

# Appendix A

## Exercises in Costing

### Exercise 1 A Problem in Riverbridge

In this exercise you are asked to analyze a problem, suggest an attack on the problem, and then, in four steps, to discuss elements of the solution to the problem. Please read the material on each Problem and note answers to the questions asked in the space provided. To the extent that time allows, after each Problem, your group will report on the results of your discussion.

Deal with each part of this exercise before moving on to the next part.

#### **Background**

Riverbridge, an old city, is a compact, inner-core suburb of a large metropolitan area. Its population of about 100,000 people inhabit 6.2 square miles of land and reflect a diverse population of the Whites, Blacks, Hispanics, Portuguese, Italians and other ethnic groups.

#### **Governmental Structure**

Since the 1940s, Riverbridge has had a Council/Manager form of government. A nine member council is elected at-large every two years. The City Council selects a Mayor from among its members and the Mayor, in addition to presiding over the City Council, acts as chairman of a separately elected School Committee. The City Manager, appointed by the City Council, serves as chief executive officer responsible for the conduct of administrative operations.

While the City Charter officially requires councilors to deal only with the Manager, in fact there has been a long tradition of direct dealing between various councilors and department heads. This has tended to allow some department heads to function with almost complete independence from the Manager and central process agencies.

City Councilors are formally elected at large yet most of the long term incumbents have a recognized base in one or two particular neighborhoods of the City. Thus many of the City's residents tend to bring their problems, complaints, etc., to "their" councilor.

#### **Neighborhood Four**

Area Four is bounded on two sides by commercial and light industrial zones, a 40 acre vacant tract of land awaiting development, a large, well-endowed university and another residential section, Midcity. Many of the residents of Area Four had once been employed in the nearby light industry but in the preceding two decades most businesses of this character had moved to the distant suburbs where land value, and consequently rent, is lower. The replacement jobs that became available were in "high tech" firms drawn to the locale because of its proximity to the University with its major research facilities.

Area Four is the site of the three largest public housing projects in the City, located in close proximity to one another. Each is about a city block in extent, and two projects are located on adjacent parcels with only a narrow alleyway between them. The administration of

public housing in the City is handled by the Riverbridge Housing Authority, an independent agency.

While little formal research had ever been conducted, it is generally agreed that the neighborhood of the City referred to as Area Four is, far and away, the poorest in the City. Even a brief visit to Area Four reveals numerous narrow streets with many boarded up apartment buildings and closed variety stores.

### **The Issue**

A City Councilor who is not usually unreasonable and is normally a supporter of the Manager has strongly attacked the manager in a private meeting with him and stated that the delivery of city services is “unfair”. In particular, Area Four, the councilor says, is not receiving its fair share of city services. The Councilor demands that the City redress the grievances of Area Four residents.

#### *Part One*

You are the Budget Director, and the Manager has informed you of the situation. Make a proposal on how to deal with the councilor's demands.

#### *Problem Two*

The manager accepted your proposal to assign budget staff to the task of conducting a cost analysis of the services provided to Area Four. Write down the **major steps** in such a cost analysis.

#### *Problem Three*

Exhibit One displays summary information about the budget for Riverbridge. This budget is a “gross budget” in the sense that all services provided by the City are financed out of the cost estimates reflected here. Study it and determine which departments should be the focus of your determination of service delivery levels. Will you limit your information gathering to services covered by this budget?

It is unlikely that much information will have already been assembled that is specific to Area Four, yet there may be some. Which departments are the most likely to have data specific to Area Four? What non-City sources might have such information?

**Exhibit One**

**GENERAL GOVERNMENT**

City Council	175 545
Mayor	160 090
City Clerk	121 400
Elections	202 280
City Manager	228 675
Law	342 835
Finance	1 253 280
Employee Benefits	9 900 872
County Tax	1 671 995
Public Celebrations	124 830
General Services	309 070
Reserve	<u>140 000</u>
	14 630 872

**PUBLIC SAFETY**

Fire	6 050 665
Police	6 272 935
Building Inspection	281 235
Civil Defense	37 845
License	41 125
Weights & Measures	54 105
Traffic & Parking	1 025 610
Electrical	1 402 380
Criminal Justice	<u>87 915</u>
	15 253 815

**COMMUNITY DEVELOPMENT**

Public Works	8 452 080
Community Development	1 678 330
Regional Transit	4 180 875
Conservation Commission	8 635
Historical Commission	48 270
Rent Control	276 170
Debt Service	5 258 085
Water	<u>2 747 895</u>
	22 650 340

**HUMAN RESOURCES DEVELOPMENT**

Health & Hospital	17 548 045
Leisure Services	3 990
Library	1 144 955
Recreation	1 453 735
Youth Resources	186 985
Community Schools	574 060
Veterans Benefits	522 125
Civic Unity	32 870
Elderly Services	148 450
Regional Manpower	530 000
City Manpower	<u>4 403 000</u>
	26 548 215

**EDUCATION**

Public Schools	25 609 783
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*Problem Four*

What is an appropriate basis for determining the “fair share” that Area Four should receive? Make more than one suggestion and critique each for its relative “fairness.”

