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Cost of Public Service

Fire Protection

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Contents

This is one of eight bulletins supported by Title V of the Rural Development Act of 1972 on estimating costs of public services in various size Idaho communities. Services covered in the series are:

- Education
- Fire Protection
- Police Protection
- Sewage Collection and Treatment
- Sheriff Protection
- Solid Waste Disposal
- Water Supply

A worksheet for estimating costs for each service area is designed to facilitate citizen use. Relationships are used to derive costs and are expressed in terms of state averages. You may use the standards as given to derive cost estimates for the services or change them to reflect the situation in your community.

Extension Bulletin 602, **Residential Growth: Its Benefits and Costs to the Local Community,** is used as a format for an overall look at what effects increases in the number of residential dwellings and people have on revenues for the public and private sector and on costs in the public sector. The estimation procedure is outlined for cities, counties and school districts.

This publication outlines a method of estimating your community's increased costs in fire protection caused by population growth.

About the Authors

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Cost of Public Service: Fire Protection

N. R. Rimbey and N. L. Meyer

This publication presents a method of estimating expenditures for fire protection and a method for estimating the impact of population growth on these expenditures. The cost estimates derived are based on relationships taken from various sources which approximate the actual situation in communities and counties. The relationships are based on state or national averages and can be changed to reflect the situation in your community. Worksheets are provided to help you in the estimation procedure.

Introduction

Idaho is currently one of the fastest growing states in the nation. This growth brings economic benefits such as increased tax revenue for the public sector and more jobs and increased purchasing within the private sector. There also may be added general social benefits such as meeting and interacting with people from different cultural backgrounds, more specialized kinds of health care and more cultural programs through schools and civic organizations.

However, this growth does not come without additional costs, and many Idaho communities and counties are not prepared. The public sector is being asked to handle the added costs of providing services to new residents through tax, fee and pricing policies.

Many rural areas are not equipped to handle population growth because the necessary facilities do not exist. For example, growth may create needs for a new sewage treatment plant, school buildings, fire and police facilities and equipment, water wells or reservoirs and garbage collection and disposal equipment. Sizable public expenditures also may be necessary for land acquisition and additional employees. Excess capacity in public services just does not exist in most rural areas.

Many urban areas, in contrast, can accommodate growth more easily because the public service infrastructure already exists. Excess capacity in the sewage treatment facility, school system, police department and other services can absorb the population increases without the need for major capital expenditures.

For any community, though, the problem of growth is compounded by a movement toward government spending limitations. "How can we accommodate the rapid population growth and additional service demands of residents and finance the services with reduced or 'frozen' revenues?" This is the most perplexing issue facing state and local government officials.

One possible alternative for local government officials is to require a new development to pay its "fair share" of the added service costs. This may appear to be a simple policy move; however, this action will require information upon which to base the policy. For example, information should be collected and analyzed to determine:

- The present costs of various services.
- The estimated costs to service new residents.
- When expansion of capital facilities will be needed (based on capacities of existing systems and projected growth rates).
- What the existing governmental unit's policy is on who should pay the additional costs.

Present costs of services are available in your local government's annual audit report or annual budget. The policy aspect may require investigation of zoning regulations and building permit procedures or conversations with city or county officials.

The cost estimates presented here were derived by using relationships or standards which typify state or national averages. Standards for each service are presented, but you can change or modify them to fit

the situation within your local government. This publication gives worksheets, an abbreviated interest table and sources of community information to help you in the estimation process.

A word of caution at this point. The cost figures presented here are **estimates** of actual costs and should be analyzed carefully before basing policies upon them. The standards should help in critically evaluating costs, but they should be changed whenever they prove inaccurate. Variations between actual and estimated costs may result from using average figures, the area's topography, the time lag between estimation and construction and a variety of other circumstances.

This publication should help you, as a concerned citizen or government official, establish a framework for determining the current costs of fire protection. A method of estimating additional costs because of population growth is also given.

Methods of Estimating Expenditures

Costs can be estimated in several ways. The procedure used most often in fiscal impact studies is known as the average cost method. This involves:

1. Using the existing budget or audit report to derive current costs of services.
2. Dividing these costs by number of people or households served to determine a per capita or per household cost for each service.
3. Projecting this cost to the new residents by multiplying the per capita or household costs by the number of new residents or houses.

