The Water Rate Calculator Guidebook

State of Alaska
Sarah Palin, Governor

Department of Commerce, Community, and Economic Development
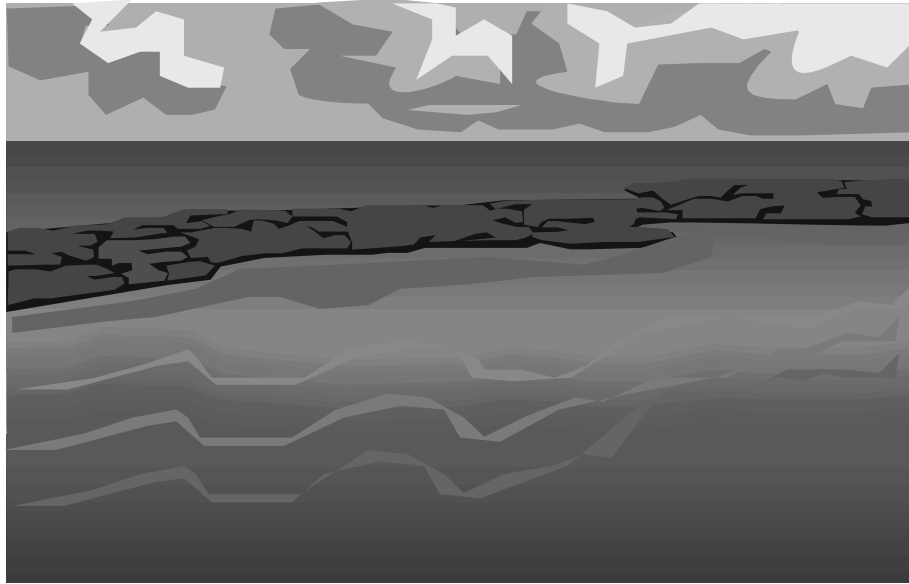Emil Notti, Commissioner

The Water Rate Calculator Guidebook

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What is the Cost of a Gallon of Water in Your Community?

After using the **Water Rate Calculator**, you will know. Really, when you think of it, the cost of a gallon of water comes down to answering three questions:

- How much does it cost to produce the water?
- How much water do you produce?
- How many customers are paying for the water?

The **Water Rate Calculator** is a user-friendly interactive spreadsheet in Excel software that will guide you through the process of finding and entering information you need to answer these three questions. First, the calculator and guidebook will help you identify all the expenses – both the obvious ones and the not so obvious ones – associated with producing a gallon of water in your community. Then, you will take a look at your entire customer base and determine how much water is actually being used by each type of customer. You will look at the amount of money you expect to receive from your water customers and compare it with the amount of money you actually receive from them. You will then learn how to design a rate structure for all of your water customers. Finally, you will arrive at the actual cost of a gallon of water in your community.

When you know the real cost of producing a gallon of water, you will be able to set realistic rates to sell that water to your customers so that your utility can stand on its own financially. This will bring you one step closer to achieving "capacity" – a goal the State of Alaska has identified for all rural utilities. Capacity is the ability of your community to staff, operate, manage, and finance its own utility.

The **Water Rate Calculator** makes assumptions that will not fit everyone's water utility perfectly. You can, however, adapt the tool to fit your community's water utility by changing the assumptions to reflect the situation in your community.

This guidebook is organized as a companion to the **Water Rate Calculator.** It has a quick-start guide for using Excel, six parts that directly correspond with the **Water Rate Calculator** spreadsheet and two appendices that provide management tools.

Here is how the **Water Rate Calculator** and the guidebook are organized:

Using Excel - A Quick Guide

Are you new to Excel? If you are, visit this section before you do anything with the **Water Rate Calculator.** It offers a quick overview of how to load and save Excel files as well as how to enter information into the worksheet. **Even the experienced user needs to refer to page 10 in this section of the guidebook.** There, you will find specific instructions for changing the security level of your spreadsheet so that you can work with the **Water Rate Calculator.**

Part 1: Annual Water Utility Expenses

In Part 1 of the guidebook, you will identify all of the expenses related to the production of water in your community. These will include the obvious expenses, such as salaries and chemicals for the water treatment plant, as well as not-so-obvious expenses, such as parts that will need to be replaced in the future. After you have completed this section, you will know how much it actually costs to produce the water in your community each year.

Part 2: Collection Rate

In Part 2, you will determine your community's collection rate—the percentage of your water income that you actually receive. You will also learn the difference between billed income and collected income.

Part 3: Annual Water Production and Water Usage

Completing the tasks in Part 3 will perhaps be the most time-consuming part of the guidebook, but you will learn valuable information about your water utility. You will find out how many gallons of water your utility actually produces in a year. You may be surprised at the amount of water produced. After you have finished Part 3, you will also have a good idea of the water usage patterns of each customer type.

Part 4: Customer Classes and Weights

In Part 4 you will learn how to create a rate structure for your customers using a concept known as "weighting."

Part 5: Water Rates Needed to Break Even

Based on the information you have put into the calculator, Part 5 of the spreadsheet will identify your community's breakeven water rates with a 100% collection rate. These are the water rates your community needs to charge each customer account type in order to generate the amount of income needed to cover the expenses of the utility. Part 5 also takes these breakeven water rates and factors in your community's collection rate, resulting in higher rates needed to accommodate the percentage of nonpaying customers.

Part 6: Testing Different Collection Rates

In Part 6 of the **Water Rate Calculator**, you can participate in a "what if analysis." Using the water rates calculated in Part 5, you will be able to vary the collection rates for all or some of your customer account types and immediately see the water rates change.

Appendices: Management Tools

Appendix A: Setting Your Water Rates

The breakeven water rates generated in Part 5 may seem high to some communities. There are accepted state and national standards for water rates based on the Median Household Income for your community. In this section you will enter the Median Household Income for your community into the calculator and discover how your breakeven water rates compare to state and national standard rates.

Appendix B: Fuel Cost Calculator

This tool will help you plan for the future of skyrocketing oil prices. The fuel expense you entered into the annual expenses worksheet will be applied with this tool. This section allows you to enter percentage increases in fuel costs into the spreadsheet and find out how much more revenue your utility will need to cover fuel costs in the future.
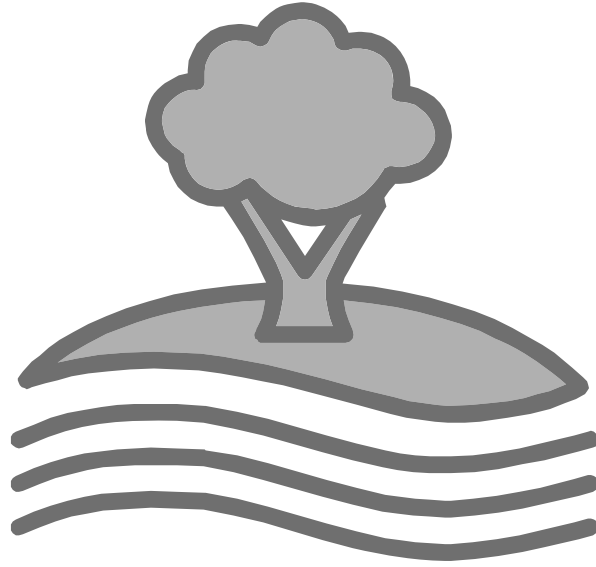
Using Excel -
A Quick Guide

If you have not used Excel spreadsheet software before, look through this chapter to familiarize yourself with the basics. If you are an experienced Excel user, make sure to change the security level of Excel as instructed on page 10 before you go on to Part 1: Annual Water Utility Expenses.