## Exercise 1: Notes on the Solution

### Problem One: The Proposal

*Focus: a professional response.*

It has been stated that service delivery to Area Four is “unfair” so it would be appropriate to determine what services are being delivered to Area Four by the various municipal departments. Since different parts of the city are likely to be receiving a different mix of services, it is appropriate to cost the services provided to Area Four so that comparisons can be made with other areas or the city as whole. Thus a cost analysis of the services provided Area Four is called for.

### Problem Two: The Cost Analysis

*Focus: craftsman-like work.*

- **Step 1:** Using the budget as a guide determine the services that are provided Area Four.
- **Step 2:** Determine the volume of each service received by Area Four. Note that it is very likely that you will have to use expert opinion of “how much” of each service Area Four receives (e.g., How much time from each police patrol is spent in Area Four?).
- **Step 3:** Determine the direct and indirect cost for each “volume of service” received by Area Four.
- **Step 4:** The accusation of unfairness was not defined so it is necessary to determine some measure of “fairness” in service delivery before any statement about “fairness” can be meaningful: other neighborhoods of the City?, the City as a whole?, comparable sections of similar cities?, etc.

### Problem Three: Determining Services and Service Levels

*Focus: completeness.*

Possible sources of information within the city government would include police, fire, public works, building inspection, traffic and parking, community development, health & hospitals, leisure services, library, recreation, youth resources, civic unity, elderly services and education at least. Other sources, such as finance, might be able to provide enlightening information about trends in property values, tax delinquencies, etc. Beyond the question of services provided there always lingers the issue of services needed or desired.

External sources of information (e.g., the census bureau, the Chamber of Commerce, state agencies, etc.) should also be sought out. Especially because the basic complaint is not very specific, the more complete the analysis of the situation in Area Four, the more impact the report will have.

### Problem Four: The Meaning of Fairness

*Focus: a comparative evaluation*

As the problem is stated, there is no clear definition of ‘fair share.’ Indeed, the idea is probably not clear in the mind of the councilor or the residents of Area Four. Thus, a significant element in the solution to the overall problem will be a definition of ‘fair share’ and building a consensus on accepting that definition.

Services might be measured by effort (i.e., inputs or costs) and a fair share might be that Area Four gets the same ratio of resources (personnel, materials, equipment, etc.) as the rest of the city. The comparative element would express the numbers on a per capita or per

square mile basis. Since government is more about people than things, per capita seems superior as a measurement technique.

Inputs do not directly deal with results, so an output-orientation may be appropriate. Thus it could be asked, does Area Four have its trees trimmed as frequently as the city as a whole? Is police response time the same?

Efforts are like good intentions so results are generally more desirable. But even results can ignore need. From this approach, fairness might be seen as a statement that efforts (if not results) are proportional to need: to the area with the greatest need would go the greatest effort (expenditure).

All of the above tends to focus on cost alone and ignore revenue entirely. It may be appropriate to look at the *net cost* -- cost less revenue -- of services. Such an approach would unveil the subsidization of one neighborhood by another, and while it might satisfy Area Four it might anger the other neighborhoods.

For what it is worth, in the experience from which this exercise is drawn, the political authorities accepted a comparison with per capita city-wide municipal expenditures.

## Exercise 2 A Problem in Cost Allocation

In this exercise you are asked to allocate rent for one building leased by a government. Get out your calculators!

A jurisdiction rents a building (referred to as the Annex) for \$2,000 a month to provide office space for several municipal programs: Systems Analysis, Home Weatherization, Elderly Services, and Building Inspection.

Systems Analysis is the planning and design function of Data Processing that provides computing services to a number of departments. Home Weatherization is a federally funded program to assist low income home owners to reduce energy costs. Elderly Services is a municipal program to help aged shut-ins obtain adequate nutrition. Building Inspection is a mandated program to assure that construction contractors abide by applicable construction codes.

### *Part One*

Determine an appropriate basis for the allocation of the building's rent to the various programs using the building.

