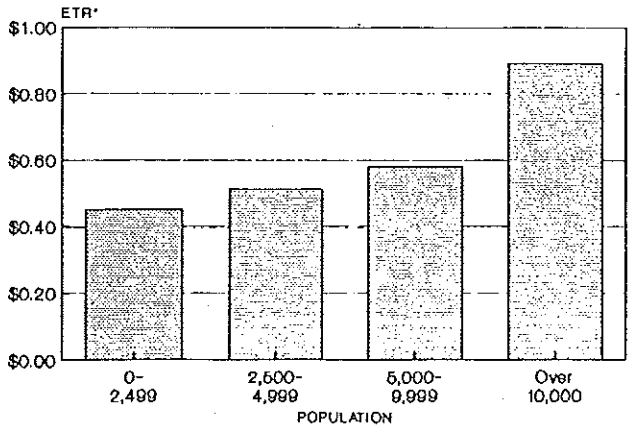


Draft Data: 86-87 Census of Governments

However, other per capita expenses, such as employee wages increase, and new services are added to the budget. For example, consider police. Most small towns don't have local police forces at all, while all the largest towns do. Among those towns which have police forces, the more commercial development in town, the higher the police budget and the higher the taxes needed to fund it.

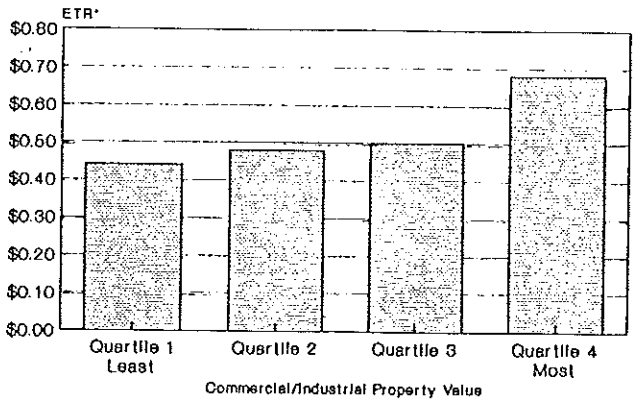
Although the general pattern is that municipal tax bills are higher in towns with larger populations (Figure 7) and more commercial and industrial development (Figure 8), there is a great deal of variation. Towns in which growth would be most likely to have apositive effect are those which have already invested in the infrastructure and services needed to accomodate the development.

7. Municipal Tax Rate and Population



*Municipal Effective Tax Rate 1987
(Does not include school tax)

8. Municipal Tax Rate and the Value of Commercial/Industrial Property



* Municipal Effective Tax Rate 1987
(Does not include school tax)

Higher Tax Bills, Higher Income?

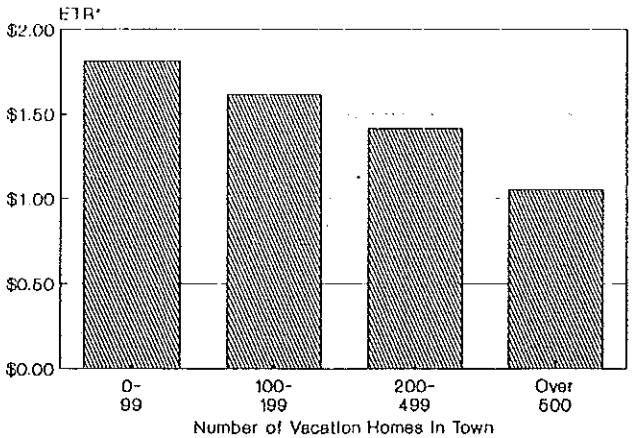
Many people have argued that high tax bills may reflect success. The income of the voters is high enough that they choose to have many extra services and public facilities, such as hockey rinks, swimming pools and a new town office. An examination of the fifty towns in which the average residential tax bill is the highest shows this may be true in some cases, but not all. In some of the towns at the top of the list, such as Charlotte and Shelburne, residents have high incomes as well as high tax bills, indicating they are willing and able to tax themselves. But the list of high tax towns also includes towns where the average income is not high: Brattleboro, Winooski, Burlington, Bennington, Fairfield, St. Albans, Barre, and Springfield.

This comes as no surprise to many residents and officials of the more urban areas in Vermont. While the foundation formula seeks to equalize the disparity in school tax rates by distributing education aid to towns which would have to have high school tax rates, there is no consideration of the municipal tax burden. As a result, even after the equalizing of the foundation formula, the total tax bill (combining the school tax and the municipal tax) on the average residence tends to be highest in the most heavily populated areas.

Vacation Homes

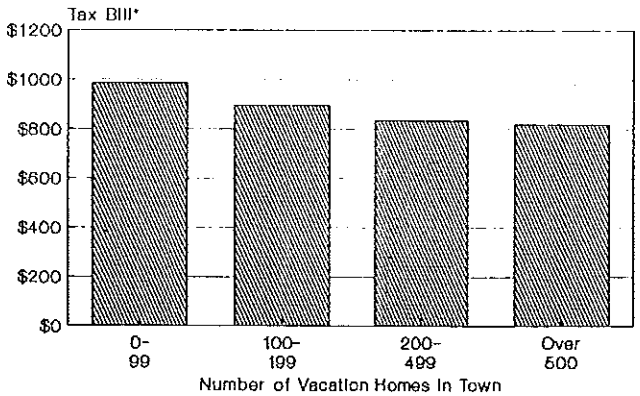
Vacation homes break all the rules. In general, towns with a large percentage of their Grand List in the "vacation" category have the lowest tax rates (Figure 9). Even though the road commissioner may grumble about the flatlanders who demand the ruts be removed from the roads in mud season, vacation homes generally pay more in taxes than they require in the way of town services. In the 50 towns with the highest ratio of vacation homes to year-round homes, the average tax bill on a house is $646 — about two-thirds of the state average (Figure 10).

9. Vacation Homes and Tax Rates



*Effective Tax Rate, 1987

10. Vacation Homes and Residential Tax Bills



*Tax on Average House with Less Than Six Acres, 1987

Most of the towns which have a high proportion of vacation homes do not receive foundation aid because they can raise all their school taxes with a relatively low tax rate. These towns will see the full benefit of the taxes of each additional vacation home. For example, in one of these towns with a tax rate of $1.25, a $200,000 vacation home would bring in $2,500 in taxes.

While vacation homes seem like the perfect development, there are some drawbacks to recognize. First, the towns which do not have mountains, lakes or other tourist attractions will find it difficult to lure in a major second-home development.

Second, vacation homes may not bring the same tax benefits to all towns. In the more average towns which are on the formula, there would be little benefit to a new development of vacation homes. In general, the school taxes which the vacation home paid would be offset by a loss in state aid. If, for example, a vacation home paid $2,500 in taxes to a formula town, the town would lose about $1,750 in state aid.

Third, vacation homes tend to raise the value of property in town. These higher values mean, to the formula at least, that the town is "richer" and needs less state aid. To compensate for the loss in state aid due to rising land values, the tax bills will increase.

Finally, the town's profit could be affected if the state were to adopt one of the many proposals to levy a state tax on second homes. Some of these proposals call for a state tax in addition to the local tax, so the local tax collections would not be affected. Others, however, call for the school tax on second homes to be collected by the state — not the town — and redistributed to all towns through the foundation formula.

Final Word

If there is a general rule, it is that many common assumptions about the impact of developments on taxes may be wrong. While it is impossible to calculate future tax rates exactly, the workbook is designed to help people analyze the fiscal situation in their town and compare the likely tax consequences of various land use options.

The workbook contains step-by-step explanations, detailed tables of data, and worksheets to help you estimate changes in capital and operating costs and changes in the tax rate. It is available for $5.00 from:

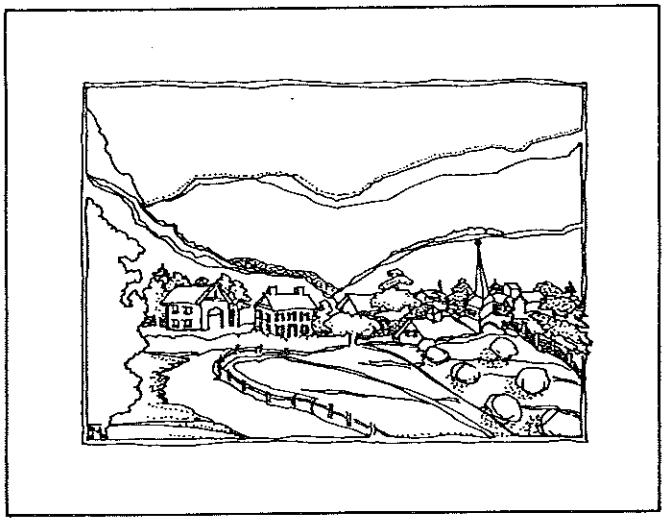
VLCT
52 State Street
Montpelier, VT 05602

VNRC
9 Bailey Avenue
Montpelier, VT 05602

A joint project of VNRC and VLCT with a grant from the Windham Foundation, prepared by Deb Brighton and Jim Northup of Ad Hoc Advocates, RD1 Box 319, Salisbury, VT 05769 (802-352-9074).

The Tax Base and The Tax Bill

Tax Implications of Development: a Workbook



Vermont League of Cities and Towns

Vermont Natural Resources Council

This project was jointly sponsored by the Vermont League of Cities and Towns (VLCT) and the Vermont Natural Resources Council (VNRC). They were assisted by a generous grant from the Windham Foundation.

Copies of the "Workbook" can be obtained for $5.00 from:

VLCT
52 State Street
Montpelier, VT 05602
(802) 229-9111

VNRC
9 Bailey Avenue
Montpelier, VT 05602
(802) 223-2328

The report was researched and prepared by Deb Brighton and Jim Northup of Ad Hoc Advocates, a consulting firm specializing in environmental analysis and planning. Please direct any questions, corrections or suggestions to them at RD 1 Box 319, Salisbury, VT 05769 (802-352-9074).

Illustrations were done by Marna Grove, Pencil Mill Graphics, Castleton, VT 05735 (802-273-2069).

THE TAX BASE AND THE TAX BILL
The Tax Implications of Development:
A Workbook

TABLE OF CONTENTS

(Note: Tables A, B and C are not included as a standard part of this workbook; they must be requested from VLCT or VNRC. Your request must indicate which county you are interested in.)

LIST OF WORKSHEETS

LIST OF TABLES

THE TAX BASE AND THE TAX BILL
Tax Implications of Development:
A Workbook

1.0 HOW TO USE THIS WORKBOOK

1.1 Scope

This workbook was prepared to help public officials and citizens in Vermont project the direct costs and revenues associated with proposed developments in their towns and estimate the effect on the tax rate. It should be used for rough estimates for planning purposes, rather than for detailed or exact fiscal analysis.

The workbook will give a reasonable estimate of a new tax rate rather than a precise answer. We recommend preparing several estimates by varying the assumptions -- such as the number of children per house, or the costs of facilities and services -- so that you calculate a range of possible tax rates.