This technique may be adequate for projecting the operation and maintenance costs of services but will severely underestimate the impact if capital expansion is needed. The problem lies in basing the estimates on past costs.

A more reliable method is using average cost figures and adding estimated capital costs. In other words, this method uses average cost figures from the budget as well as the estimated increases in capital costs to derive estimates of the impact on expenditures.

The most reliable (and costly) method is a detailed audit of each department within the municipality to determine the actual costs per household (or resident) and the anticipated date and cost of needed expansion of facilities. This involves a detailed study of each employee's duties, anticipated equipment and personnel needs and the municipality's projected growth rates. Although time comsuming and expensive, this is the most reliable method to support local policies that require a new development to pay for the added service costs.

The following section outlines standards and procedures for estimating existing costs and the added costs of development for fire protection. This material should be used together with the information in Ext. Bull. 602, **Residential Growth: Its Benefits and Costs to the Local Community,** to derive estimates of the benefits and costs of community growth.

Fire Protection

The type and quality of fire protection vary considerably throughout Idaho. Some communities rely completely upon volunteer fire personnel while others are staffed by full-time professionals. Equipment differences are dictated by a community's size and physical characteristics. Other differences are in areas of jurisdiction (city and county), response time of the departments and water sources. These account for many of the cost and personnel differentials in Idaho communities.

The following relationships are based on responses in a survey concerning fire protection conducted in the spring of 1978. Fire departments serving various population sizes were contacted, and the returns are summarizes in the following standards.

Standard 1 — The ratio of pumper trucks per 1,000 persons decreases as community population increases (Table 1).

Standard 2 — The replacement cost per pumper truck also varies with population (Table 2).

Standard 3 — Automobile and other equipment replacement cost is 20 percent of pumper truck replacement cost except for communities of less than 1,000 population. Communities of smaller size (less than 1,000) are generally volunteer departments with one truck and no autos or other equipment.

Standard 4 — Maintenance and operation costs on all equipment as a percentage of pumper, automobile and other equipment replacement cost is 4.00 percent for all populations.

Standard 5 — The number of full-time paid fire personnel per truck varies with population (Table 3).

Standard 6 — The average annual salary in 1978 (plus benefits) of full-time fire personnel is $11,109 for populations up to 25,000, $12,809 for populations of 25,000 to 40,000 and $15,233 for populations of more than 40,000 people.

Standard 7 — The number of volunteers and the insurance and training cost per volunteer vary with the population served (Table 4).

Standard 8 — The total area of the firehouse (square feet) and construction cost vary with population served (Table 5).

Standard 9 — Firehouse maintenance and operation costs can be expressed as 5 percent of firehouse construction costs.

Standard 10 — Other costs such as uniforms, supplies and other equipment are 9 percent of total variable cost (maintenance and operation of equipment and firehouse and wages and benefits) for all population sizes.

Table 1. Estimated number of pumper trucks by community size.

Community population	Pumper trucks per 1,000 population	Estimated number of pumper trucks
under 500	0.4	1.0
1,000 to 1,499	1.5	1.0 to 2.0
1,500 to 2,999	1.0	1.5 to 3.0
3,000 to 5,499	0.6	1.8 to 3.3
5,500 to 14,999	0.3	1.7 to 4.3
15,000 to 25,000	0.2	3.0 to 5.0
over 25,000	0.1	2.5+

Table 2. Replacement cost of pumper truck by community size.

Community population	Replacement cost per pumper truck
	(1978 prices)
under 1,000	$ 9,300
1,000 to 1,999	32,650
2,000 to 3,499	42,525
3,500 to 9,999	53,825
over 10,000	59,390

Table 3. Number of full-time fire personnel per truck by community size.

Community population range	Full-time personnel per truck
under 3,499	0
3,500 to 5,499	1
5,500 to 9,999	2
10,000 to 19,999	3
20,000 to 24,999	7
25,000 to 40,000	11
over 40,000	.25/1,000 population

Table 4. Number and cost per volunteer by community size.