### *Part Two*

The following table shows space allocation for the Annex. Use it to allocate the full rent to the various programs.

<b>Program/Function</b>	<b>Area in Sq. Ft.</b>
Systems Analysis	24,000
Home Weatherization	20,000
Elderly Services	20,000
Building Inspection	11,000
Hallways, Stairs, etc.	13,500
Toilets	1,500
Available Space	<u>10,000</u>
<b>Total</b>	<b>100,000</b>

### *Part Three*

What is to be done with the Available Space and its rent cost of \$235.29?

### *Part Four*

How should a cost that cuts across fiscal years be handled (for example, a bill for \$4,000 for building insurance for the calendar year, while the fiscal year is July to June)?

### *Part Five*

How would you allocate a cost which consists of a fixed base charge and a variable use charge, such as the Annex's telephone bill?

### *Part Six*

Assume that the city has just rented out the remaining space to a private firm for \$2,000 per month. How are the answers to the preceding questions altered?

## Exercise 2 Solution

### *Part One: Answer*

Space, probably on a square foot basis. But never forget benefit as a criterion: if some of the space is in less finished rooms in the basement which perhaps have no windows, rent should probably be less for this area.

### *Part Two: Answer*

The space (15,000 square feet) for the hallways, stairs, toilets, etc. constitute “building overhead” whose rent will have to be allocated to the other functions. Using ‘share of the space’ as the allocation technique, each function will receive a fraction of the total bill for rent as determined by the following formula:

$$\text{Function's rent} = (\text{Function's space} / (100,000 - 15,000)) \times \$2,000$$

Thus, for example, the rent for Systems Analysis works out to be:

$$24,000 / 85,000 \times \$2,000 = \$564.71$$

The complete list of rents is given below:

Systems Analysis	\$ 564.71
Home Weatherization	470.59
Elderly Services	470.59
Building Inspection	258.82
Hallways, Stairs, etc.	0
Toilets	0
Available Space	<u>235.29</u>
<b>Total</b>	<b>\$2,000.00</b>

### *Part Three: Answer*

As long as there is no direct benefit of that space to the other programs in the building, the rent should not be allocated to them alone. Rather it should become part of the general indirect cost of the government (whence some fraction will be allocated back to the programs working in the Annex).

Note that if it is the practice of the Data Processing function to fully recover its costs from benefiting departments and if the other functions in the Annex use Data Processing, then these functions will indirectly pay some fraction of the Systems Analysis rent.

### *Part Four: Answer*

The insurance bill should be prorated by fiscal year and then the current year portion can be allocated to the benefiting functions (probably by space, as long as it reflects the benefit each function receives from the insurance).

### *Part Five: Answer*

The fixed base charge should be *allocated* by benefit (perhaps by the number of handsets) while the long distance bills should be *assigned* to whatever function made the calls.

### *Part Six: Answer*

They are not altered. As Gertrude Stein nearly said: A cost is a cost is a cost. The existence of a revenue does not alter cost at all (although if you are looking at net cost — cost less revenue generated — the Annex is now producing a profit) because the internal city functions will (should) continue to pay rent.

### Exercise 3 True-False Questions

Indicate below whether the following statements are true or false.

1. In evaluating bids for a piece of high technology equipment, the decision should be made on the lowest cost of acquisition of the hardware.      \_\_\_ True    \_\_\_ False
2. Indirect costs should be included in the comparison of in-house service delivery versus contracted out service delivery.      \_\_\_ True    \_\_\_ False
3. The police chief's salary is a direct cost of the public safety function.      \_\_\_ True    \_\_\_ False
4. The police chief's salary is a direct cost of the service of criminal investigation.      \_\_\_ True    \_\_\_ False
5. Increases in unit costs are always an indication of a problem.      \_\_\_ True    \_\_\_ False
6. Knowledge of the total cost of providing a service is always a relevant factor in fee setting.      \_\_\_ True    \_\_\_ False
7. Sunk costs are not relevant for government decision making.      \_\_\_ True    \_\_\_ False
8. Implementing a cost accounting system makes cost analysis unnecessary.      \_\_\_ True    \_\_\_ False
9. The expenditure ledger for the current year provides all the information necessary for costing services.      \_\_\_ True    \_\_\_ False
10. Generally Accepted Accounting Principles (GAAP) are designed to provide information on the "true economic cost" of providing services.      \_\_\_ True    \_\_\_ False

## Exercise 3 Solution

### Question 1

In evaluating bids for a piece of high technology equipment, the decision should be made on the lowest cost of acquisition of the hardware.