Only direct costs and revenues are covered. Direct costs include governmental expenditures caused by a proposed development and not those caused by other connected developments. Indirect costs -such as changes in adjacent property values, adjacent land uses, employment, income -- are important to consider but almost impossible to predict accurately. For the most part, they are not covered in this workbook.

Many towns have capital plans which will help them anticipte the capital facilities which will be needed when certain types of growth occur. Although the workbook would be most useful in towns which already have these plans, the information and methodology also may help other towns begin their capital planning.

This workbook focuses on the property tax. Some towns will pay for certain facilities through user fees or through impact fees. These will not be covered in this workbook.

1.2 How the Property Tax Works

The property tax basically works like this: The town's budget is divided among all property owners in town in proportion to the value of their taxable property.

The town appraises all taxable property and compiles a list, called the Grand List, which actually includes one percent of the value of each parcel. The total Grand List, then, represents one percent of the value of all taxable property in town.

The voters decide on the budget. Town officials then divide the budget by the Grand List to calculate a tax rate. The tax rate is used to calculate each property owner's tax bill.

Example: Calculating the tax rate in a town with a Grand List of $400,000 and a budget of $500,000. Assumes no other revenue than property taxes.

Town Budget: $500,000
Total value of taxable property in town: $40,000,000
Grand List: $400,000 ($40,000,000 / 100)
Tax Rate: $1.25 ($500,000 / $400,000)
Tax Bill on $100,000 house: $1,250 ($1,000 x $1.25)

Development, growth, zoning, and conservation purchases can affect both the budget needed to run the town, and the value of the property which will pay for the budget. Without considering federal and state aid or hidden costs, if something increased the Grand List without increasing the budget, the tax rate would go down and tax bills would be lower. If, on the other hand, the budget increased but the Grand List did not, the tax rate and tax bills would go up.

Most changes in a town will affect both parts of the equation: the budget and the Grand List. It is important to estimate the net result.

Example: A development worth $10 million, which would need $10,000 worth of municipal services moves into town:

New Town Budget: $500,000 + $ 10,000 = $510,000
New Grand List: $400,000 + $100,000 = $500,000
New Tax Rate: $1.02 , down 18%
New Tax Bill on $100,000 house: $1,020, down $230

This picture is considerably different in towns which receive state aid to education. Part of the budget is shared between the town and the state, and gains or losses caused by development are often offset by gains or losses in state aid.

This simple analysis is complicated further by differences in assessment levels. Because towns don't reappraise each year, the values in the Grand List will not keep up with inflation, and the changes in the tax rate may appear exaggerated and uneven.

In this workbook, to get a true picture of what is happening, all values will be fair market value. The state's figures for the Equalized Grand List (adjusted to 100 percent of fair market value) and the effective tax rate (calculated by dividing the budget by the Equalized Grand List) will be used. These figures are published annually by the Department of Property Valuation and Review.

When you are looking at the effect a development would have on your town's tax rate, it is important to compare the present effective tax rate (budget divided by Equalized Grand List) with the effective tax rate calculated in these worksheets.

There are two basic components of the tax rate: the school rate and the municipal rate. On the average, school taxes comprise about two thirds of the total, although municipal taxes become more and more important as towns grow.

Each of these components has two parts: operating costs, and capital expenditures. To evaluate the effect of growth and development, this workbook will consider each component separately.

The first step is to estimate the new budget for each of the four components. The second step is to calculate a new equalized Grand List, and to divide it into the budgets to come up with a tax rate.

1.3 The Worksheets and Data Tables

Seven worksheets were designed to help you estimate the effects of proposed land use changes on your local budgets and tax rates. Blank worksheets are included in the text; examples of completed worksheets are available upon request.

SUMMARY OF WORKSHEETS

1: Estimating Change in School Operating Budgets
2: Estimating Minimum Aid
3: Estimating Supplemental Aid for Above Average Expenditures
4: Estimating School Capital Budgets
5: Estimating Municipal Operating Budgets
6: Estimating Municipal Capital Budgets
7: Estimating the New Effective Tax Rates

1.4 About the Numbers

Many proposed developments will be phased in over several years, thus spreading the costs over time. This workbook is designed to help you tally the direct costs and revenues that would result as if the development were fully completed and operating today.

This approach assumes the relationship between costs and revenues will not change much over time since both will rise at approximately the same rate due to the effects of inflation.

To compare costs and revenues from different years, you must convert them to a constant base year to neutralize the effects of inflation. The worksheets in this book use 1989 dollars. To convert dollar values from other years to 1989 dollars, refer to Table D.1.

2.0 ESTIMATING SCHOOL BUDGETS

2.1 Overview

Schools are the biggest budget items, making up about two-thirds of the property tax in most towns -- even after state aid has been subtracted. On average, state funds cover one third of the local school expenses. Because of this, it is important to estimate total school costs, to estimate the state aid, and then to calculate the amount that will be raised by property taxpayers in town.

This must be done separately for operating costs and capital costs. Before beginning, gather information from your town's latest budget about actual school costs, and separate these into operating costs and capital costs.

2.2 Estimating School Operating Budgets

Here are the steps for estimating the change in school operating budgets caused by new developments. Worksheets for you to use and completed examples accompany this explanation.

RECOMMENDATION

Before you complete Worksheet 1, see Table B to determine if your town is on the formula now and will be after the development you are analysing.

If your town is on the formula now, and will be on the formula after the development, it is reasonable to skip Worksheet 1 and assume the operating portion of your school tax rate will not change. Look up your present school operating tax rate (Table C) and write it in on Worksheet 7, Line 6.

If your town will not be on the formula after the development, you will not receive Foundation Aid but you may be eligible for Minimum Aid. Use Worksheet 2 to see if you will receive Minimum Aid. If so, begin Section C of Worksheet 1 at Line 18 (Minimum Aid). If you will not receive either Foundation Aid or Minimum Aid, skip Section C of Worksheet 1 entirely.

The following sections correspond with steps A through D of Worksheet 1:

A. Estimate New Equalized Grand List

The new development will add value to your Grand List. Estimate the new value of the development and divide this by 100 to estimate the equalized listed value. Because this parcel was already paying taxes (before it was developed) you should also subtract its undeveloped value. Add the net amount to your Equalized Grand List (Table C).

B. Estimate New School Operating Budget.

The best way to estimate the new operating budget is to calculate the cost of educating a student now and multiply this by the number of new students in the school after the development. Although the per student cost increases somewhat unevenly -- jumping when a grade needs a new teacher, for example -- the average cost is fairly uniform in the state over all sizes of schools.

For long-term planning, either the town's average cost or the state average cost would be the best numbers to use. From your school board or town annual report, look up the total budget and subtract capital expenditures. This will give you the current school operating budget. Divide this by the number of students, and you will have the current per pupil operating cost. Table C lists the estimated 1989 operating cost per student in each town.

C. Estimate State Aid

In many towns, the state shares the cost of education with the town. In those towns, the school tax rate does not change significantly with development.

Here's why. The foundation formula was designed to ensure that each town was capable of raising enough money per child to provide an adequate education without overtaxing. The state determines the amount it costs to provide a basic education for one child. In 1989 it was $3300 per elementary student and $4125 per secondary student. It then multiplies this by the number of school children in the town and comes up with "Foundation Need." If your town spent the average amount, the state's calculation of Foundation Need should be the same as your calculation in step B.

The state also determines an average school tax rate -- $1.17 in 1989. It then calculates the amount the town should be able to raise for education by multiplying $1.17 by the Equalized Grand List. This amount is called the "Foundation Levy." If that is not enough to cover the Foundation Need, the state chips in and pays the difference.

Example: A town with 100 elementary and 126 secondary students and $40 million in taxable fair market value. (Grand List is 1 percent of this value, or $400,000)

Foundation Need:	100 x $3,300	= $330,000
	126 x $4,125	= $519,750
	Total	= $849,750
Foundation Levy:	$400,000 x $1.17	= $468,000
Foundation Aid:	$849,750 - $468,000	= $381,750

Budget to be raised from property tax:
$849,750 - $381,750 = $468,000
School tax rate: $468,000 / $400,000 = $1.17

Example: The same town with a new $10 million commercial development which does not add school children:

Foundation Need:	100 x $3,300	= $330,000
	126 x $4,125	= $519,750
	Total	= $849,750
New Grand List:	$400,000 + $100,000	= $500,000
Foundation Levy:	$500,000 x $1.17	= $585,000
Foundation Aid:	$849,750 - $585,000	= $264,750 (down $117,000)

Budget to be raised from property tax:
$849,750 - $264,750 = $585,000 (up $117,800)
School tax rate: $585,000 / $500,000 = $1.17 (no change)

The examples above were simplified and there are many factors which would make the results slightly different in each town.

THE BASIC RULE

For towns that will remain on the formula there will be little, if any, change in the operating portion of the school tax rate from development. For long range planning, we recommend assuming the effects of a development on the operating portion of the town's school tax rate will be minimal, as long as the town remains on the formula.

The state also pays a small amount of Supplemental Aid for towns which spend more per student than the state average. If your town consistently spends more than the average amount per student and you believe this will continue, you may want to calculate Supplemental Aid using Worksheet 3.

D. Estimate the Amount to be Raised from the Property Tax

Subtract the State Aid from the New Operating Budget.

WORKSHEET 1

ESTIMATING CHANGE IN SCHOOL OPERATING BUDGETS

A. Estimate New Equalized Grand List

* Old Equalized Grand List (Table C)		_____	(1)
+ 1% value of new development	+	_____	(2)
- 1% value of the same parcel before	-	_____	(3)
= New Equalized Grand List	=	_____	(4)

B. Estimate New Budget

Per Pupil Cost (Table C)		_____	(5)
x Number of students after new development (See Table C for current # students, and Tables E.1 and E.2 for avg. pupils/home)	x	_____	(6)
= New Operating Budget	=	_____	(7)

C. Estimate New State Aid For Towns on the Formula

1. Foundation Need:

Number of students after the new development		_____	(8)
x Town's Per Pupil Weight (Table C)	x	_____	(9)
= Weighted Students		_____	(10)
x State's Foundation Cost	x	3300	(11)
= New Foundation Need		_____	(12)

2. Foundation Levy:

New Equalized Grand List (Line 4)		_____	(13)
x Town's Foundation Tax Rate (Table C)	x	_____	(14)
= New Foundation Levy		_____	(15)

3. State Aid:

New Foundation Need (Line 12)		_____	(16)
- New Foundation Levy (Line 15)	-	_____	(17)
= New Foundation Aid (or Minimum Aid)	=	_____	(18)

(If the amount calculated for Foundation Aid is less than $150 per weighted student, the town may be eligible for Minimum Aid instead. Use Worksheet 2 to calculate this amount)

(+ Supplemental Aid for Operating Expenses optional calculation; see Worksheet 3)	(+	_____	)(19)
= Total State Aid for Operating Expenses	=	_____	(20)

D. Estimate Amount to be Raised from the Property Tax

New School Operating Budget (Line 7)		_____	(21)
- State Aid for Operating Expenses (Line 20)	-	_____	(22)
= Amount to be raised from property taxes	=	_____	(23)

WORKSHEET 2

ESTIMATING MINIMUM AID

Only towns which receive less than $150 per student in New Foundation Aid (Worksheet 1, Line 18) should fill this out.