Loading the Water Rate Calculator into Excel

There is one Excel file on the compact disc (CD) that accompanies this guidebook. It is called the **Water Rate Calculator.** To use this file, you must have Excel already loaded on your computer.

To load the **Water Rate Calculator** file:

- Take the CD out of the protective jacket and insert it into your computer's CD-ROM drive.
- If you are brand new to Excel, an easy way to launch your file is to go to **My Computer.** **My Computer** may be an icon on the desktop that you can open.
- Double-click the desktop icon.
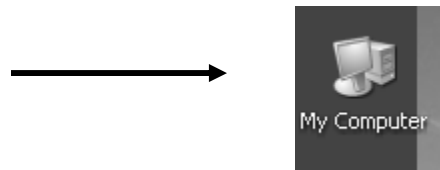
OR

- Click on the **Start** button at the lower left corner of your screen.
- Select **My Computer** from the pop-up screen.
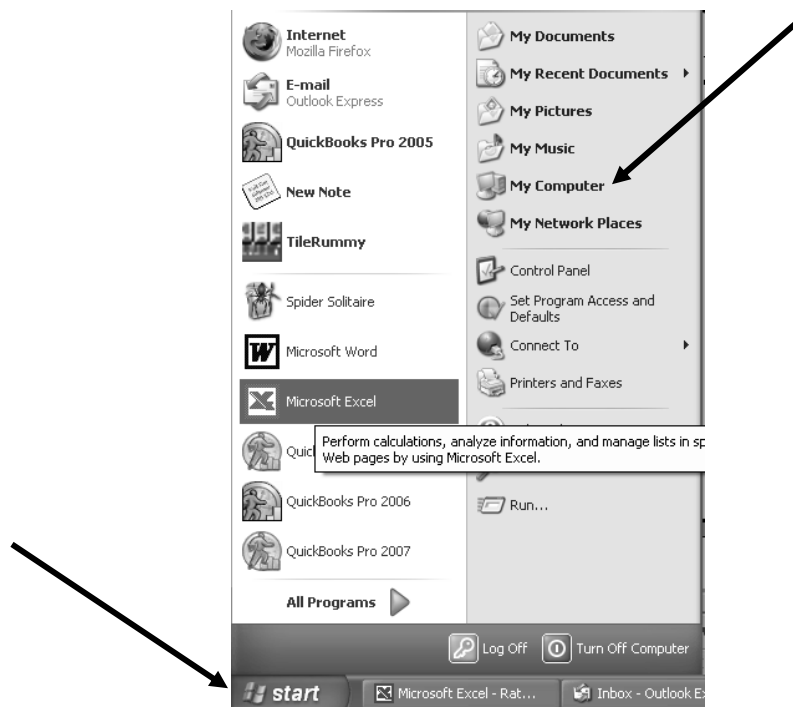
Depending on the version of Windows your computer is running, you will see a picture of your computer with all of its drives. Your **Water Rate Calculator** is located on the drive labeled CD-ROM – WATER RATES. In the example below, the **Water Rate Calculator** is located on Drive E: WATER RATES.

- Double-click your CD-ROM drive.
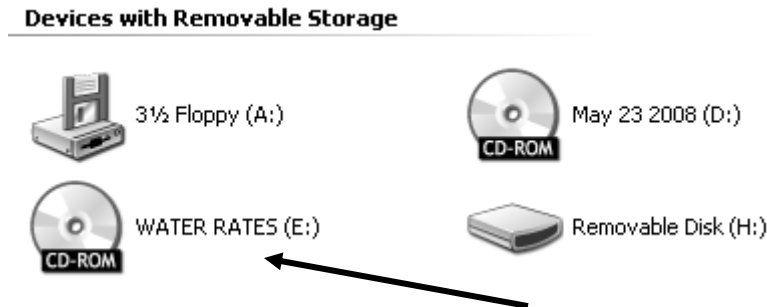
When you double-click the CD-ROM drive, you will immediately see the contents of the CD. The file you will be working with in this guidebook is named **The Water Rate Calculator.**

- Double-click this file.
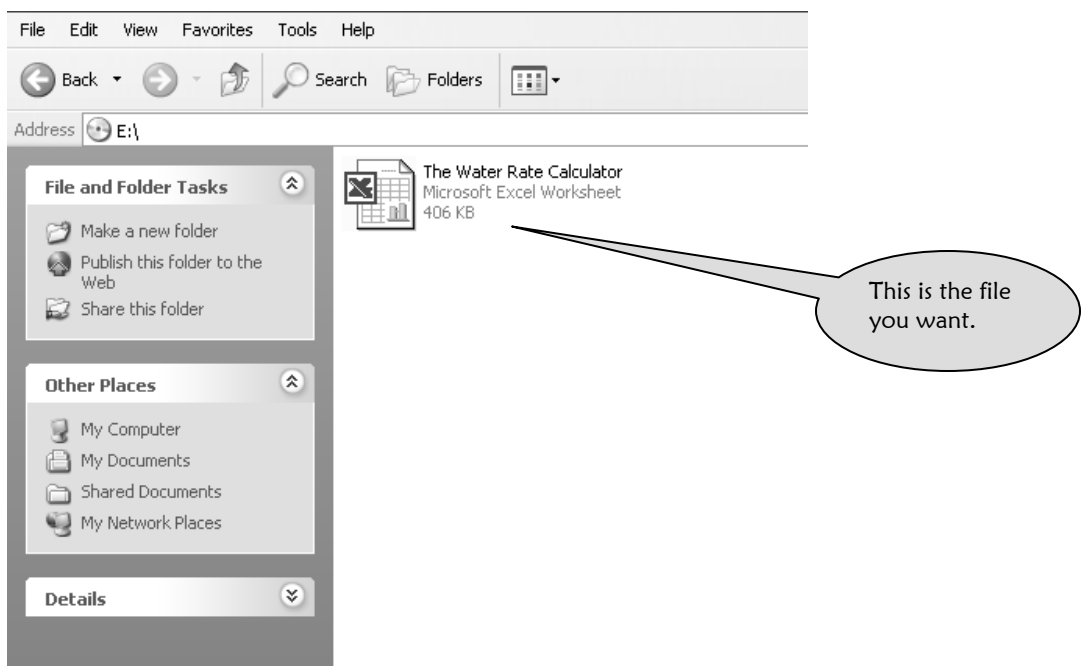
After you double-click this file, your computer will load the **Water Rate Calculator** into the spreadsheet software computer program known as Excel.