**False.** The lowest life-cycle cost of the system provides a better selection method because it includes ALL costs associated with acquisition and operation.

### Question 2

Indirect costs should be included in the comparison of in-house service delivery versus contracted out service delivery.

**False.** Only costs that are *avoidable* should be used in a comparison of in-house versus contracted out service delivery. Generally only a portion of indirect costs are avoidable.

### Question 3

The police chief's salary is a direct cost of the public safety function.

**True.** The police chief's salary can be specifically assigned to the function of public safety.

### Question 4

The police chief's salary is a direct cost of the service of criminal investigation.

**False.** The police chief's salary is an *indirect* cost of the service of criminal investigation because it is necessary for criminal investigations but cannot be directly assigned to one service.

### Question 5

Increases in unit costs are always an indication of a problem.

**False.** Increases in unit costs almost always indicate that something has changed but change is sometimes for the better as in the example of a purchasing office that started to use blanket purchase orders for frequently purchased goods. The result was a decline in the number of purchase orders that caused an increase in the unit cost per purchase order but an increase in efficiency and customer satisfaction.

### Question 6

Knowledge of the total cost of providing a service is always a relevant factor in fee setting.

**True.** Total cost, expressed as the sum of direct and indirect costs, is always a relevant factor in fee setting but not necessarily a controlling one. For various reasons, governments set fees to recover less than total cost.

### Question 7

Sunk costs are not relevant for government decision making.

**False.** Sunk costs can be relevant when the assets they purchased can be redirected to avoid additional expenditures. However, a sunk cost should never be used as an argument against a proposed expenditure when that expenditure can be demonstrated as in the best interests of the government.

### Question 8

Implementing a cost accounting system makes cost analysis unnecessary.

**False.** Cost accounting systems provide a lot of information about direct and indirect costs but little information about avoidable costs, marginal costs, etc. Cost analysis will still be needed.

*Question 9*

The expenditure ledger for the current year provides all the information necessary for costing services.

**False.** Current services are frequently financed by expenditures from prior periods (e.g., the use of previously purchased equipment) and expenditures to be financed in future fiscal periods (e.g., current year increases in unfunded pension liabilities). Costing services requires an awareness of the different fiscal periods that might finance a service.

*Question 10*

Generally Accepted Accounting Principles (GAAP) are designed to provide information on the “true economic cost” of providing services.

**False.** GAAP is designed to display compliance with applicable federal, state and local requirements regarding revenues and expenditures. While important and necessary, this is a far cry from the information necessary to make the best management decisions.

## Exercise 4: Costing Two Officer Patrol Cars

### *Problem Statement*

A certain well-to-do neighborhood of a city has experienced an increase in burglaries that has alarmed the residents. The burglars strike during the day and the night and, in at least one instance, have shown themselves to be armed and dangerous. There is a feeling that “something must be done.”

A previously unsuccessful candidate for the city council says that the neighborhood needs extra patrols and recommends that three additional motorized patrols be established, day and night.

Your task is to determine the increase in cost this proposal will require, assuming that:

- 1 New staff and vehicles will be required to staff the patrols;
- 2 Police benefits as a percent of payroll are 42 percent;
- 3 Patrol officers work a four-days-on and two-days-off schedule;
- 4 The average officer on the force takes a grand total of 45.33 paid but un-worked days each year;
- 5 The per mile cost of a police cruiser (all inclusive) is \$1.25;
- 6 The patrol in question will require 10,000 miles a year;
- 7 The average patrol officer earns a base salary of \$22,500 per year; and,
- 8 The contract with the police union requires two officer patrol cars.

## Exercise 4 Solution Outline

The most common approach is to establish personnel costs first and then non personnel costs.

### *Personnel Costs*

The staffing factor is determined by:

$$365 \text{ desired service days} / (4 \text{ on} + 2 \text{ off}) \times 4 \text{ days on} = 243.33 \text{ paid days.}$$

Days actually worked are, therefore,  $243.33 - 45.33 = 198.00$  effective days. The staffing factor is:

$$365 / 198 = 1.843$$

The cost of one patrol is, therefore:

2 officers x 3 shifts x 1.843 staffing factor x \$22,500 salary x 1.42 (to include benefits) or \$353,303.10 per car. Since there are three cars, total personnel costs are \$1,059,909.30 but, be sure to include non-personnel costs.

### *Non Personnel Costs*

Non personnel costs are 3 cars x 3 shifts x 10,000 miles x \$1.25 per mile or \$112,500.

Thus the total cost for this new service is \$1,172,409.30, or a tidy hunk of change by anyone's accounting.