A. Determine whether town is eligible for Minimum Aid

Foundation Need (Worksheet 1, Line 12)		(1)
x 1.5	x 1.5	(2)
= 150% of Foundation Need	=	(3)
- Foundation Levy (Worksheet 1, Line 15)	-	(4)
= Minimum Eligibility Factor	=	(5)

(If the factor is negative, the town is not eligible for Minimum Aid. If the factor is greater than 0, the town is eligible for Minimum Aid; go to next section.)

B. Estimate Minimum Aid

Weighted Students (Worksheet 1, Line 10)		(6)
x $150 per Weighted Student	x $150	(7)
= Minimum Aid	=	(8)

(If this amount is greater than the amount calculated for Foundation Aid in Worksheet 1, write this amount on Line 18 of Worksheet 1. You will not get both Minimum Aid and Foundation Aid.)

WORKSHEET 3

ESTIMATING SUPPLEMENTAL AID FOR ABOVE AVERAGE EXPENDITURES

Some towns spend more per pupil than the state average. Supplemental Aid is available as a partial match for these above average expenses for instruction if the town is on the formula.

In general, we do not recommend calculating this aid as a part of long term planning for two reasons: the amount of aid is small, and town instructional spending tends to fluctuate in relation to the average, so that towns which receive aid one year may not the next.

However, if your town has made a conscious commitment to spend more than average and you expect this to continue, or if you would like to calculate a tax rate which compares exactly with the 1989 tax rate, you may want to fill this out.

A. Estimate Foundation Aid Ratio

Foundation Aid (Worksheet 1, Line 18)		(1)
÷ Foundation Need (Worksheet 1, Line 12)	÷	(2)
= Foundation Aid Ratio	=	(3)

B. Estimate Supplemental Spending

Number of students after the development		(4)
x State's calculation of Above Average Per Pupil Spending (Table C)	x	(5)
= Town total Supplemental Spending	=	(6)

C. Estimate Supplemental State Aid

Town Supplemental Spending (Line 6)		(7)
x 0.5 (50% of Supplemental Spending is eligible for aid)	x 0.5	(8)
= Supplemental Spending eligible for aid	=	(9)
x Foundation Aid Ratio (Line 3)	x	(10)
= Supplemental Operating Aid	=	(11)

(This figure should be entered on Worksheet 1, Line 19)

2.3 Estimating School Capital Budgets

The best way to figure out whether you will need a new school or a school addition if a certain development were to come in is to talk with school officials. If the new development does not require a capital expenditure, but the town is already paying for a building or addition, its still important to complete Worksheet 4. The new development will spread the capital cost over more people; it will also change the state's reimbursement.

If the development will require a school addition, a new school, or remodeling, here is some information for making a rough estimate of the cost using average figures distributed by the Vermont Department of Education in 1989.

First, approximate the size of school facilities you will need. If your town knows exactly the size of the addition it will need, use that figure. Otherwise, use the following standards which include classroom space plus other rooms:

Elementary:	91 S.F. (square feet) per student
Middle School:	116 S.F. per student
High School:	153 S.F. per student

Estimate the construction, site work, and waste treatment costs (Tables G.1 and G.2) based on the square foot estimate, unless you have specific information. Note that smaller buildings and special education facilities cost more, and adjust accordingly.

Example: A community needs a new elementary school (K-6) that will accomodate another 210 students. They would like 500 square feet of the total to be for special education.

210 pupils	x 91 S.F./pupil=	19,110 S.F.	total
500 S.F.	x $72.05/S.F.	= $ 36,025	for special education
18,610 S.F.	x $65.50/S.F.	= $1,218,955	for general facilities
19,110 S.F.	x $ 7.00/S.F.	= $ 133,770	for site work
19,110 S.F.	x $ 2.50/S.F.	= $ 47,775	for waste treatment
		$1,436,525	TOTAL COST

All towns can receive state capital construction aid equal to 30% of the total eligible construction cost. If you want detailed information about what costs and what types of facilites are eligible, refer to Capital Outlay Financing, published by the Department of Education. For rough estimates, we recommend adding 10% to the Annual Eligible Capital Payment in Worksheet 4 to cover ineligible costs and furnishings.

Towns which receive Foundation Aid (Worksheet 1, Line 18) are also eligible for state aid to reduce their annual capital debt payments. Use Worksheet 4 to estimate the state aid and the town's annual payments for school capital construction.

WORKSHEET 4

ESTIMATING SCHOOL CAPITAL BUDGETS

A. Estimate Annual Payments for New Capital Construction

New School Capital Construction Cost		(1)
x 70% (state pays 30%; town pays 70%)	x 0.7	(2)
= Town's share of eligible capital cost	=	(3)
x Factor to calculate annual payment (assumes 8% interest for 20 years)	x 0.102	(4) 1/
= Payment/year on new eligible construction	=	(5)
+ Eligible Capital Payment on Existing Debt (Table C)	+	(6)
= Total Annual Eligible Capital Payment	=	(7)

B. Estimate State Aid for Indebtedness

Foundation Aid (Worksheet 1, Line 18)		(8)
÷ Foundation Need (Worksheet 1, Line 12)	÷	(9)
= Foundation Aid Ratio	=	(10)
x Annual Eligible Capital Payment (Line 7)	x	(11)
= State Aid for Indebtedness	=	(12)

C. Estimate Amount to be Raised by the Property Tax

Annual Eligible Capital Payment (Line 7)		(13)
(x 1.1 to Cover Ineligible Costs; Optional)	(x 1.1	(14)) 2/
= Total Annual Capital Payment	=	(15)
- State Aid for Indebtedness (Line 12)	-	(16)
= Capital Budget to be Raised from Taxes	=	(17)

NOTE: 1/ Table D.2 displays factors for other rates and terms.

2/ We recommend adding an amount equal to 10% of the Total Annual Eligible Capital Payment to account for additional capital costs which do not meet the state's eligiblity requirements. This is optional.

3.0 ESTIMATING MUNICIPAL BUDGETS

3.1 Overview

New developments often place demands on municipal services such as roads, water systems, wastewater treatment, police and fire protection, recreation, and general administration. Some of these services are paid for through the property tax; others are funded through user fees. This section of the workbook will give you a framework for estimating the additional municipal costs, and help you calculate the effect of the new development on the municipal portion of the tax rate. It will not cover calculating user fees or impact fees.

Before beginning, look at your town's most recent budget and separate each department (fire, water, police, general administration, etc.) into two categories: operating costs and capital costs.

3.2 Estimating Municipal Operating Budgets

The most commonly used method of estimating a new operating budget is to look at the average per capita cost now, assume the relationship will continue, and multiply it by the anticipated population. For example, if a town presently spends $5 per capita for recreation and a new development will bring 500 more people then the increased cost of recreation would be $2,500 using a per capita approach.

The cost of the recreation program and general administration can be reasonably estimated on this per capita basis. Other operating budgets, such as fire protection and police protection, may depend more on the value of the property in town than on the population. We found that in Vermont, the cost of the police operating budget is more closely correlated with the equalized value of commercial property than with population. This makes sense: a town needs police and fire protection for its nonresidential development as well as for its population.

Road costs depend on the number of miles as well as the average daily traffic and the type of traffic. State aid for highways depends on the number of miles of Class I - III roads.

Water and wastewater costs are generally estimated on a gallons-per-day basis. Tables I.1 - I.2 help you estimate water usage of developments.

Calculating Average Unit Costs for Your Town

To calculate your town's average unit costs add up each municipal service's total annual operating costs and divide by the total units that were serviced. To estimate the increases in operating costs that would result from a proposed development multiply the average unit costs by the development's projected demands for those units. Worksheet 5 will help you organize the results.

This average costing approach assumes the present levels of government service are desirable, present expenses reflect the long-term average costs of providing those service levels, and the new development will not require different or proportionately greater levels of service than what is presently provided. Often these are reasonable assumptions, but not always. You may want to use other information.

For example, if a one-person-police-department town needed to double its police force to cope with a new development, the operating budget would nearly double even though the population would increase only slightly. In this case, the average costing approach would underestimate the real cost.

In some cases, one year's budget will not be an adequate basis for calculating average unit costs because of some unusual expenditure or revenue. It may be appropriate to look at records from several years, adjusted to 1989 dollars (Table D.1), to smooth out the lumps.

You may also find your town has been getting by with programs which will definitely not be adequate for a larger town. For example, it may be necessary to open the library every day, run an organized recreation program, or hire staff people to take over jobs previously done by volunteers. In these situations, using the average per capita cost would underestimate the necessary expenses and you should estimate the operating budget by comparing your situation with that of other towns.

Using Average Unit Costs from Other Towns

The average unit costs of providing various municipal services in other towns are contained in Tables E and F. The information has been gathered from national, regional and state sources, and organized by size of municipality.

Most per capita costs swell as the town grows. Vermont data as well as data from the Northeast as a whole show the per capita costs of recreation, police, fire, and general government increase as population increases. This is due to many factors: the need for more sophisticated infrastructure to handle more people, greater demand for public services, higher wages, and the demand for new public services where private or volunteer services used to suffice.

Because these were produced by averaging the budgets of many, widely differing municipalities the results are unlikely to mirror your town's present situation. For the same reason, they may provide more accurate long-term, average costs than a few years of local budget data. If you use these tables, pick the data that best seems to fit your town and apply them cautiously.

Sources of information and notes on how to interpret and use the data are found at the bottom of each table. More detailed and complete information can be obtained by consulting the source document or the Sources of Information (pages 20-21).