Changing the Security Level of the Water Rate Calculator

When you load the **Water Rate Calculator**, you might receive a message similar to the one below. This security message lets you know that your version of Excel is not set to read all the instructions in the **Water Rate Calculator**. If you receive this message, you must decrease the security level to proceed with the project.

- Click **OK.**

To modify the security settings for this file:

- Click **Tools** (at the top of the screen).
- Click **Macro.**
- Click **Security.**
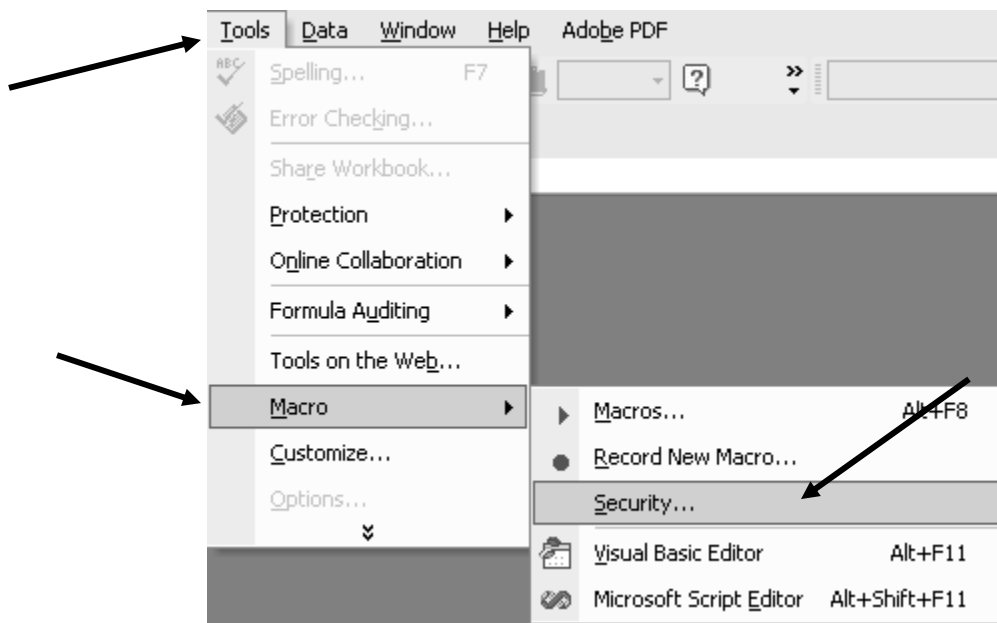
- Change the Security Level from High to Low by clicking the circle next to **Low**.
- Click **OK.**
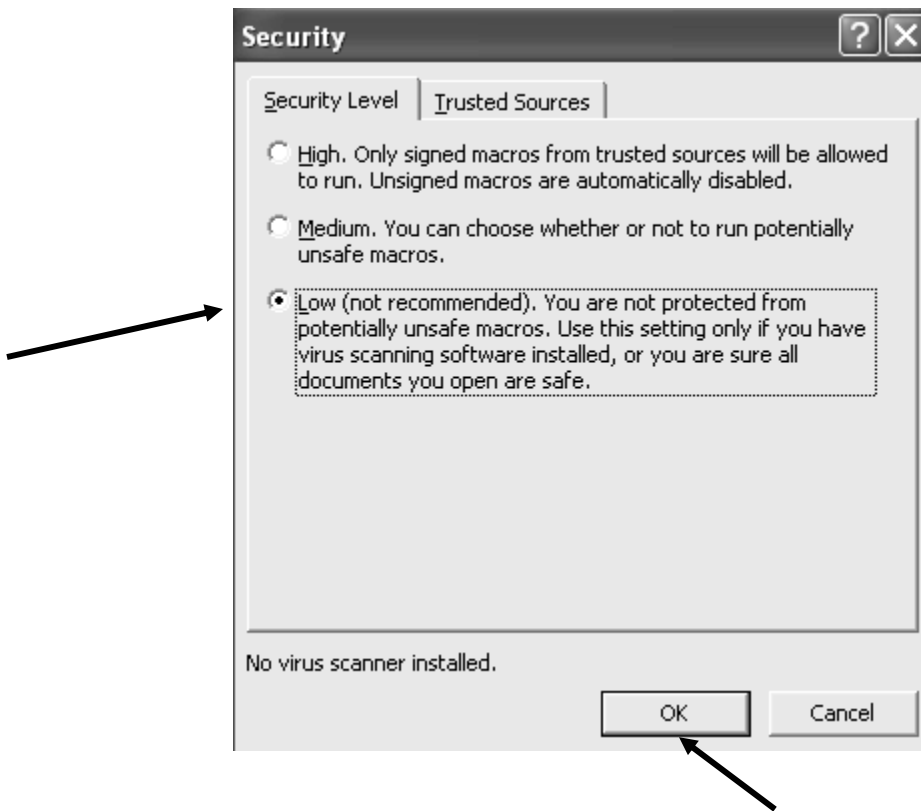
You are now ready to use the **Water Rate Calculator.**

Moving Around Inside an Excel File

When Excel opens the **Water Rate Calculator**, a worksheet will appear in the foreground. This worksheet contains columns and rows. Looking at the top of each column, you will see the alphabet across the screen. To the left of each row, numbers go down the screen.

The intersection of a column and a row is known as a cell. Each cell has an address, which is the letter of the column and the number of the row, with the column identified first – such as **I25**. A box will appear in your spreadsheet wherever your cursor is located. In the figure below, the cursor is in Cell **I25**. You can also identify the location of your cursor by reading the cell address in the top left of your screen.