Community population range	Estimated number of volunteers	Community cost per volunteer
under 1,499	17	$ 46.00
1,500 to 25,000	21	$381.00
over 25,000	0	$ 0.00*

*All fire fighters are full-time professionals.

Table 5. Firehouse area and construction cost by community size.

Community population range	Firehouse area in sq. ft.	Cost of construction per sq. ft.
under 499	812	$19
500 to 2,499	1,706	15
2,500 to 5,499	2,949	35
5,500 to 19,999	8,241	36
20,000 to 24,999	14,065	51
25,000 to 40,000	17,750	53
over 40,000	444/1,000 population	53

Table 6. Amortization rates for different interest rates and loan periods.

Interest Rate	Years						
	5	10	15	20	30	40	50
7	.243891	.142378	.109795	.094393	.080586	.075009	.072460
8	.250456	.149029	.116830	.101852	.088827	.083860	.081743
9	.257092	.155820	.124059	.109546	.097336	.092960	.091227
10	.263797	.162745	.131474	.117460	.106079	.102259	.100859
11	.270570	.169801	.139065	.125576	.115025	.111719	.110599
12	.277410	.176984	.146824	.133879	.124144	.121304	.120417
13	.284315	.184290	.154742	.142354	.133411	.130986	.130289

Table 6 should help you calculate the annual payments on investments for community services. For example, the annual payments for a $40,000 loan at 10 percent interest for 15 years can be calculated using the following equation.

Loan amount × amortization rate = annual payment
($40,000) (.131474) ($5,259)

An annual payment of $5,259 would pay the principal and interest on this loan and retire the debt in 15 years. If the interest rate and the time period of the loan are not listed in this table, your local bank will be able to provide the figures.

Estimating the Cost Of Providing Fire Protection

Using the 10 relationships or standards, you can derive cost estimates for providing fire service to communities of various sizes. As an example, consider a community with a population of 4,000 people.

Step 1 — Estimate the number and total cost of the pumper trucks using Standards 1 and 2.

4,000 population × .6 trucks 1,000 population
= **2.4 pumper trucks**[1]

The estimated cost per pumper truck for a community of 4,000 people is $53,825 per truck.

2.4 pumper trucks × $53,825
= **$129,180 total pumper-truck cost**

If a community does not buy equipment on a cash basis, calculate the annual ownership costs of the trucks (the community finances the purchases through conventional loans, bonds or other means of financing). Assuming that a community obtains financing terms of 8 percent annual interest on a 10-year loan with 10 percent salvage or resale value, calculate the annual payment for the pumper trucks as follows:

$116,262 (purchase price - salvage value) × .149029
(amortization rate for 8% loan for 10 years)
= **$17,326 annual payment on pumper trucks**

You need to figure salvage or resale value into this equation because when the truck is sold or traded in for new equipment, the resale will result in a dollar flow (or "value" flow) into community coffers. In effect, this flow reduces the total expenditures for the equipment by the amount of the resale. The amortization rate is a figure used for calculating annual ownership costs of purchases made with loans. It yields the annual amount which would have to be paid to retire the debt (including principal and interest) in a certain time period (10 years in this case).

Table 6 presents amortization rates for different interest rates and time periods. Interest tables are available at most financial institutions and contain amortization rates for interest rates and time periods not included in this table.

Step 2 — The annual ownership cost of equipment such as automobiles, pickups, communication systems, tankers, ladder trucks, ambulances and other equipment can be calculated. Using Standard 3, estimate the annual ownership cost of other equipment simply by taking the ownership cost for pumper trucks developed in Step 1 ($17,326) and multiplying by the appropriate percentage:

$17,326	annual ownership cost of pumper trucks
0.20	percentage figure from Standard 3
$ 3,465	**annual ownership cost of other equipment**

or, figuring another way,

$129,180	pumper truck replacement cost
0.20	percentage figure from Standard 3
$ 25,836	replacement cost of other equipment
$25,836	
- 2,583	salvage (10%)
$23,253	
$ 23,253	
×.149029	amortization rate
$ 3,465	**annual ownership cost of other equipment**

This figure assumes the same financial arrangement used in Step 1 (8 percent loan for 10 years with 10 percent salvage value). If any terms of financing change for other equipment (time period, for example), then this figure must be "recalculated." You can do this by taking the percentage (9 percent)

[1]A partial truck can be reflected in more sophisticated equipment or more accessories.

of the pumper truck replacement cost, subtracting the salvage and multiplying by the appropriate amortization rate. For example, if the 8 percent loan is available for 5 years, the amortization rate is .250256 (Table 6). This will yield higher annual payments because of the shorter time period of the loan.