WORKSHEET 5

ESTIMATING MUNICIPAL OPERATING BUDGETS

(Administration)

Current Total Cost		_____
÷ Current # of Units	÷	_____
= Average Cost/Unit	=	_____
x Estimated # of Units	x	_____
= Estimated Total Cost	=	_____
- Non-Prop Tax Revenues	-	_____
= Property Taxes Needed	=	_____

(Police Protection)

Current Total Cost		_____
÷ Current # of Units	÷	_____
= Average Cost/Unit	=	_____
x Estimated # of Units	x	_____
= Estimated Total Cost	=	_____
- Non-Prop Tax Revenues	-	_____
= Property Taxes Needed	=	_____

(Fire Protection)

Current Total Cost		_____
÷ Current # of Units	÷	_____
= Average Cost/Unit	=	_____
x Estimated # of Units	x	_____
= Estimated Total Cost	=	_____
- Non-Prop Tax Revenues	-	_____
= Property Taxes Needed	=	_____

(Class ___ Roads) 3/

Current Total Cost		_____
÷ Current Total Miles	÷	_____
= Average Cost/Mile	=	_____
x ADT Weight 4/	x	_____
x # of Affected Miles 5/	x	_____
= Cost of Affected Roads	=(	_____)
# of Unaffected Miles		_____
x Average Cost/Mile	x	_____
= Cost of Unaffected Rds	=(	_____)
Estimated Total Cost		_____
- Non-Prop Tax Revenues	-	_____
= Property Taxes Needed	=	_____

(Parks and Recreation)

Current Total Cost		_____
÷ Current Population	÷	_____
= Average Cost/Person	=	_____
x Estimated # People	x	_____
= Estimated Total Cost	=	_____
- Non-Prop. Tax Revenues	-	_____
= Property Taxes Needed	=	_____

(_____) 1/

Current Total Cost		_____
÷ Current # of Units	÷	_____
= Average Cost/Unit	=	_____
x Estimated # of Units	x	_____
= Estimated Total Cost	=	_____
- Non-Prop. Tax Revenues	-	_____
= Property Taxes Needed	=	_____

(_____) 1/

Current Total Cost		_____
÷ Current # of Units	÷	_____
= Average Cost/Unit	=	_____
x Estimated # of Units	x	_____
= Estimated Total Cost	=	_____
- Non-Prop. Tax Revenues	-	_____
= Property Taxes Needed	=	_____

(Other Municipal Services) 2/

Property Taxes Needed _____

(All Other Roads) 6/

- Non-Prop. Tax Revenues	-	_____
= Property Taxes Needed	=	_____

TOTAL TO BE RAISED FROM PROPERTY TAX _____

1/ Fill out for other municipal services.
2/ If needed, estimate costs of other services separately and total.
3/ Fill this out only for the affected class of roads.
4/ ADT Weight = Projected ADT/Existing ADT of heavy trucks; see tables.
5/ Affected Miles = New Miles or Mileage with increased traffic
6/ Fill this out for all other road classes in town.

3.3 Estimating Municipal Capital Budgets

A town frequently discovers a development adds just enough traffic or people to require a new piece of equipment, a new facility, a new road intersection, or a new building.

Often, the new development which triggers the capital investment is only "the straw which breaks the camel's back," and the total cost of the new facility should not be attributed to that development. Until new users move into town, however, present residents must pay the annual debt service. When new users arrive they will share the annual debt service payment and will bring the unit costs down until the excess capacity is used up and another facility is required. Unless a special system of user charges or impact fees is created, present taxpayers end up paying for benefits that will accrue to future residents.

Worksheet 6 and tables in the appendix of this workbook will help you make ballpark estimates of some common capital investments, but actual costs may vary widely from those estimates due to differences in local conditions and final design. Nevertheless, rough estimates are helpful when gauging a development's impacts, analyzing alternative growth scenarios, or doing long-range capital planning and budgeting.

A. Estimate the Need for a New Facility

Ask the local experts in charge of each facility to tell you the capacity of the facility, the present operating level, and the amount of capacity that is obligated but not yet used. Estimate the additional demand from the proposed development by talking with your local experts or by using the tables in this workbook.

B. Estimate the Cost of the New Facility

If little or no surplus capacity remains, estimate the size of the additional facility you will need to build or purchase by talking with your local experts, and referring to the general service standards (tables by topic) and to your capital plan. New public facilities are usually built with more capacity than is needed to satisfy present demand, in anticipation of future growth. Although the total capital investment is greater for larger facilities, the unit costs are often lower making the purchase of some excess capacity a smart investment.

After you have determined the size of the facility, you need to estimate the cost. Although there are tables in the appendices for coming up with a rough estimate, it would be helpful to make your own estimates by talking with people in neighboring towns or with local experts or state officials. The tables in this workbook are based on national, regional and state averages for facilites of various size and type. To estimate capital cost, the total size or capacity of the needed facility is multiplied times the average unit costs (tables by topic). Remember to adjust historic costs to a current base year (Table D.1).

C. Calculate the Annual Payments

To calculate the annual payments, you first must subtract any non-property tax revenues which can be used to pay for the facility's construction. These may include federal, state or local capital funds.

The town will probably need to bond to pay for the remaining costs of the facility. Worksheet 6 assumes financing for 20 years at 8% interest, but you can calculate alternate arrangements using Table D.2.

Some or all of the annual payments may be covered by impact fees or user fees. Subtract the amount collected annually from these fees to determine the amount to be paid for through the property tax.

WORKSHEET 6

ESTIMATING MUNICIPAL CAPITAL BUDGETS

Department: _____ Facility: _____

A. Estimate the Need for a New Facility

Designed Operating Capacity, or Service Standard, of Existing Facility			(1)
- Current Operating Level	-		(2)
- Obligated Capacity	-		(3)
= Remaining Capacity	=		(4)
- Proposed Demand	-		(5)
= Surplus or (Deficit) Capacity	=		(6)

B. Estimate the Cost of the New Facility

Size of Facility Needed			(7)
x Unit Cost	x		(8)
= Total Estimated Capital Cost	=		(9)

C. Calculate the Annual Payments

Total Estimated Capital Cost (Line 9)			(10)
- Revenues for Construction	-		(11)
= Total Amount to be Borrowed	=		(12)
x Annual Payment Factor (assumes 8% interest, 20 year term)	x	0.102	(13) 1/
= Annual Payment for New Facility	=		(14)
- Annual User Fees, Impact Fees, and Other Charges	-		(15)
= Balance to be Raised from Annual Property Tax	=		(16)
+ Annual Debt on Old Facility	+		(17)
= Total Amount to be Paid for by Property Taxes Annually	=		(18)

1/ Table D.2 contains factors for other interest rates and terms.

4.0 CALCULATING THE NEW TAX RATE

4.1 The Final Step

Here's the final step. The tax rate is calculated by dividing the amount to be raised from the property tax by the Grand List. Worksheet 7 will help you do this.

A. Projected School Tax Rate

Add the bottom lines from Worksheets 1 and 4. This will give you the projected total school budget which would be raised from the property tax. Divide this by the New Equalized Grand List (Worksheet 1, Line 4) to determine the projected school tax rate.

B. Projected Municipal Tax Rate

Add the bottom lines from Worksheets 5 and 6. This will give you the total municipal budget which must be raised from the property tax to pay for the proposed land use change. Divide this by the New Equalized Grand List to come up with the projected municipal tax rate.

C. Estimating the Tax Bill

Performing the following calculations will give you an idea of what the new tax rate would mean to an owner of a $100,000 home before and after a proposed development:

Before the development, the property tax bill would be calculated by adding the estimated effective school tax rate (Table C) to the present municipal tax rate and multiplying the sum by $1,000.

After the development, the property tax bill would equal the projected total tax rate (Worksheet 7, Line 16) times $1,000.

WORKSHEET 7

ESTIMATING NEW EFFECTIVE TAX RATES

A. Projected School Tax Rate

	New Equalized Grand List (Worksheet 1, Line 4)			(1)
x	1.05 (inflation factor to account for lag between calculation of state aid budget year)	x	1.05	(2)
=	Projected Equalized Grand List	=		(3)
	School Operating Expense to be Paid from Property Tax (Worksheet 1, Line 23)			(4)
÷	Projected Grand List (Line 3)	÷		(5)
=	School Operating Tax Rate	=		(6)
	School Capital Expense to be Paid from Property Tax (Worksheet 4, Line 17)			(7)
÷	Projected Grand List (Line 3)	÷		(8)
=	School Capital Tax Rate	=		(9)
	Total Projected School Tax Rate (Add Lines 6 and 9)			(10)

B. Projected Municipal Tax Rate

	Municipal Operating Expenses to be Paid from Property Tax (Worksheet 5)			(11)
+	Municipal Capital Expenses to be Paid from Property Tax (Worksheet 6, Line 18)	+		(12)
=	Total Municipal Budget to be Paid from Property Tax	=		(13)
÷	New Equalized Grand List (Line 1)	÷		(14)
=	Projected Municipal Tax Rate	=		(15)

C. Projected Total Tax Rate (Add Lines 10 and 15) (16)

5.0 APPENDICES

5.1 Sources of Information

Useful References Not Cited In Data Tables

GENERAL:

Burchell, R. W., D. Listokin, and W.R. Dolphin. 1985. The New Practitioner's Guide to Fiscal Impact Analysis. New Brunswick: Center for Urban Policy Research.

Burchell, R.W., and D. Listokin. 1978. The Fiscal Impact Handbook - Estimating Local Costs and Revenues of Land Development. New Brunswick: Center for Urban Policy Research.

Canter, L.W., S. Atkinson, and F.L. Leistritz. 1984. Impact of Growth - A Guide for Socio-Economic Impact Assessment and Planning. Chelsea: Lewis Publishers, Inc..

Carr, James H.. 1984. Crisis and Constraint in Municipal Finance, Local Fiscal Prospects in a Period of Uncertainty. New Brunswick: Center for Urban Policy Research.

Chicoine, D.L., and N. Walzer. 1986. Financing Local Infrastructure in Non-Metropolitan Areas. New York: Praeger Publishers.

Colman, W.G.. 1983. A Quiet Revolution in Local Government Finance: Policy and Administrative Challenges in Expanding the Role of User Charges in Financing Local and State Government. Washington: National Academy of Public Administration.

Downing, P.B., and R.D. Gustely. 1977. "The Public Service Costs of Alternative Development Patterns: A Review of the Evidence." In Local Service Pricing Policies and Their Effect on Urban Spatial Structure, edited by Paul B. Downing. Vancouver: University of British Columbia Press.

Frank, J. E.. 1989. The Costs of Alternative Development Patterns - A Review of the Literature. Washington: The Urban Land Institute.

Humstone, E., and Squires, J. 1987. Planning Manual for Vermont Municipalities, Appendix C- State and Federal Grant and Loan Programs. Vermont Department of Housing and Community Affairs.

Muller T.. 1976. Economic Impacts of Land Development - Employment, Housing, and Property Values. Washington: The Urban Institute.

Muller, T.. 1976. Fiscal Impacts of Land Development - A Critique of Methods and Review of Issues. Washington: The Urban Institute.

Real Estate Research Corporation. 1974. The Costs of Sprawl: Detailed Cost Analysis. Washington: U.S. Government Printing Office.

Small, K.A., C. Winston, and C. Evans. 1989. Road Work - A New Highway Pricing and Investment Policy. Washington: The Brookings Institute.

Stein, J.M., ed.. 1988. Public Infrastructure Planning and Management. Volume 33, Urban Affairs Annual Reviews. Newbury Park: Sage Publications.

Windsor, D.. 1979. " A Critique of the Costs of Sprawl." Journal of the American Planning Association 45 (3): 279-92.
Government Financing and Employment:

PROPERTY TAXATION:

Kieschnick, M.. 1981. Taxes and Growth: Business Incentives and Economic Development. Washington: Council of State Planning Agencies.