You can move around your worksheet with the arrow keys on your computer. You can also scroll up and down by using the bar on the right. Practice moving around the spreadsheet. Watch the cell address change in the top left corner of your screen.
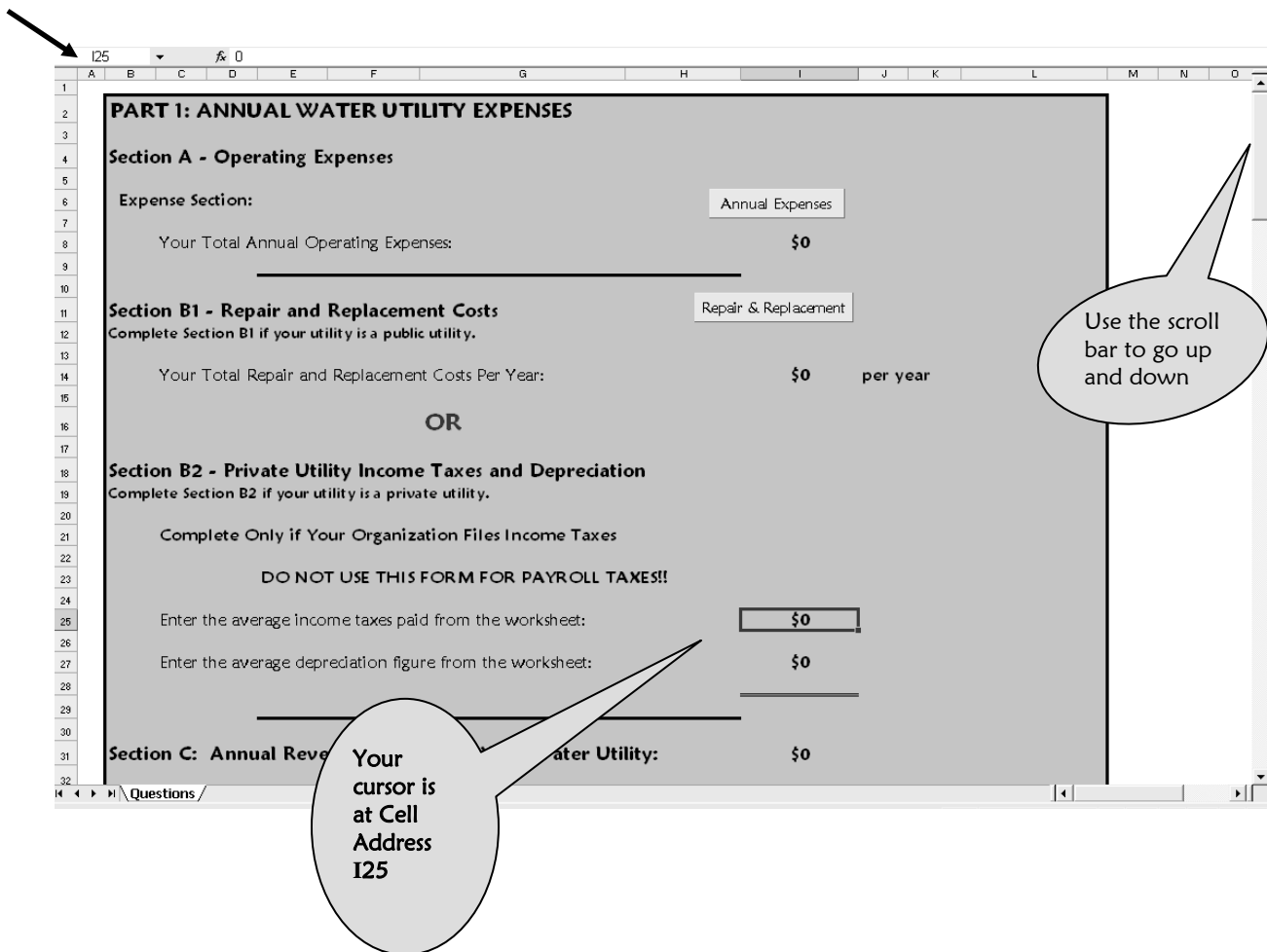
Entering Information into the Water Rate Calculator

Sometimes you will enter numbers directly into individual cells in the **Water Rate Calculator.** Sometimes you will enter numbers into UserForms embedded in the spreadsheet.

Entering, Removing, and Changing Numbers in the Cells

To enter data into a spreadsheet cell, move to the correct cell by using your arrow keys or by clicking on the cell itself.

Once you are in the correct cell:

- Type in the number.
- Press **ENTER.**

Remember to enter the number into the spreadsheet without commas or the dollar sign. The **Water Rate Calculator** will add the commas. In this example, the number 5000 was entered. It automatically appears in the **Water Rate Calculator** as $5,000.

I40	▼	fx	5000								
Name Box	C	D	E	F	G	H	I	J	K	L

PART 2 - COLLECTION RATE	
Income Section:	
Determining Your Collection Rate:	
Enter Your Total Billed Income:	$5,000
Enter Your Total Collected Income:	$0
Your Collection Rate:	0.0%

You will enter many of your numbers directly into cells on this spreadsheet as shown in the example above.

Changing and Removing Numbers in Individual Cells

To change information in any cell, go to the cell by using your arrow keys or click on the cell using your mouse.

- Highlight the cell.
- Enter the new information.
- Press **ENTER**.

To delete the contents of the cell:

- Highlight the cell.
- Press the **DEL** key.

Entering Numbers into UserForms

Not all of your numbers will be entered into spreadsheet cells. Some numbers will be entered into UserForms, which are pop-up screens. You may enter multiple numbers at a time into a UserForm. You access a UserForm by clicking on a UserForm button.

Here are examples of two UserForm buttons – **Annual Expenses** and **Repair and Replacement**.

Clicking on the UserForm button will bring the UserForm that corresponds to that button to the foreground of your spreadsheet. The UserForms also have fields requiring information. You can move around these forms with your arrow keys or by using your mouse. To enter a number into a box, highlight the zero and enter the number. You can also use the Tab or Enter keys to get to the field. The zero will be automatically highlighted for you. Once again, do not enter the dollar sign or commas.

Notice that each UserForm screen has **Clear Data** and **Save and Close** buttons.

- Click on the **Save and Close** button when you wish to save all the numbers you have entered into the screen. You will then be taken back to the main screen of the **Water Rate Calculator.**
- If the data you entered is incorrect, you may clear the screen by clicking on the **Clear Data** button. This button will zero out all the numbers you have entered.
- You can also click on **Save and Close** when you want to get back to the main screen of the **Water Rate Calculator,** whether you have finished with the screen or not.

Saving Your Water Rate Calculator File

You should save the entire file each time you use it so that all of the information you entered will be there when you return to the file.

DON'T FORGET TO SAVE YOUR FILE EVERY TIME YOU USE IT OR ALL OF YOUR NUMBERS WILL BE LOST!!