Step 3 — You can estimate maintenance and operating costs of all equiment by applying the percentage figure in Standard 4 to the sum of the replacement costs of the pumper truck and other equipment. In this example,

($129,180 + 25,836) × 0.04
= **$6,201 annual maintenance and operation of equipment**

Step 4 — Estimate the number of full-time personnel and the cost of employing them. Using Standard 5, there is one full-time person per pumper. Since there are an estimated 2.4 engines (Standard 1), there will be 2.4 paid fire personnel (or in actuality, two full-time and one part-time fire fighters).

Note that whenever fractions of people or equipment appear, this example is strictly for illustrative purposes. Obviously, a community cannot possess .4 of a pumper truck. However, the community may only have 2 pumper trucks and needs 2.4 trucks to adequately serve the population. This community is overusing the two trucks it owns. Therefore, the fractions are used simply to estimate the cost of the equipment and do not depict actual number of trucks. As a general "rule of thumb," if there is a fractional part of a truck shown here, the actual number is the nearest whole number. The demand for the service may be for 2.4 trucks, but the capacity is only 2 trucks.

Step 5 — Use Standard 6 to estimate the cost of employing the firefighters.

2.4 full-time personnel × $11,109 average salary/person
= **$26,662 annual salary expenditure for personnel**

Step 6 — Estimate the number of volunteers and the cost of training, insurance and other costs associated with volunteers.

21 volunteers × $381 per volunteer (Standard 7)
= **$8,001 total volunteer cost**

Step 7 — Estimate the total area and cost of the firehouse. The area of the firehouse for a community of 4,000 people would be 2,949 square feet and would cost $35 per square foot (Standard 8). The total construction cost would be $103,215 (2,949 sq. ft. × $35/sq. ft.).

2,949 sq. ft. × $35 per sq. ft.
= **$103,215 total construction cost**

Estimate the annual cost of the firehouse by amortizing the construction cost minus 10 percent salvage at 8 percent for 20 years.

$92,894 × .101852 (amortization rate for 20 years at 8 percent = **$9,461**

Step 8 — Estimate maintenance and operation of the firehouse by multiplying the construction cost by 5.00 percent (Standard 9).

$103,215 × 0.05 or **$5,161**

Step 9 — Estimate other costs such as training, uniforms, supplies and other equipment by multiplying total variable cost by 9.0 percent (Standard 10).

$38,024 × 0.09 = **$3,422**

The total variable cost equals maintenance and operation of equipment and firehouse plus wages and benefits of fire personnel.

Step 10 — The total annual cost of the system is the sum of all annual costs derived in this example.

Ownership cost, pumper trucks	Step 1	$17,326
Ownership cost, other equipment	Step 2	3,465
Maintenance and operation, equipment	Step 3	6,201
Wages and benefits, firefighters	Step 5	26,662
Volunteer costs	Step 6	8,001
Ownership cost, firehouse	Step 7	9,461
Maintenance and operation, firehouse	Step 8	5,161
Other costs	Step 9	3,422
Total annual cost		$79,699

In this example, the total annual cost is about $19.92 per capita (79,699 ÷ 4,000 population) per year. This amounts to $63.74 per household of 3.2 persons. Cost estimates for other populations are presented in Table 7.

Estimating Population Growth's Impact on Fire Protection Expenditures

You can use the standards given to estimate the impact of a given number of new residents entering a community on the cost of providing fire protection. As a community grows, certain items will affect the cost of providing fire protection. The location of new residents, for example, is an important consideration.

If the new residents are absorbed within the existing city or fire district boundaries, there may be little effect on the cost of providing fire protection. Added costs in this circumstance would fall in the area of personnel costs (salaries, training, insurance, etc.) and possibly capital items such as pumper or ladder trucks and firehouse expansion.