Netzer, D.. 1966. Economics of the Property Tax. Washington: The Brookings Institution.

Tipps, D., et al., eds. 1980. State and Local Tax Revolt: New Direction for the 80's. Washington: Conference on Alternative State and Local Policies.

Vaughan, R.J.. 1979. State Taxation and Economic Development. Washington: The Council of State Planning Agencies.

SOURCES OF DATA:

Commission on Property Taxation. 1989. Report on the Governor's Special Commission on Property Taxation, Parts 1 and 2. Montpelier: Governor's Office.

Vermont Department of Taxes. Annual. Vermont Department of Taxes Annual Report. Waterbury: Division of Property Valuation and Review.

Vermont Department of Taxes. Monthly. Property Transfer Tax System: Accumulated Year-To- Date Returns. Montpelier: Department of Taxes.

Tax Foundation. 1988. Facts and Figures on Government Finance. Baltimore: Johns Hopkins University Press.

U.S. Department of Commerce. 1984. 1982 Census of Governments. Washington: U.S. Government Printing Office. (NOTE: This census is done every five years)

Groups That Can Help

Regional Planning Commissions
- Addison County..... 388-3141
- Bennington County..... 375-2576
- Chittenden County..... 658-3004
- Franklin-Grand Isle..... 524-5958
- Lamoille County..... 888-4548
- Northeastern Vermont..... 748-5181
- Rutland..... 775-0871
- Southern Windsor County..... 674-9201
- Two Rivers-Ottauquechee..... 457-3188
- Upper Valley-Lake Sunapee Council..... 448-1680
- Windham County..... 257-4547

State of Vermont

- Agency of Transportation
  - Planning Division..... 828-2676
- Dept. of Economic Development..... 828-3221
- Dept. of Education, School
  - Administrative Services Division..... 828-3154
  - Statistics and Information..... 828-3151
- Dept. of Environmental Conservation
  - Public Facilities Division..... 244-8744
  - Solid Waste Management Division..... 244-8702
  - Water Quality Division..... 244-5638
- Dept. of Housing and Community Affairs..... 828-3217
- Dept. of Taxes
  - Property Valuation and Review..... 241-3500
- Office of Policy Research and Analysis..... 828-3326

University of Vermont
- Center for Rural Studies..... 656-3021

Vermont League Cities and Towns..... 229-9111

Vermont Local Roads Program..... 655-2000

Vermont Natural Resources Council..... 223-2328

5.2 Vermont Towns and the State Aid to Education Formula

Tables A, B and C.

Tables A, B, and C are not included as a standard part of this workbook. They must be requested from the Vermont League of Cities and Towns or the Vermont Natural Resources Council. Since separate tables have been prepared for each Vermont county, you must specify which county you are interested in. These tables will be periodically updated if there is sufficient interest.

Once received, we suggest you insert Tables A, B, and C here.

5.3 Supporting Information (Tables D.1 - J.4)

Table D.1 Factors for Converting Dollars to a Constant Base Year

Nominal Year	Base Year							
	1982	1983	1984	1985	1986	1987	1988	1989
1977	0.673	0.640	0.607	0.581	0.565	0.541	0.516	0.499
1978	0.722	0.687	0.652	0.623	0.606	0.581	0.554	0.535
1979	0.786	0.748	0.709	0.679	0.660	0.632	0.603	0.582
1980	0.857	0.815	0.773	0.740	0.720	0.689	0.657	0.635
1981	0.940	0.894	0.848	0.812	0.789	0.756	0.721	0.696
1982	1.000	0.951	0.903	0.864	0.840	0.805	0.767	0.741
1983	1.051	1.000	0.949	0.908	0.882	0.846	0.806	0.779
1984	1.108	1.054	1.000	0.957	0.930	0.891	0.850	0.821
1985	1.158	1.102	1.045	1.000	0.972	0.932	0.888	0.858
1986	1.191	1.133	1.075	1.028	1.000	0.958	0.913	0.882
1987	1.243	1.183	1.122	1.073	1.044	1.000	0.953	0.921
1988	1.304	1.241	1.177	1.126	1.095	1.049	1.000	0.966
1989	1.350	1.284	1.218	1.166	1.134	1.086	1.035	1.000

Source: U.S. Department of Commerce, Bureau of Economic Analysis, "Survey of Current Business", Fixed-Weighted Price Indexes for Gross National Product, State and local government purchases of goods and services (1979 to 1989).

Note: Dollar values should be converted to a constant base year to account for the effects of inflation. Choose the base year which best suits your needs and divide the actual revenue or expenditure by the factor corresponding to the nominal year and base year.

For example, to convert a cost of $1,000 incurred in 1980 (nominal year) to a comparable cost in 1989 (base year) you would divide $1,000 by 0.635 (= $1,574.80).

The "Fixed-Weighted Price Index" is a weighted average of the detailed prices used in the deflation of the Gross National Product (GNP) while holding the composition of the GNP constant. The Bureau of Economic Analysis calculated this index using 1972 and 1982 as base years. The factors for base years 1983 to 1989 were derived from their calculations.

Table D.2 Calculation of Capital Debt Payments by Rate and Term

Interest Rate (%)	Annual Payment Per $1000 Borrowed		
	10 years	20 years	30 years
2 %	$ 111.33	$ 61.16	$ 44.65
3 %	117.23	67.22	51.02
4 %	123.29	73.58	57.83
5 %	129.51	80.24	65.05
6 %	135.87	87.19	72.65
7 %	142.38	94.39	80.59
8 %	149.03	101.85	88.83
9 %	155.82	109.55	97.34
10 %	162.75	117.46	106.08
11 %	169.80	125.58	115.02
12 %	176.98	133.88	124.14
13 %	184.29	142.35	133.41
14 %	191.71	150.99	142.80
15 %	199.25	159.76	152.30

Note: To calculate the annual payment of principal and interest on a $50,000 debt that must be repaid over 20 years at 8% interest you would multiply $101.85 times 50 (payment equals $5,066).

Table E.1 Total Population and School Age Children Per Housing Unit by Type of Unit and Number of Bedrooms - Vermont

Type of House		Bedrooms	Total People Per House	School Age Children Per House	Sample Size	Percent Rental Units
Single Family (Detached)		1	1.648	0.080	250	37.6%
		2	2.256	0.214	1138	16.3%
		3	3.057	0.672	2554	8.3%
		4	3.589	1.045	1211	8.8%
		5	3.805	1.183	481	11.6%
		All	3.011	0.677	5634	11.6%
Townhouses	*	1	1.417	0.083	12	91.7%
	*	2	1.941	0.177	34	55.9%
	*	3	2.914	0.457	69	42.9%
		All	2.284	0.277	115	39.1%
Mobile Homes	*	1	1.790	0.194	62	29.0%
		2	2.273	0.226	385	17.7%
		3	3.489	0.983	229	12.2%
		All	2.641	0.479	676	16.9%
Duplex		1	1.530	0.044	181	83.4%
		2	2.104	0.214	377	69.5%
		3	3.218	0.778	252	44.0%
		4	3.822	1.050	101	28.7%
		All	2.486	0.428	911	60.5%
Triplex and Quadplex		1	1.406	0.022	652	95.4%
		2	2.256	0.256	519	86.7%
		3	3.312	0.831	183	62.8%
		All	2.075	0.221	1354	87.7%

Source: U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population and Housing (Public Use Sample), 1980.

Note: Data is for Vermont only and was compiled for this project by the Center for Rural Studies at the University of Vermont. Use caution when using multipliers that are based on small sample sizes (*).

In 1987, the statewide average number of pupils per year-round housing unit (regardless of type and size of unit) was 0.49 according to housing and enrollment estimates by Vermont Departments of Health and Education.

The characteristics of a proposed residential development could vary significantly from the norms represented by these numbers. In such cases, be sure to vary your assumptions (high or low) accordingly.

Table E.2 Total Population and School-Age Children Per Housing Unit by Type of Unit and Number of Bedrooms - Northeast

Type of House	Bedrooms	Total People Per House	School Age Children Per House	Percent of School Age Children in Public School
Single Family	2	2.417	0.243	93.02
	3	3.345	0.793	90.72
	4	4.141	1.470	90.88
	5	4.853	2.052	89.29
	All	3.325	0.840	90.84
Garden Apartments	1	1.295	0.007	100.00
	2	2.142	0.203	91.39
	3	3.074	0.883	86.75
	All	1.768	0.155	92.01
Townhouses	1	1.491	0.053	100.00
	2	2.098	0.147	88.88
	3	3.000	0.676	93.00
	All	2.355	0.348	91.91
Mobile Homes	1	1.560	0.000	-
	2	2.127	0.167	94.21
	3	3.444	0.917	96.03
	All	2.505	0.398	95.80
Duplex, Triplex, and Quadplex	1	1.398	0.020	100.00
	2	2.326	0.288	87.50
	3	3.430	0.824	88.24
	All	2.350	0.356	86.72
Vacation	1	3.085	N/A	N/A
	2	3.039	N/A	N/A
	3	3.198	N/A	N/A
	4	3.244	N/A	N/A

Source: U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population and Housing (Public Use Sample), 1980.

Note: Data is drawn from the Northeastern states, including Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont. Table E.1 contains Vermont data only.

Table E.3 Per Capita Local Government Expenses by Town Size - VT

Municipal Function	Population of Vermont Town		
	5,000 - 9,999	2,500 - 4,999	Less than 2,500
Libraries	$ 7.39	$ 3.58	$ 1.96
Health	3.97	2.75	1.67
Roads	83.08	94.78	171.32
Police	38.73	21.10	5.11
Fire	21.29	11.84	13.72
Parks/Rec.	10.57	5.87	2.07
Sewerage	46.07	15.11	11.77
Administration General	41.38	35.22	46.66

Source: U.S. Dept. Of Commerce, "1987 Census of Governments, Finances of Municipal and Township Governments", p. 155 (Preliminary Data).

Note: All values are expressed in 1987 dollars. Refer to Table D.1 if you wish to convert dollar values to a more current base year.

Table E.4 Local Government Employees by Size of Town - Vermont

Municipal Function	Municipal Population				
	Total	25,000-49,999	10,000-24,999	5,000-9,999	Less than 5,000
	Full Time Equivalents Per 1,000 Population				
Roads	1.49	0.95	1.44	1.50	1.55
Police	1.22	2.49	2.18	1.60	0.69
Officers only	0.96	1.67	1.71	1.21	0.60
Fire	0.49	2.25	0.88	0.73	0.11
Firefighters	0.48	2.20	0.87	0.73	0.10
Parks & Rec	0.14	0.48	0.44	0.13	0.02
Sewerage	0.25	0.45	0.31	0.41	0.17
Water	0.25	0.90	0.51	0.39	0.06
Administration	0.94	0.53	0.96	1.06	0.95

Source: U.S. Department of Commerce, "1982 Census of Governments, Compendium of Public Employment" pp. 368-369 (1984).