To save your file:

- Click **File** in the top left corner of your spreadsheet.
- Click **Save As.**
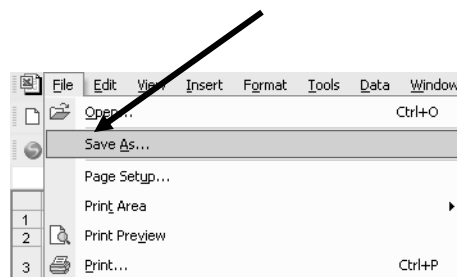
Save the file on the Desktop of your own computer so that you can easily find it later.
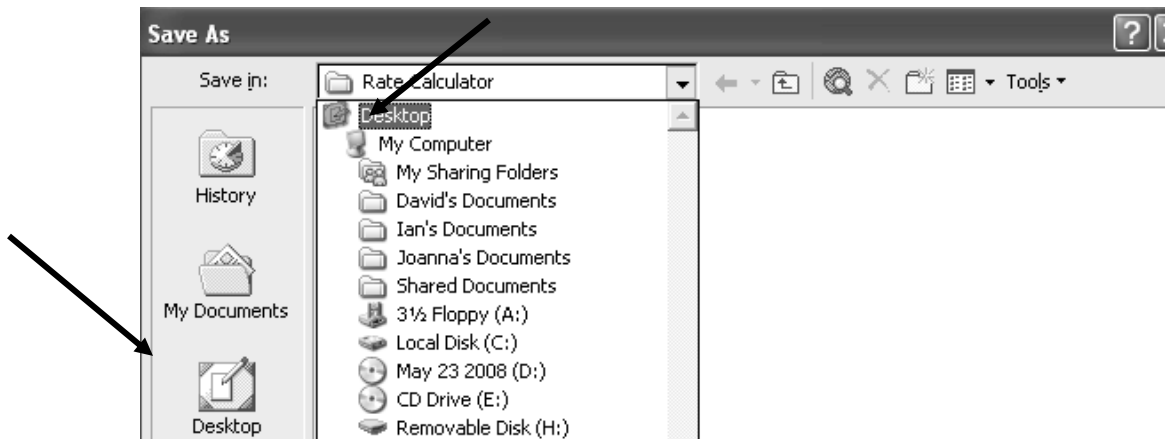
Backing Up Your File

Take the time to back up your file in case the CD or your computer is misplaced or damaged. You may also wish to create several files with different information so that you can look at different scenarios for your community. To save several different files, you must give each file a unique name.

To save your file to another location or to give your file another name:

- Insert a flash (thumb or jump) drive or a CD.
- Click **File.**
- Click **Save As.**
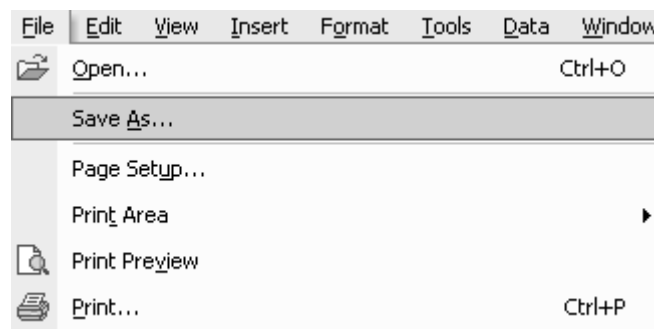
Saving the File on a Flash Drive

In the example below, the file is being saved on a flash drive and is renamed so that a second version may be saved.

This is the flash drive where the file will be saved

This is the name of the file.
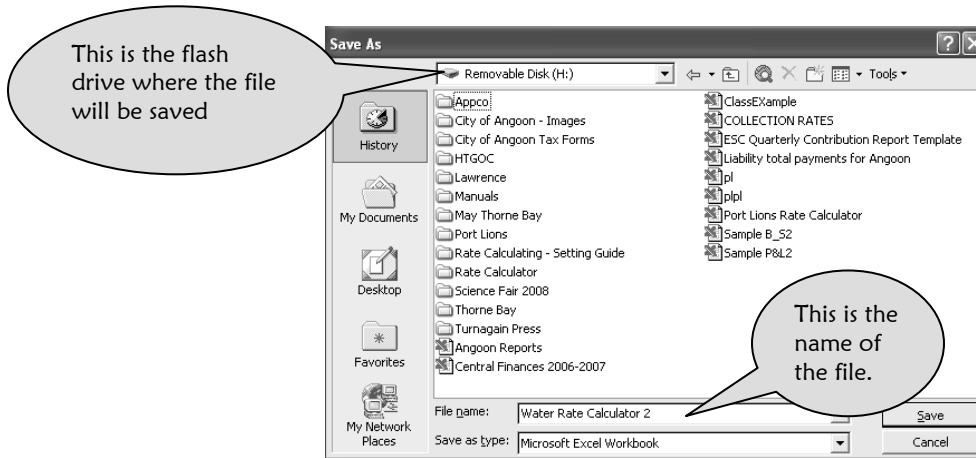
Saving the File on a CD

In this example, the file is being sent to and saved on a CD.
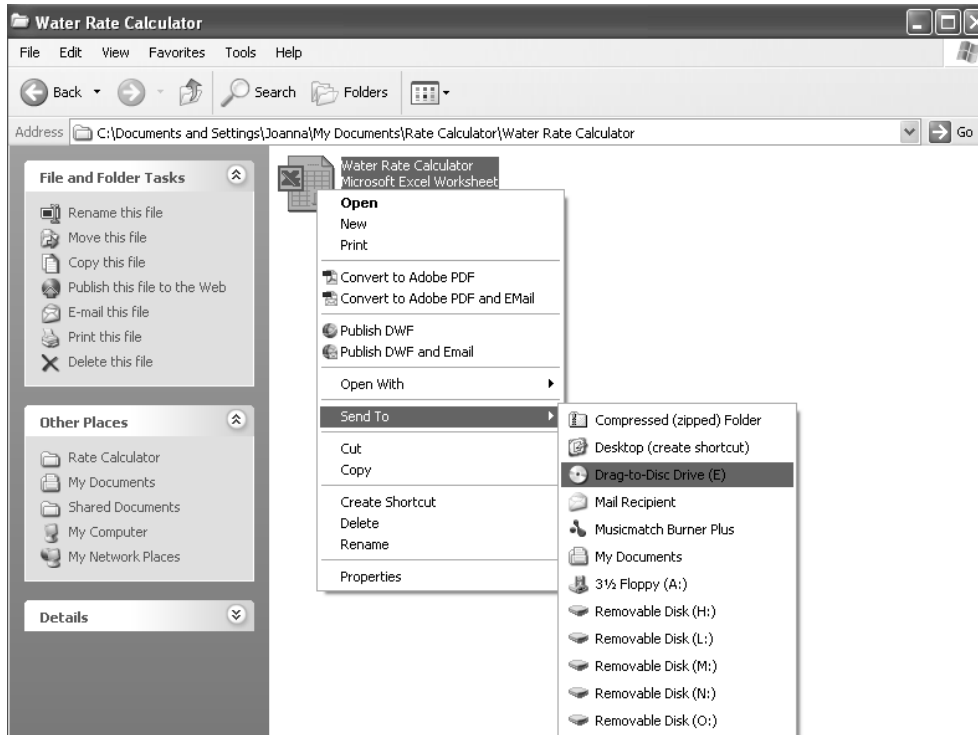
REMEMBER TO SAVE YOUR FILE WHENEVER YOU USE IT!!