Table 7. Annual fire service costs by community size.

Population	A No. of pumper trucks	B Total invest. pumper trucks	C Annual cost pumper trucks	D Total investment autos & equip.	E Annual cost autos & equip.	F No. of full-time fire personnel	G Annual salary expenditure	H No. of volunteers	I Annual cost volunteers	J Total investment firehouse	K Annual cost firehouse	L M & O* firehouse	M M & O* equip.	N Other costs	O Total annual cost	P Annual cost per capita
200	1.0	$ 9,300	$ 1,386	$ 0	$ 0	0	$ 0	17	$ 782	$ 15,428	$ 1,414	$ 771	$ 372	$ 103	$ 4,828	$24.14
500	1.0	9,300	1,386	0	0	0	0	17	782	15,428	1,414	771	372	103	4,828	9.66
1,000	1.5	48,975	7,299	9,795	1,460	0	0	17	782	25,590	2,346	1,280	2,351	327	15,845	15.85
1,500	1.5	48,975	7,299	9,795	1,460	0	0	21	8,001	25,590	2,346	1,280	2,351	327	23,064	15.38
2,000	2.0	85,050	12,675	17,010	2,535	0	0	21	8,001	25,590	2,346	1,280	4,082	483	31,402	15.70
2,500	2.4	102,060	15,210	20,412	2,535	0	0	21	8,001	103,215	9,461	5,161	4,899	905	46,172	18.47
3,000	2.4	129,180	17,326	25,836	3,465	0	0	21	8,001	103,215	9,461	5,161	6,201	1,023	50,638	16.88
3,500	2.4	129,180	17,326	25,836	3,465	2.1	23,329	21	8,001	103,215	9,461	5,161	6,201	3,122	76,056	21.73
4,000	2.4	129,180	17,326	25,836	3,465	2.4	26,662	21	8,001	103,215	9,461	5,161	6,201	3,422	79,699	19.92
4,500	2.7	145,328	19,492	29,066	3,898	2.7	29,994	21	8,001	103,215	9,461	5,161	6,976	3,792	86,775	19.28
5,000	3.0	161,475	21,658	32,295	4,332	3.0	33,327	21	8,001	103,215	9,461	5,161	7,751	4,162	93,853	18.77
5,500	3.3	177,623	23,824	35,505	4,765	3.3	36,660	21	8,001	296,676	27,195	14,833	8,526	5,402	129,206	23.49
10,000	3.0	178,170	23,897	35,634	4,779	6.0	66,654	21	8,001	296,676	27,195	14,833	8,552	8,104	162,015	16.20
15,000	3.0	178,170	23,897	35,634	4,779	9.0	99,981	21	8,001	296,676	27,195	14,833	8,552	11,103	198,341	13.22
20,000	4.0	237,560	31,863	47,512	6,273	12.0	133,308	21	8,001	717,315	65,754	35,866	11,403	16,252	309,440	15.44
25,000	5.0	296,950	39,829	59,390	7,966	35.0	448,315	0	0	940,750	86,236	47,038	14,254	45,864	689,503	27.58
40,000	5.0+	296,950+	39,829	59,390	7,966	55.0	704,495	0	0	940,750	86,236	47,038	14,254	68,921	968,739	24.22

A. See Standard 1
B. See Standard 2
C. (B — Salvage Value) × amortization rate
D. See Standard 3
E. (D — Salvage Value) × amortization rate
F. See Standard 5
G. See Standard 6
H. See Standard 7
I. See Standard 7
J. See Standard 8
K. (J — Salvage) × amortization rate
L. J × 0.05, Standard 9
M. (B + D) × 0.04, Standard 4
N. (G + I + L + M) × .09, Standard 10
O. C + E + G + I + K + L + M + N
P. O ÷ population

*M & O — Maintenance and operation

If the expansion takes place on the outskirts of the community or outside existing fire district boundaries, however, the effect on costs may be much different. What will be the effect on fire response time for the existing department? Will new personnel need to be hired? Will additional capital expenditures be necessary for equipment or buildings? Will the growth area fit into the existing fire district or will a new district have to be created to provide funding and fire protection for the new residents? These questions should be considered by growing communities.