Table E.5 Per Capita Local Government Expenses by Size of County - VT

Municipal Function	Population of Vermont County					
	Total	100,000+	50,000-99,999	25,000-49,999	10,000-24,999	Less than 10,000
Education	475.38	522.56	485.75	454.87	439.9	328.02
Libraries	3.99	5.86	3.85	3.91	1.43	2.29
Welfare	0.37	-	0.44	0.63	0.25	0.09
Health	3.11	2.48	3.42	3.91	1.68	1.74
Roads	83.57	55.42	85.83	92.29	107.49	82.10
Police	25.12	37.72	24.31	21.17	17.30	6.68
Fire	19.60	25.85	21.90	14.99	15.66	10.16
Parks/Rec.	7.98	10.27	9.01	7.72	2.97	0.92
Sewerage	31.49	15.47	24.76	42.11	54.76	10.62
Administration						
General	33.58	32.22	33.32	35.59	31.73	32.95
Buildings	3.19	5.90	2.12	2.12	1.27	1.01

Source: U.S. Dept. Of Commerce, "1982 Census of Governments, Compendium of Government Finances", pp. 310 - 311 (1984).

Table E.6 Per Capita Local Government Expenses By County - Vermont

County	Direct General Expenditures					
	Roads	Police	Fire	Parks & Rec	Sewage	Administration
Addison	101.10	11.39	9.22	2.86	140.38	33.16
Bennington	78.75	24.65	10.65	9.63	13.41	35.60
Caledonia	94.35	16.62	16.08	5.11	16.86	31.69
Chittenden	55.42	37.72	25.85	10.27	15.47	38.13
Essex	74.92	5.86	11.88	1.11	15.37	36.38
Franklin	62.49	13.86	12.59	5.61	11.84	31.51
Grand Isle	91.91	7.80	7.80	0.65	4.12	30.57
Lamoille	112.72	27.85	21.53	3.94	30.24	30.41
Orange	106.82	6.20	16.01	1.63	5.28	32.68
Orleans	104.39	20.52	11.13	3.58	120.31	35.16
Rutland	70.73	21.01	21.77	10.69	17.94	32.26
Washington	81.06	20.25	16.80	8.82	22.10	34.31
Windham	124.14	35.88	24.99	13.70	35.96	53.23
Windsor	107.98	32.26	27.28	7.29	35.27	43.64
VERMONT	83.57	25.12	19.60	7.98	31.49	36.76

Source: U.S. Dept. Of Commerce, "1982 Census of Governments, Compendium of Government Finances", pp. 616-617 (1984).

Notes: Values in Tables E.5 and E.6 are expressed in 1982 dollars. Refer to Table D.1 to convert values to a more current base year.

Not all municipal services are shown and only operating expenses are included.

Table E.5 Municipal Recreation Expenditures and Employees

Municipal Population	Per Capita Expenditure 1/ (Vermont)	Employees Per 1000 People 2/ (Northeast)	Employees Per 1000 People 3/ (Vermont)
less than 1,000	$1.21	-	-
1,000 to 2,499	$2.36	-	-
2,500 to 4,999	$7.14	0.15 4/	0.02 4/
5,000 to 9,999	$11.18	0.14	0.13
10,000 to 24,999	$12.83	0.34	0.44
25,000 to 49,999	$28.14	0.75	0.48
All	$10.62	-	0.14

Source: 1/ 1988 Vermont Recreation Plan, Community Recreation Task Group Report, Appendix E, p. 52 (January 1989). Values are 1987 dollars; refer to Table D.1.

2/ Burchell, "Fiscal Impact Handbook", p. 73 (1978).

3/ U.S. Department of Commerce, "1982 Census of Governments, Compendium of Public Employment", pp. 368-369 (1984).

Notes: 4/ Figures are for populations less than 5,000.

These costs include only direct operating expenses for municipal recreation programs. They do not cover any capital expenditures for recreation acquisition or development. Some recreation costs are paid from user fees rather than property taxes.

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The State of Maine recommends that towns with part-time recreation programs spend a minimum of $6.00 per capita, and towns with full time recreation departments spend at least $12.00 per capita. (ME Resource Sheet G-10a, 12/8/88).

"Suggested minimal recreation requirements", for towns of varying sizes, are described in the 1988 Vermont Recreation Plan, "Community Recreation Task Group Report, Appendix D". For this and other information on recreation facility standards contact the Vt. Dept. of Forests, Parks and Recreation (802-828-3375).

Table E.8 Library Facility Standards

Population	Library Space (sq. ft. per capita)	Seating (seats per 1000 residents)	Books (books per capita)
less than 10,000	1.00	9.0	4.0
10,000 to 30,000	0.75	5.0	2.2

Sources: Canter, "Impact of Growth", (1986). Lushington and Mills, "Libraries Designed for Users, A Planning Handbook". Deprospo, "Performance Measures for Libraries", (1973).

Note: The information in this table was derived from several sources and presented in a simplified format. Consult the listed sources if more precise information is needed.

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Lushington and Mills recommend that 0.5 library employees provide services to every 1000 residents. The U.S. Census of Governments showed that towns smaller than 10,000 had .04 to 0.9 full-time equivalent employees per 1,000 residents, and larger towns had about 0.3.

Table F.1 Police Protection Costs by Size of Municipality - VT

Population	Sample Size (# Towns)	Officers Per Capita	Median Annual Salary	Annual Cost Per Capita	Annual Cost Per $1000 AFMV 1/
20,000+	1	0.0024	$ 23,359	$ 85.32	$ 1.99
15,000 - 19,999	3	0.0017	20,714	71.21	0.84
10,000 - 14,999	4	0.0018	20,625	73.28	0.99
6,000 - 9,999	8	0.0015	20,188	67.64	1.09
4,000 - 5,999	11	0.0010	19,125	42.03	0.67
2,000 - 3,999	14	0.0014	20,078	57.73	0.50
less than 2,000 2/	4	0.0028	19,999	109.39	0.25
Average	45 (Total)	0.0016	20,536	66.95	0.37

Source: Vermont Criminal Justice Center, "A Profile of Municipal Police Departments in Vermont", (March 1989).

Note: This data is based on survey responses from 45 of 46 municipal police departments in Vermont. The results are not recommended standards.

1/ Figures show annual police protection cost per $1,000 of a town's total AFMV (Aggregate Fair Market Value).

2/ Seventy five percent of these are towns with ski areas. Per capita costs appear high since only the year-round residents are counted. The per capita costs would be lower if the seasonal residents, commuting workers and tourists were counted.

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Some recommended standards for police facilities include:

Size of police station-
250 sq. ft./officer in municipalities 10,000 to 30,000 in size.
200 to 225 sq. ft./officer in towns less than 10,000.

Number of vehicles per 1,000 dwelling units-
1.0 in towns with populations of 10,000 to 30,000.
0.7 in towns with populations of 5,000 to 10,000.
0.5 in rural towns having populations of less than 5,000.

Canter, "Impacts of Growth", pp. 17-18 (1986).

Table F.2 Per Capita Expenses for Police and Fire Protection

Function	Population Size	Per Capita Expenditure (1987 $)			
		Total	Personnel 1/	Capital Outlay 2/	Other 3/
Police	100,000 - 249,999	98.51	82.28	2.66	13.57
	50,000 - 99,999	98.55	83.76	2.87	11.92
	25,000 - 49,999	90.36	73.31	3.67	13.39
	10,000 - 24,999	92.01	69.83	3.76	18.42
Fire	100,000 - 249,999	70.36	62.23	1.65	6.48
	50,000 - 99,999	71.46	62.94	2.01	6.51
	25,000 - 49,999	69.27	57.84	3.74	7.69
	10,000 - 24,999	58.14	48.78	2.82	6.54

Source: Hoetmer, G., "1988 Municipal Yearbook", ICMA (1988).

Notes: 1/ Personnel includes uniformed and civilian employees. Expenditures include salaries, social security, retirement, life and health benefits.

2/ Capital outlays include purchase and replacement of equipment, purchase of land and existing structures, and construction.

3/ All other expenditures such as fuel, supplies, and utilities.

All figures are national averages.

Table G.1 Estimating School Construction Costs

Type of Construction	Unit Costs ($/S.F.) by Grades			
	K-6	K-8	Jr. High	Sr. High
New School 1/ (>10,000 S.F.)	$65.50	$68.50	$73.50	$77.00
School Addition 1/ (>10,000 S.F.)	$68.78	$71.93	$77.18	$80.85
Remodeling 1/	$32.75	$34.25	$36.75	$38.50
Conversion 1/	$42.58	$44.53	$47.78	$50.05
Site Work 2/	$ 7.00	$ 7.00	$ 8.00	$ 8.50
Wastewater System 3/	$ 2.50	$ 2.50	$ 4.00	$ 4.00

Source: Vt. Dept. of Education, Capital Outlay Financing, (1989).

Notes: 1/ Projects smaller than 10,000 S.F. (square foot) will cost up to 15 % more than the amounts in these columns. Use the figure beneath Table G.2 to determine a multiplier for smaller projects. Assume 10,000 S.F. is the typical size project.

Assume special education facilities will cost 10 % more than the amounts shown.

2/ Site work costs are per square foot of building and do not include wastewater treatment systems.

3/ Wastewater costs assume no municipal waste treatment facility is available.

Table G.2 Typical Costs for Public Buildings ($/Square Foot) 1/

Building Type	Typical Size	Typical Range	Median Cost Per S.F. 2/	
	(Gross S.F.)	(Gross S.F.)	(U.S.A.)	(Vermont 3/)
Community Center	9,400	5,300 - 16,700	64.55	58.10
Fire Station	5,800	4,000 - 8,700	66.30	59.67
Garage, Municipal	8,300	4,500 - 12,600	47.25	42.53
Jail	13,700	7,500 - 28,000	119.00	107.10
Library	12,000	7,000 - 31,000	72.60	65.34
Police Station	10,500	4,000 - 19,000	92.30	83.07
Swimming Pool	13,000	7,800 - 22,000	68.00	61.20
Town Hall	10,800	4,800 - 23,400	66.50	59.85
Town Office	8,600	4,700 - 19,000	55.40	49.86

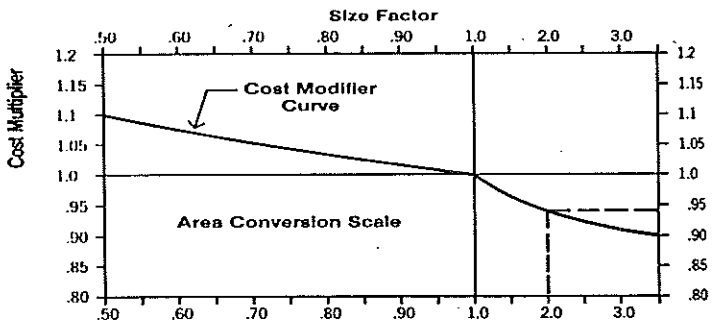
Source: R.S. Means Company, Inc., "Means Assemblies Cost Data 1988", pp. 476-495 (1988).