Exiting Excel

After you have saved and backed up your file, you can exit Excel.

- Click **File.**
- Click **Exit.**
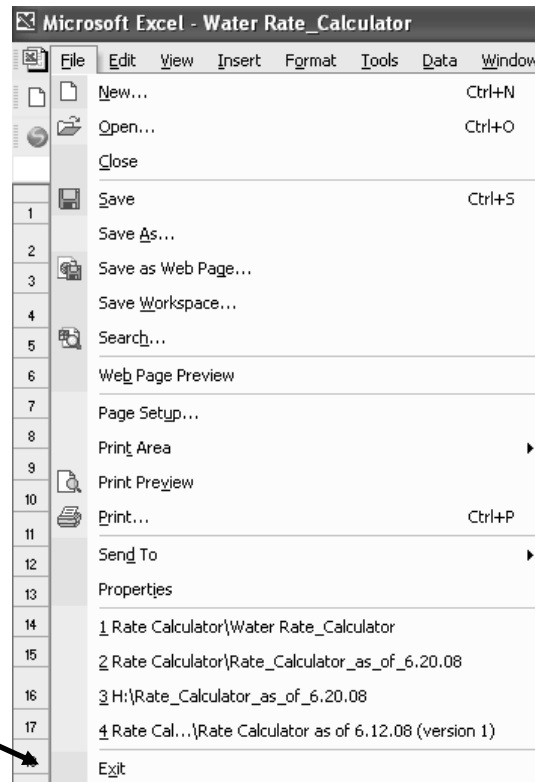
Reentering Your File

When you want to reenter your **Water Rate Calculator** file, locate the file on your desktop and double-click it.
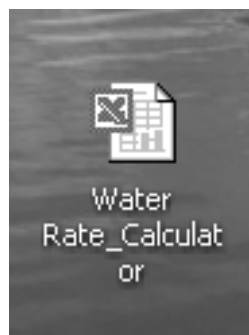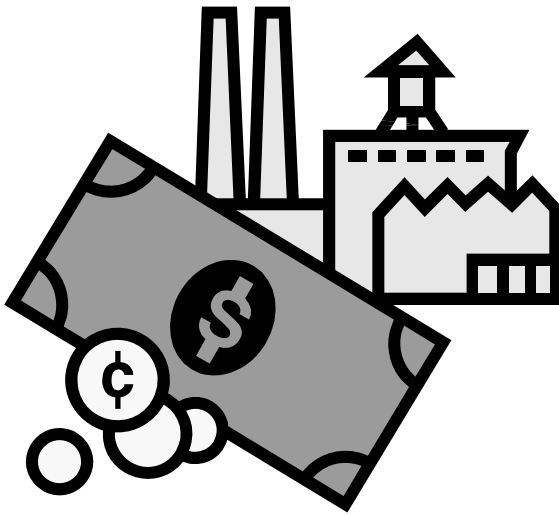
Part 1: Annual Water Utility Expenses

In this chapter you will identify all of the expenses associated with your water utility. You will then enter these expenses into Part 1 of your **Water Rate Calculator**, Sections A and B1 or B2.

Section A – Operating Expenses

Gathering the Numbers

If you work at the water plant, you may call these expenses O&M, short for operations and maintenance. Operations and maintenance expenses are all of the expenses associated with producing the water – payroll, electricity, chemicals, fuel, and office supplies, to name a few. It is important that these expenses be for the Water Department only. If your water utility is a combined water/sewer utility and you send out one invoice each month for both services, enter both water and sewer expenses and your end result will be water/sewer rates. Otherwise, if you enter only water expenses, your end result will be a water rate. These expenses can be found in the Profit and Loss Statement of your accounting records whether you have computerized accounting software, Excel spreadsheets, or manual ledgers.

Whatever system you use, gather the expenses for the past year for your water treatment plant and enter them into the Annual Expense Worksheet on the next page.

TIPS TO REMEMBER

- Expenses must be for an entire fiscal year. Most fiscal years are July 1 through June 30. Some fiscal years are October 1 through September 30.
- Expenses must be only for the Water Department or the Water/Sewer Department if you have a combined utility.
- Do not mix in totals from other departments such as Administration and Finance.

Annual Expense Worksheet

The expense categories below are the most common expenses for a water utility.   Enter the **annual** totals for your expenses in the spaces provided.   There are blank spaces at the bottom of the worksheet for expense categories not listed in this form.

Water Department Expenses - Annual Totals
July 1 through June 30

Operations & Maintenance (O&M)

Bank Charges	_____
Building Materials	_____
Chemicals & Testing	_____
Computer/Internet	_____
Contractual Labor	_____
Copier Supplies	_____
Dues & Subscriptions	_____
Electricity	_____
Equipment	_____
Freight	_____
Fuel Oil	_____
Insurance & Bonding	_____
Interest on Loans	_____
Professional Fees	_____
Office Supplies	_____
Parts & Supplies	_____
Payroll Benefits	_____
Payroll Wages	_____
Payroll Taxes	_____
Per Diem	_____
Postage	_____
Regulatory Cost	_____
Rent	_____
Repairs & Maintenance	_____
Stipends	_____
Telephone	_____
Training	_____
Travel	_____
Vehicles	_____
Worker's Comp. Insurance	_____
Other_____	_____
Other_____	_____
Other_____	_____
Other_____	_____
Other_____	_____
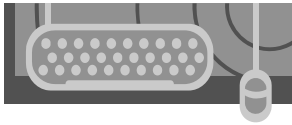
Entering the Numbers

Once you have completed the Annual Expense Worksheet, you are ready to enter the numbers into Section A of the **Water Rate Calculator.** Section A consists of a button labeled **Annual Expenses**. Clicking this button will call up a UserForm. You will enter all of your annual operating expenses into this form. The UserForm will total your expenses as you enter them. The total will then be displayed in the field below the **Annual Expenses** button.

PART 1 - ANNUAL WATER UTILITY EXPENSES

Section A - Operating Expenses

Expense Section:

Your Total Annual Operating Expenses: Annual Expenses $0

> Calls up the UserForm

> Displays the total from UserForm

- Go to Part 1, Section A, of your **Water Rate Calculator**.
- Click on the button labeled **Annual Expenses**.
- The UserForm will appear in the foreground.