There is no reliable way to fit these questions into the relationships stated earlier. You can, though, use the relationships or standards to estimate added costs of fire service provision created by population growth. The figures will be basic cost estimates which may be influenced by the individual community's answers to such questions as those stated above.

If a community of 3,500 people experiences a population growth projected to reach 1,500 new residents, which variables in the assumptions will be affected?

- **Standard 1** — The number of pumper trucks would increase from 2.1 to 3.0.
- **Standard 2** — The replacement costs for pumper trucks would increase from $113,033 to $161,475. Annual cost would increase from $15,161 to $21,658.
- **Standard 3** — The automobile and other equipment replacement costs as a percentage of pumper truck replacement cost would remain the same (20.0%). However, the value would rise from $25,836 to $32,295. Annual costs are estimated to increase from $3,465 to $4,332.
- **Standard 4** — The maintenance and operation cost of equipment would rise from $6,201 to $7,751.
- **Standard 5** — The number of full-time fire personnel would increase from 2.1 to 3.
- **Standard 6** — The average annual salary for paid fire personnel would remain the same ($11,109), however, the gross annual salary payments will increase from about $23,329 to $33,327. This is caused by the increase in the number of pumper trucks.
- **Standard 7** — The number of volunteers and total annual expenditures for volunteers would remain constant at 21 and $8,001, respectively.
- **Standard 8** — The area and total expenditure for the firehouse would remain constant at 2,949 square feet and $103,215, respectively. (This assumes that the community had built-in excess capacity in the firehouse.) Annual ownership cost would remain $9,461.
- **Standard 9** — The maintenance and operation cost of the firehouse would remain the same at $5,161.
- **Standard 10** — Other costs would increase from $3,422 to $4,162. ($34,691 × 0.09 and $46,239 × 0.09.)

The total annual cost would increase from $76,786 to $93,853, and the per capita cost would decline from $21.73 to $18.77 — a per household decrease from $69.54 to $60.06.

Community Information Sources

- The local fire chief will be able to provide information concerning the department (personnel, equipment, the existing situation concerning needs, etc.). The chief may also know the costs of needed equipment and problems facing the department.
- The city or county offices should be able to supply budgets or cost information on the department as it exists today.
- Local banks should be able to provide information on loans, interest rates and other considerations concerning the financing of equipment and buildings.
- The city manager may be able to provide further insight into problems facing the community relating to fire protection.

Information Sources — Publications

Childs, Dan, Gerald Doeksen and Jack Frye. 1977. Economics of rural fire protection in the Great Plains. Ag. Info. Bull. No. 407, Oklahoma State Univ., Stillwater.

Mackey, R. Bruce. 1977. Costs for rural community services in Nevada — an economic-engineering approach. Ag. Exp. Sta. Bull. T21, Univ. of Nevada, Reno.

U.S. Department of Agriculture. 1977. Rural community fire protection. Forest Service Program Aid 1196.

WORKSHEET — Estimating Fire Protection Expenditures

Community population = _____

A. _____ = (_____ × _____)
Estimated number of pumper trucks | 1,000 population | Table 1 value

B. _____ = (_____ × _____)
Pumper truck replacement cost | (A) Number of pumper trucks | Table 2 value

C. _____ = (_____ × _____)
Annual cost of pumper trucks | (B) Pumper truck replacement cost | Amortization rate (Table 6)

D. _____ = (_____ × _____)
Auto and other equipment replacement cost | (B) Pumper truck replacement cost | Standard 3

E. _____ = (_____ × _____)
Annual cost of auto and other equipment | (D) Auto and other equipment replacement cost | Amortization rate (Table 6)