1/ Median square foot costs can be useful for making preliminary estimates when doing conceptual planning and budgeting. Costs include the contractor's overhead and profit, but do not include architectural fees, land costs or site work. Costs have been adjusted to 1988 dollars.

2/ These square foot costs are based on thousands of projects across the U.S.. Median costs indicate the point where 50% of the projects cost more, and 50% cost less.

3/ Vermont costs were derived by multiplying the U.S. costs by the Means City Cost Index (0.895) for Rutland, VT. Burlington's factor is 0.912. In order to make accurate estimates, the Vermont costs must be further adjusted by a project size modifier (below) since they represent the cost of a "typical size" building. In general, for two buildings built to the same specifications in the same locality, the larger building will have lower S.F. costs.

Project Size Modifier



First, calculate the Size Factor for your project by dividing its area by the area of the "Typical Size" project. Then match your Size Factor with the appropriate Cost Multiplier by using the Cost Modifier Curve.

EXAMPLE: The S.F. cost of an 8,000 S.F. library could be estimated by dividing proposed size (8,000 S.F.) by typical size (12,000 S.F.) to get a Size Factor of 0.67. The corresponding Cost Multiplier is 1.06, so the adjusted S.F. cost would be 1.06 X $65.34 = $69.26.

Table H.1 Average Road Construction Costs (1988 $)

Type of Construction	Construction Costs 1/
4 lane highway, new location	$4,750,000/mile
2 lane highway, new location	$1,750,000/mile
2 lane highway, minor relocation	$2,000,000/mile
2 lane highway, existing location	$1,250,000/mile
Resurface Town Road, gravel to paved	$550,000/mile
Resurface Town Road, dirt to gravel 2/	$350,000/mile
Bridges: 3/	
Without Approaches	$150/sq. ft.
With Approaches	$232/sq. ft.
Timber Bridges: 4/	
20 Foot Span	$32/sq. ft.
60 Foot Span	$50/sq. ft.
Urban Street:	
30 ft. curb to curb	$1,500,000/mile
60 ft. curb to curb	$4,000,000/mile

Source: Vermont Agency of Transportation and University of New Hampshire, Department of Civil Engineering.

Notes:
1/ Costs include drainage and mobilization, but not preliminary engineering, construction engineering or right-of-way acquisition.

2/ Typically this involves upgrading a Class IV road to Class III standards.

3/ Concrete slabs over steel support beams.

4/ These are costs for "modern" timber bridges made with laminated beams, and pressure treated wood. These costs reflect designs capable of supporting 55 ton loads.

Table H.2 Cost of Resurfacing and Reconstructing Local Roads

Action	Cost (1988 $)			
	$/S.F.	$/Mile		
		16' wide	20'wide	24'wide
RESURFACE:				
1" gravel 1/	$3.00 to $6.00/cu.yd.	$ 782 to $ 1,564	$ 978 to $ 1,956	$ 1,173 to $ 2,346
< 1" asphalt	$0.20 to $0.40	$16,896 to $33,792	$21,120 to $42,240	$25,344 to $50,688
1"-2" asphalt	$0.40 to $0.60	$33,792 to $50,688	$42,240 to $63,360	$50,688 to $76,032
RECONSTRUCT:				
Repair Base/ Replace Surface	$2.00 to $3.00	$168,960 to $253,440	$211,200 to $316,800	$253,440 to $380,160
Replace Base/ Replace Surface	$3.00 to $4.00	$253,440 to $337,920	$316,800 to $422,400	$380,160 to $506,880

Source: University of New Hampshire, "Road Surface Management System (RSMS)", Appendix C, (1989).

Notes:

1/ Costs are for purchase of processed gravel which has been crushed and graded. The costs of labor and equipment needed to apply the gravel are not included.

No comparable cost data is available for Vermont's paved local roads, but several Vermont experts believe these costs are valid.

Cost for a "chip coat and seal" (used for preventive maintenance, and sealing cracks on low volume roads) is $0.04 to $0.08/S.F.. On a 20' wide road this translates to $4,225 to $8,450 per mile.

Developments which increase the amount of heavy-vehicle traffic are likely to increase road damage and accelerate the need for resurfacing. If resurfacing must be done more frequently the total public costs over time will increase even though the resurfacing costs per square foot remain unchanged.

Table H.3 Vehicle Trip Generation Rates for Selected Land Uses 1/

Land Use Category	Unit of Measure	Average Weekday Trip Ends Per Unit 2/
Residential Housing:		
Single Family Detached	Household	10.0
Apartment	Household	6.1
Condominium	Household	5.2
Mobile Home	Household	4.8
Planned Unit Development	Household	7.8
Retirement Community	Household	3.3
Commercial:		
Hotels	Room	10.5
Motels	Room	10.2
Office Buildings	Employee	3.6
	1,000 S.F.	12.3
Shopping Centers:		
0- 49,999 S.F.	1,000 S.F.	117.9
50,000-100,000 S.F.	"	82.0
100,000-200,000 S.F.	"	66.7
200,000-300,000 S.F.	"	50.6
Super Markets	1,000 S.F.	125.5
Convenience Markets		
Open 12-16 hours	1,000 S.F.	322.6
Open 24 Hours	1,000 S.F.	625.2
Discount Stores	1,000 S.F.	70.1
Hardware/Paint	1,000 S.F.	51.3
Restaurants:		
Quality	1,000 S.F.	74.9
High Turnover, Sit-Down	1,000 S.F.	164.4
Drive-In	1,000 S.F.	553.0
Wholesale	1,000 S.F.	6.7
Auto Service Station	Pump	133.0
Industrial:		
General Light Industrial	Employee	3.2
	1,000 S.F.	5.5
Manufacturing	Employee	2.0
	1,000 S.F.	3.9
Warehousing	Employee	3.9
	1,000 S.F.	4.9
Institutional:		
Elementary School	Student	1.0
High School	Student	1.4
Library	1,000 S.F.	41.8
Hospital	Bed	11.4
Medical Clinic	1,000 S.F.	23.8

Source: Institute of Transportation Engineers, "Trip Generation Manual", Third Edition (1983).

Notes: 1/ Trip generation rates for more specific land use classifications and other units of measure are available.

2/ Average 24-hour total of all vehicle trips to and from the sites from Monday through Friday. The "peak-hour" traffic would be much higher than these averages, and should also be considered.

Some Notes on the Effects of Traffic on Road Costs:

The increased traffic from a new development may trigger the need for road improvements. These could include widening, changing alignment, paving or repaving, improving the base, replacing narrow bridges, and adding lights or signals at intersections. The costs of these and other improvements can be high and will vary widely depending on the specific circumstances (Table H.1).

Even if no improvements are needed, traffic from a new develpment may shorten the time before resurfacing roads with gravel or asphalt is needed. Periodic resurfacing is costly (Table H.2) and constitutes the greatest portion of the annual road budget.

Gravel Roads

According to researchers at the University of New Hampshire, gravel roads lose approximately 1" of gravel per year if the average daily traffic is 100 vehicles. If the road is 20' wide this amounts to about 326 cubic yards of gravel lost per mile.

Paved Roads

In Vermont, pavement on a new, well constructed road should last 15 years before resurfacing is needed. The actual time before a road needs repaving will depend on the adequacy of the road's base and drainage, as well as the volume and weight of traffic. According to Vermont Transportation Agency officials, resurfacing should be done every 8 to 10 years on most Vermont roads.

Municipalities should insist developers build new roads to adequate standards before accepting the financial liability of maintaining them.

Development May Increase Road Damage

For all practical purposes, structural damage to roads is caused by heavy trucks and buses, not by light passenger vehicles. Road damage rises steeply as the size and number of heavy vehicles using the road increases.

The load per axle, not the total vehicle weight, determines the damage done to roads. As axle load increases the damage caused increases as the fourth power of the load. For example if the axle load doubled, the damage would increase sixteen fold.

Because of this relationship considerable road damage can be caused during the construction of a new development if trucks carrying heavy equipment, gravel and building materials will be used. If the new development will be serviced by heavy vehicles then the damage will continue even after initial construction. The financial costs of such damage should be considered when assessing the merits of a proposed development.

Table I.1 Typical Wastewater Flow Quantities

ESTABLISHMENT	GALLONS/PERSON/DAY (unless otherwise noted)
Assembly Areas, Conference Room	5
Airports (per passenger)	5
Bathhouses and Swimming Pools	5
Bowling Alley (no food service) per lane	75
Camps:	
Campground with central comfort stations (4 people/site)	140/site
With flush toilets, no showers (4 people/site)	100/site
Construction camps (semi-permanent)	50
Day camps (no meals served)	15
Resort Camps (night & day) with limited plumbing	50
Cafeterias	50/seat
Churches:	
Sanctuary seating x 25%	5
Church suppers	8
Cottages	50
Country Clubs (per resident member)	100
Country Clubs (per non-resident member present)	25
Dentists:	
Staff Member	35
Per Chair	200/chair
Doctor's Office:	
Staff Member	35
Patient	10
*Dwellings:	
Apartments (minimum 2 people/bedroom)	75
Boarding Houses	50
Addition for non-resident boarders	10
Multiple Dwellings (condominiums, townhouses, clustered housing) (minimum 2 people/bedroom)	75
Rooming Houses (per occupant bed space)	40
Single Family Dwellings (per bedroom)	150
Factories (gallons per person, per shift, exclusive of industrial waste)	15
Gyms:	
Participant	10
Spectator	3
Hairdressers:	
Operator	10
Per Chair	150/chair
**Hotels with Private Baths (per person sleeping space)	50
Institutions other than hospitals (per bed)	125
Laundries, self-service (gallons per machine)	500
Mobile Home Parks (per space)	450
**Hotels with bath, toilet (per person sleeping space)	50
Picnic Parks (toilet wastes only/picnicker)	5
Restaurants (toilet and kitchen wastes/seat, including restaurant and bar seats)	30
Additional per seat for restaurant serving 3 meals per day	15
Restaurants (fast food - see cafeterias)	
Schools:	
Boarding	100
Day, without gyms, cafeterias, or showers	15
Day, with gyms, cafeterias, and showers	25
Day, with cafeteria, but without gyms or showers	20
Service Stations (first set of gas pumps)	500
(each set thereafter)	300
Sewer Line Infiltration (where applicable)	300 gal/in pipe dia/mile/day
**Shopping Centers/Stores:	
Large Dry Goods	5 GPD/100 ft²
Large Supermarkets with meat department without garbage grinder	7.5 GPD/100 ft²
Large Supermarkets with meat department with garbage grinder	11 GPD/100 ft²
Small Dry Goods Stores (in shopping centers)	100 GPD/store
Subdivision per lot (or 150 per bedroom, whichever is greater	450
Theaters:	
Movie (per auditorium seat)	5
Drive-in (per car space)	5
Travel Trailer Parks without individual water & sewer hookups (per trailer space)	50
Travel Trailer Parks with individual water & sewer hookups (per car space)	100
Veterinary Clinic (3 or less doctors):	
without animal boarding	750/clinic
with animal boarding	1,500/clinic
Workers:	
Construction (at semi-permanent camps)	50
Day at schools and offices (per shift)	15

Source: Vermont Department of Environmental Conservation, "Environmental Protection Rules and Related Statutes", Appendix 7-A, pp. 74-75 (1982).