Annual Expenses

Bank Charges	$ 0	Postage	$ 0	Clear Data
Building Materials	$ 0	Regulatory Cost	$ 0	
Chemicals & Testing	$ 0	Rent	$ 0	
Computer/Internet	$ 0	Repairs & Maintenance	$ 0	Save and Close
Contractural Labor	$ 0	Stipends	$ 0	
Copier Supplies	$ 0	Telephone	$ 0	Annual Expense Total:
Dues & Subscriptions	$ 0	Training	$ 0	
Electricity	$ 0	Travel	$ 0	$ 0
Equipment	$ 0	Vehicles	$ 0	
Freight	$ 0	Worker's Comp. Insurance	$ 0	
Fuel Oil	$ 0	Other	$ 0	
Insurance & Bonding	$ 0	Other	$ 0	
Interest on Loans	$ 0	Other	$ 0	
Professional Fees	$ 0	Other	$ 0	
Office Supplies	$ 0	Other	$ 0	
Parts & Supplies	$ 0	Other	$ 0	
Payroll Benefits	$ 0	Other	$ 0	
Payroll Wages	$ 0	Other	$ 0	
Payroll Taxes	$ 0	Other	$ 0	
Per Diem	$ 0	Other	$ 0	

TIPS FOR NUMBER ENTRY

- Highlight the zero by left-clicking your mouse and dragging over the zero until it is shaded.
- After you have the number highlighted, it will appear as below:

Chemicals & Testing $ 0

- Enter the correct number – in this example the yearly expense is $5,325.50 for Chemicals and Testing.   The number 5325.50 is entered.
- Note that the dollar sign and the comma are not entered.

Chemicals & Testing $ 5325.50

- Press the Tab key, the Enter key, or the down arrow to move to the next field. When you use the Tab key, the zero or number in the next field is automatically highlighted for you.
- **YOU CANNOT BACKSPACE THE ZERO OUT. YOU HAVE TO HIGHLIGHT IT OR PRESS TAB. IF YOU TRY TO BACKSPACE, YOU WILL GET THE FOLLOWING ERROR MESSAGE:**

Value error! ☒
Only numbers can be used.
OK

- Click **OK.**
- Highlight the zero and try again.

Continue pressing the Tab key, the Enter key, or the down arrow as you enter the numbers for each expense category. If you have expense categories that are not listed in this form, enter them into the lines marked **Other.**

In the example below, this water utility had Health Insurance and PERS (retirement benefit) for the water plant operator. These two categories were not in the form. The annual total expenses for these categories were entered into the fields labeled **Other.**

As you enter the numbers, notice that the expenses are being totaled at the right side of the form in the field labeled O&M Total. This total will be carried forward to the main spreadsheet.

When you have finished entering all of the information:

- Click **Save and Close.**
- You will return to **Section A: Operating Expenses.**
- Remember, if you want to clear the form and start over, click the **Clear Data** button.

Annual Expenses						
Bank Charges	$ 0	Postage	$ 52		Clear Data	
Building Materials	$ 317	Regulatory Cost	$ 0			
Chemicals & Testing	$ 6945	Rent	$ 0			
Computer/Internet	$ 917	Repairs & Maintenance	$ 3984		Save and Close	
Contractural Labor	$ 0	Stipends	$ 0			
Copier Supplies	$ 0	Telephone	$ 110		Annual Expense Total:	
Dues & Subscriptions	$ 160	Training	$ 430			
Electricity	$ 5364	Travel	$ 1652		$ 119257	
Equipment	$ 10333	Vehicles	$ 1459			
Freight	$ 1370	Worker's Comp. Insurance	$ 2624			
Fuel Oil	$ 5645	Health Insurance	$ 5354			
Insurance & Bonding	$ 0	PERS	$ 4780			
Interest on Loans	$ 0	Other	$ 0			
Professional Fees	$ 0	Other	$ 0			
Office Supplies	$ 151	Other	$ 0			
Parts & Supplies	$ 12877	Other	$ 0			
Payroll Benefits	$ 6398	Other	$ 0			
Payroll Wages	$ 43442	Other	$ 0			
Payroll Taxes	$ 4051	Other	$ 0			
Per Diem	$ 842	Other	$ 0			

The total from the **Annual Expenses** UserForm should now appear in Part 1, Section A, of your spreadsheet, underneath the **Annual Expenses** UserForm button.

PART 1 - ANNUAL WATER UTILITY EXPENSES

Section A - Operating Expenses

Expense Section: Annual Expenses

 Your Total Annual Operating Expenses: $119,257

If the total number for your expenses does not appear, it is probably because you did not save your work.
- Click the **Annual Expenses** button.
- Reenter the numbers.
- Remember to save your work this time by clicking **Save and Close**.

Section B1 - Repair and Replacement Costs
OR
Section B2 - Private Utility Income Taxes and Depreciation

> ### Important Note!!!!!
>
> For a public water utility, complete only Section B1.
>
> For a private water utility, complete only Section B2.

Section B1 - Repair and Replacement Costs
Complete this section only if your utility is a public utility.

A wide variety of water utility plants are found in rural Alaska. Systems have been designed and built to accommodate each community's varied environmental conditions, size, and need for water. Each plant consists of parts which wear out over time and sometimes break unexpectedly. Some parts need to be routinely replaced so that the plant will remain operational. Some parts need to be kept on hand so that they can be quickly installed in an emergency. Many of these parts are expensive. To be able to purchase the parts when you need them, your water utility must generate enough income to have funds available for purchasing, repairing and replacing parts.

The amount of your repair and replacement cost set-aside depends on the cost of the parts in your water system and how often they need to be replaced.   Ask your water plant operator if a replacement parts list has already been prepared. If so, you can use this list. If there is no list, call your water plant's remote maintenance worker and ask for help preparing a list.

Each part you list in the **Repair and Replacement** form should meet both of the following criteria:

- Value greater than $1,000.
- Useful life greater than one year but less than seven years.

You need the following information to create a Replacement Parts List:

- Name of each part.
- The useful life of each part. This is an estimate of how long the part in your utility is expected to last.
- The cost of each part.

Before completing the worksheet, take a look at the following example to understand the concept of an annual set-aside for repair and replacement parts.

Replacement Parts – Example

This example shows a water plant with four replacement parts. Each part costs more than $1,000.00 and each part wears out and needs to be replaced every one to seven years. The circulation pump is expected to last six years and costs $1,500. Dividing the total cost by the expected life of the part calculates the total annual cost of the part.

Name of Part	Quantity	Cost	Useful Life	Annual Cost (Cost divided by useful life)		
Circulation Pump	1	$1,500	6 years	1,500/6	=	$250

Replacement Parts Worksheet – Example

Name of Part	Cost of Part	Expected Life (Years)	Yearly Amount		
Circulation Pump	1,500	6	1,500/6	=	250
Boiler	4,900	7	4,900/7	=	700
Filter Media	3,000	6	3,000/6	=	500
Well Pump	4,000	5	4,000/5	=	800
Total amount to be set aside each year					**$2,250**

This total is an important number. It must be considered when determining the total annual revenue needed to support your utility. Thus, the replacement parts total needs to be included in the calculation for your water rates.

Using your list of repair and replacement parts, complete the following worksheet. Unlike the previous example, you do not have to calculate the yearly cost of the part. The spreadsheet UserForm will do that for you.