F. _____ = [_____ × (_____
Annual maintenance and operation of equipment | Standard 4 | Pumper truck replacement cost

× _____)]
Auto and other equipment replacement cost

G. _____ = (_____ × _____)
Number of paid personnel | Table 3 value | Number of pumper trucks

H. _____ = (_____ × _____)
Annual cost salaries | Standard 6 | (G) Number of paid personnel

I. _____ = (_____ × _____)
Annual volunteer cost | Number volunteers (Table 4) | Cost per volunteer (Table 4)

J. _____ = (_____ × _____)
Firehouse construction cost | Square feet needed (Table 5) | Cost per square foot (Table 5)

K. _____ = (_____ × _____)
Annual cost of firehouse | (J) Firehouse construction cost | Amortization rate (Table 6)

L. _____ = (_____ × .05)
Annual maintenance and operation of firehouse | (J) Firehouse construction cost | Standard 9

M. _____ = [(_____ + _____
Other costs | (F) Equipment maintenance and operation | (H) Annual cost of salaries

+ _____ + _____) × .09]
(I) Annual volunteer cost | (L) Firehouse maintenance and operation cost | Standard 10

N. _____ = _____ + _____
Total annual cost | (C) Annual cost pumper trucks | (E) Annual cost auto and other equipment

+ _____ + _____ + _____
(F) Annual maintenance and operation for equipment | (H) Annual cost of salaries | (I) Annual cost of salaries

+ _____ + _____ + _____
(K) Annual cost of firehouse | (L) Annual maintenance and operation of firehouse | (M) Other costs

O. _____ = _____ ÷ _____
Annual cost per capita | (N) Total annual cost | Community population

WORKSHEET
Estimating Growth's Impact on Fire Protection Expenditures

Estimated population increase = _____

A. _____ = (_____ × _____)
Estimated number of new pumper trucks — 1,000 population — Table 1 value

B. _____ = (_____ × _____)
Estimated cost of pumper trucks — (A) Number of pumper trucks — Table 2 value

C. _____ = (_____ × _____)
Annual cost of new pumper trucks — (B) New pumper truck cost — Amortization rate (Table 6)

D. _____ = (_____ × _____)
New auto and other equipment cost — (B) New pumper truck cost — Standard 3

E. _____ = (_____ × _____)
Annual cost of auto and other new equipment — (D) New auto and other equipment cost — Amortization rate (Table 6)

F. _____ = [_____ × (_____
Annual maintenance and operation of new equipment — Standard 4 — New pumper truck cost

× _____)]
New auto and other equipment cost

G. _____ = (_____ × _____)
Number new fire personnel — Table 3 value — Number of new pumper trucks

H. _____ = (_____ × _____)
Annual cost new salaries — Standard 6 — (G) Number new paid personnel

I. _____ = (_____ × _____)
Annual cost new volunteer — Number new volunteers (Table 4) — Cost per new volunteer (Table 4)

J. _____ = (_____ × _____)
New firehouse construction cost — New square feet needed (Table 5) — Cost per square foot (Table 5)

K. _____ = (_____ × _____)
Annual cost of new firehouse construction — (J) New firehouse construction cost — Amortization rate (Table 6)

L. _____ = (_____ × .05)
Annual maintenance and operation of new firehouse — (J) Firehouse construction cost — Standard 9

M. _____ = [(_____ + _____
Other new costs — (F) New equipment maintenance and operation — (H) Annual cost new salaries

+ _____ + _____) × .09]
(I) Annual cost new volunteers — (L) New firehouse maintenance and operation costs — Standard 10

N. _____ = _____ + _____
Total increase in annual fire expenditures — (C) Annual cost of new pumper trucks — (D) Auto and other new equipment cost

+ _____ + _____ + _____
(E) Annual cost of auto and other new equipment — (F) Annual maintenance and operation of new equipment — (H) Annual cost of new salaries

+ _____ + _____ + _____
(I) Annual cost new volunteers — (K) Annual cost of new firehouse construction — (L) Annual maintenance and operation of new firehouse

+ _____
(M) Other new costs

Cost of Public Service: Fire Protection is the third in a series of bulletins on estimating costs of public services in various size Idaho communities. Other bulletins in that series available from the University of Idaho Agricultural Information Department are as follows:

EXT 602 Residential Growth: Its Benefits and Costs to the Local Community ..... 50 cents

EXT 604 Cost of Public Service: Education ..... 25 cents

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EXT 607 Cost of Public Service: Sewage Collection and Treatment ..... 25 cents

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