* Elderly housing may be calculated at 1.5 people per bedroom.
** Does not include laundry or restaurant waste.

Table I.2 Commercial Water Use Estimates

Commercial Category	Unit of Measure	Mean Annual Usage (gal/day/unit of measure)
Apartments	Occupied units	217.000
Barber shops	Barber chairs	54.600
Beauty shops	Stations	269.000
Bowling Alleys	Alleys	133.000
Bus-Rail Depots	Square feet	3.330
Car washes	Inside Sq. Ft.	4.780
Churches	Members	0.138
College residences	Students	106.000
Golf-Swim Clubs	Members	22.200
Hospitals	Beds	346.000
Hotels	Square feet	0.256
Laundromats	Square feet	2.170
Laundries	Square feet	0.253
Medical offices	Square feet	0.618
Motels	Square feet	0.224
Night clubs	Persons served	1.330
Nursing homes	Beds	133.000
Office buildings, new	Square feet	0.093
Office buildings, old	Square feet	0.142
Restaurants, regular	Seats	24.200
Restaurants, fast food	Establishments	1790.000
Retail stores	Sales floor sq. ft	0.106
Schools, elementary	Students	3.830
Schools, high	Students	8.020
Service stations	Inside sq. ft.	0.251
Theaters	Seats	3.330

Source: U.S. Army Corps of Engineers. "Forecasting Municipal and Industrial Water Use: A Handbook of Methods", (1983).

Table I.3 Drinking Water Treatment Costs (1989 dollars) 1/

Population	System Capacity (1000 gal. per day)	Capital Investment ($1000)	Operating Expense ($1000/yr)	Annualized Cost ($/1000 gal)
			Filtration 2/	
500	100	443	89	3.54
1500	300	811	133	1.78
2500	500	1165	162	1.37
5000	1000	1770	236	0.90
10000	2000	2950	354	1.22
15000	3000	4278	457	1.05
25000	5000	5900	649	0.89
50000	10000	9293	1106	0.72
			Chlorination 3/	
500	100	10	7	0.27
1500	300	16	10	0.16
2500	500	22	12	0.13
5000	1000	34	16	0.08
10000	2000	44	22	0.07
15000	3000	56	27	0.05
25000	5000	77	37	0.03
50000	10000	148	52	0.03

Source: United States Environmental Protection Agency, The Cost Digest: Cost Summaries of Selected Environmental Control Technologies", EPA-600/8-84-010, October 1984.

1/ Costs are derived from graphs published in the above report adjusted to 1989 dollars using ENR Construction Cost factor of 1.475 (4646/3150). These costs are averages that could vary widely depending on the actual design of a system.

2/ Costs are based on a "conventional" filtration system including raw water pumping, chemical addition, rapid mix/ flocculation, sedimentation, filtration, chlorination, finished water storage and pumping, and sludge removal. Water softening and distribution systems are not included.

3/ Chlorination and other methods are used to disinfect water. The costs are included as part of the conventional filtration system (Note 2) and listed separately here. The system's costs assume a medium chlorine dosage rate (3 mg./l), a duplicate stand-by chlorinator, injector pumps, chlorinator building and a 30-day chlorine storage capacity

Table I.4 Wastewater Treatment Costs (1989 dollars) 1/

Population	System Capacity (1000 gal per day)	Treatment Level			
		CST 2/ 210	AWT 3/ 210	CST 4/ 1000	AWT 5/ 1000
		Total Capital Investment ($1,000):			
700	100	$4,425	$4,868	$5,163	$6,048
1,400	200	4,868	5,605	6,195	7,375
2,800	400	6,195	6,490	8,555	10,325
4,900	700	7,228	8,555	10,473	12,538
7,000	1,000	8,703	10,030	13,275	15,045
14,000	2,000	11,800	13,275	20,650	22,125
28,000	4,000	17,700	20,650	29,500	35,400
35,000	5,000	22,125	25,075	36,875	44,250
		Net Annual Operating Costs ($1,000):			
700	100	$369	$443	$605	$664
1,400	200	398	516	738	811
2,800	400	457	590	959	1,033
4,900	700	561	708	1,180	1,328
7,000	1,000	620	885	1,401	1,770
14,000	2,000	885	1,328	2,065	2,360
28,000	4,000	1,401	1,918	3,098	4,130
35,000	5,000	1,623	2,360	3,688	5,015
		Unit Annualized Cost ($/1000 gal/yr):			
700	100	$17.70	$26.55	$22.13	$32.45
1,400	200	11.65	14.75	14.75	16.23
2,800	400	7.23	8.85	10.33	13.28
4,900	700	5.02	6.64	7.38	10.33
7,000	1,000	4.28	5.61	6.05	8.41
14,000	2,000	2.95	4.43	5.02	6.20
28,000	4,000	2.07	3.39	3.98	5.16
35,000	5,000	1.77	3.10	3.69	4.72

Source: United States Environmental Protection Agency, "The Cost Digest: Cost Summaries of Selected Environmental Control Technologies", EPA-600/8-84-010 (October 1984).

1/ Costs are derived from graphs published in the above report and adjusted to 1989 dollars using ENR Construction Cost factor of 1.475 (4646/3150). These costs are averages that could vary widely depending on the actual design of a system.

2/ CST 210 = Conventional Secondary Treatment of wastewater having an initial BOD (Biochemical Oxygen Demand) of 210 mg/l. This is typical of municipal or medium strength industrial wastewater. Treatment will achieve 30 mg/l or less of BOD and 30 mg/l or less of suspended solids.

3/ AWT 210 = Advanced Wastewater Treatment; influent wastewater BOD 210. Treatment will achieve 10 mg/l or less of BOD and 10 mg/l or less of suspended solids.

4/ CST 1000 = Conventional Secondary Treatment; influent wastewater of BOD 1000. This is typical of high strength industrial wastewater. Treatment should achieve same levels as CST 210.

5/ AWT 1000 = Advanced Wastewater Treatment; influent wastewater of BOD 1000. Treatment should achieve same levels as AWT 210.

Table J.1 Various Per Capita Solid Waste Generation Rates

Generator	Rate 1/ (lbs/day)	Percent (%)
Year-Round Residents 2/		
Rural Resident		
Paper	1.04	40 %
Food and Yard	0.57	22
Glass	0.39	15
Ferrous Metals	0.13	5
Plastic	0.10	4
Non-ferrous Metals (Aluminum)	0.03	1
All Other	0.34	13
Total	2.60	100 %
Urban Resident		
Paper	2.03	48 %
Food and Yard	0.84	20
Glass	0.56	13
Ferrous Metals	0.28	7
Plastic	0.17	4
Non-ferrous Metals (Aluminum)	0.04	1
All Other	0.28	7
Total	4.20	100 %
Seasonal Residents 3/		
Seasonal Homeowner	2.00	100 %
Seasonal Camper	1.80	100 %

Source: State of Vermont, "Vermont Solid Waste Management Program - State Plan", (1989). Donovan Associates, "Northwest Vermont Solid Waste Generation and Recycling Analysis", prepared for Northwest Vermont Solid Waste Management District, (1989).

Notes: 1/ Amounts are for net generation (ie. gross generation minus amount disposed on-site or recycled) and exclude special wastes, such as those listed in Table J.2.

2/ Amounts include wastes generated by households, businesses, schools, offices and industries.

3/ Amounts include only household wastes.

Table J.2 Per Capita Generation Rates for Special Wastes

Special Waste	Unit	Average Unit Weight (lb.)	Per Capita Rate (units/ year)	Per Capita Rate (lb./ year)
Dry Cell Battery	Battery	0.13	8.0	1.03
Wet Cell Battery	Battery	30.0	0.056	1.68
Household Hazardous Wastes	Pound	2.9	2.9	2.90
Appliances	Appliance	250.0	0.1	25.00
Used Crankcase Oil	Gallon	8.0	0.1	0.80
Construction Debris				
Rural	Ton	2,000.0	0.01	20.00
Urban	Ton	2,000.0	0.03	60.00
Used Tires	Tire	30.0	0.37	11.10

Source: State of Vermont, "Vermont Solid Waste Management Program - State Plan", (1989).

Table J.3 Waste Generation of Selected Commercial and Industrial Facilities

Facility	Amount of Waste Generated (pounds/employee/year)
Retail:	
Building Supplies/Hardware	4,160
Department and Variety Stores	7,900
Grocery Store, Large	13,600
Grocery Store, Small (Mom and Pop)	11,500
Restaurant	2,000
Fast Food	8,500
Auto Service Station	3,120
Service:	
Hotels, Motels, Inns	7,243
Campgrounds/ RV Parks	2,580
Elementary and Secondary Schools	2,716
Manufacturing	
Textile Mill	3,490
Lumber and Wood Products	3,263
Household Furniture	11,960
Paper and Allied Products	5,760
Electronic/Electric Equip.	7,280

Source: DSM Environmental Services, Inc., "Analysis of Solid Waste Generation in the Addison Waste Management District", October 1989.

Note: This is a brief, summary listing for typical facilities. More detailed and complete listings of commercial and industrial waste generation coeeficients are available. Contact your regional solid waste district office for more information.

Table J.4 Costs of Typical Solid Waste Facilities (1987 $)

Facility	Capital Cost	Annual 1/ Debt Service	Initial Operating Costs 2/
Mini-Transfer Station (4,000 tons/yr)	$ 55,500	$ 7,500	$ 29,000
Large Transfer Station (50,000 tons/yr)	$1,253,000	$186,000	$249,000
Small Recycling Center (collection only)	$ 9,000	N/A	N/A 3/
Large Recycling Center 4/ (collection/processing)	$ 130,000	$ 19,400	$ 82,000
Conventional Landfill:			
150 tons/day	$3,678,000	$388,000 5/	$492,000
475 tons/day	$7,883,000	$833,000 5/	$812,000

Source: Wehran Engineering, "Current Solid Waste Management Practices and Recommendations for a Long-Term Approach to Solid Waste Management", prepared for Central VT Solid Waste District (1987).

Notes:
1/ Annual debt service is based on 10 year financing at 8.5% interest, except where noted.
2/ Operating costs are based on first years of operation. They do not include equipment replacement or landfill closure costs.
3/ Assumes recycling center is located at a transfer station so costs are included in the transfer station operating costs.
4/ Capable of processing 15 tons per year of recyclable goods.
5/ Financed 20 years at 8.5%