Water Plant Replacement Parts Worksheet

Name of Part	Quantity	Cost of Part	Useful Life
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
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_____	_____	_____	_____

Entering the Numbers

Upon completing your Water Plant Replacement Parts Worksheet, you are now ready to enter the numbers into **Part 1, Section B1,** of the **Water Rate Calculator – Repair and Replacement Costs**.

- Click on the button labeled **Repair & Replacement.**
- The UserForm **Repair and Replacement Checklist** will appear.

Section B1 - Repair and Replacement Costs
Complete Section B1 only if your utility is a public utility.

| | Repair & Replacement |

Your Total Repair and Replacement Costs Per Year: $0 per year

Using the Water Plant Replacement Parts Worksheet, enter your numbers into the UserForm. As you enter each item, observe that the annual amount to set aside is being calculated for you, under the column labeled Annual Cost. Notice also that all of the annual costs for the parts are being totaled on the right side of the form in the field labeled Annual Repair and Replacement Total.

- Enter the name of the equipment or replacement part.
- Enter the quantity.
- Type in the unit cost of the part (cost for each single piece of equipment).
- Type in the expected useful life of the part.
- When you have completed entering your list, click **Save and Close**.
- If you have entered incorrect numbers, click the **Clear Data** button and start over.
- After you click **Save and Close**, you will return to the **Water Rate Calculator** spreadsheet.

Repair and Replacement Checklist

Equipment	Quantity	Cost	Years of Life	Annual Cost	
					Clear Data
Circulation Pump	1	$ 1500	6	$ 250	Save and Close
Boiler	1	$ 4900	7	$ 700	
Filter Media	1	$ 3000	6	$ 500	
Well Pump	1	$ 4000	5	$ 800	Annual Repair and
Item 5	0	$ 0	1	$ 0	Replacement Total:
Item 6	0	$ 0	1	$ 0	
Item 7	0	$ 0	1	$ 0	$ 2250
Item 8	0	$ 0	1	$ 0	

Notice that the total annual cost of repair and replacement parts has been brought to **Part 1, Section B1,** of the main **Water Rate Calculator** spreadsheet.

Section B1 - Repair and Replacement Costs
Complete Section B1 only if your utility is a public utility.

Repair & Replacement

Your Total Repair and Replacement Costs Per Year: $2,250   per year

Section B2 - Private Utility Income Taxes and Depreciation
Complete this section only if your utility is a private utility.

> IMPORTANT NOTE: This section is specifically for Income Taxes. This section IS NOT used to enter Payroll Taxes.

Part 1, Section B2, of the **Water Rate Calculator** is for private utilities that pay income taxes and deduct depreciation. Income tax expense needs to be taken into account when determining the total cost of producing water. Depreciation expense, although classified as a tax deduction, is calculated using the useful life and cost of parts that wear out. It can be used as a substitute figure for the total calculated with the **Repair and Replacement Parts Worksheet.**

Section B2 - Private Utility Income Taxes and Depreciation
Complete Section B2 only if your utility is a private utility.

Complete Only if Your Organization Files Income Taxes

DO NOT USE THIS FORM FOR PAYROLL TAXES!!

Enter the average income taxes paid from the worksheet: $0

Enter the average depreciation figure from the worksheet: $0

Gathering the Numbers

To complete this section, you need income tax returns from the previous three years. Two numbers are needed from each of these returns:

- Total Income Taxes Paid.
- Annual Depreciation Deducted.

Enter these numbers into the Tax and Depreciation Worksheet.

Below is an example of a completed worksheet.

Tax and Depreciation Worksheet – Example

	Income Taxes Paid	Depreciation Deducted
Year 1	$ 6,000	$ 24,000
Year 2	$ 4,000	$ 28,000
Year 3	$ 5,000	$ 26,000
Total	$ 15,000	$ 78,000

Calculating the Average of Each of These Totals:

Average Income Taxes Paid:
Total Income Taxes $ 15,000 divided by 3 = $ 5,000
(Divide by 2 if you only have 2 years of income tax returns.)

Average Depreciation Paid:
Total Depreciation Paid $ 78,000 divided by 3 = $ 26,000
(Divide by 2 if you only have 2 years of income tax returns.)

Now enter your utility's data into the following worksheet:

Tax and Depreciation Worksheet

	Income Taxes Paid	Depreciation Deducted
Year 1	$_____	$_____
Year 2	$_____	$_____
Year 3	$_____	$_____
Total	$_____	$_____

Calculating the Average of Each of These Totals:

Average Income Taxes Paid:
Total Income Taxes $_____   divided by 3 = $_____
(Divide by 2 if you only have 2 years of income tax returns.)

Average Depreciation Paid:
Total Depreciation $_____   divided by 3 = $_____
(Divide by 2 if you only have 2 years of income tax returns.)

Entering the Numbers

After completing the **Tax and Depreciation Worksheet**, go to **Part 1, Section B2,** of your **Water Rate Calculator**.

- Enter the Average Income Taxes paid.
- Enter the Average Depreciation figure.

Section B2 - Private Utility Income Taxes and Depreciation
Complete Section B2 only if your utility is a private utility.

Complete Only if Your Organization Files Income Taxes

DO NOT USE THIS FORM FOR PAYROLL TAXES!!

Enter the average income taxes paid from the worksheet: $6,500

Enter the average depreciation figure from the worksheet: $2,465

Annual Revenue Needed for Your Water Utility

After you complete **Part 1, Sections A and B**, your **Water Rate Calculator** will automatically calculate and display **Section C - Annual Revenue Needed for Your Water Utility**.

Section C – Annual Revenue Needed for Your Water Utility: $130,472

What is this number? "Annual revenue needed" is the amount of income your utility needs to produce its water. In the beginning, you might have thought that operations and maintenance expenses alone would make up the cost of producing water. Now you know that you also have to include the cost of repairing and replacing plant parts or, for a private utility, the costs of income taxes paid and depreciation deducted.

You now also know the answer to the first question in the introduction of this guidebook:
How much does it cost to produce the water in your community?

In Part 2 of this guidebook, you will be introduced to the concept of a collection rate and you will determine the collection rate for your community.

Each part in this guidebook will be followed by a look at an example community called Salmon River. The examples in Salmon River show you how a community enters its information into the **Water Rate Calculator.** Sometimes the best way to understand something is to see it in practice.

Salmon River – A Look at the Numbers

Salmon River is a small community in rural Alaska. It has a public water utility with 185 customers. The utility has mostly residential customers, but it also has other customers: the school, city hall, a fuel station, store, bingo hall, and fish processing plant. Take a look and see how the Salmon River accounting clerk filled out **Part 1** of the **Water Rate Calculator**.

CALCULATING ANNUAL WATER UTILITY EXPENSES

The accounting clerk at city hall got the past year's operations and maintenance numbers from the financial records of Salmon River. She entered the following numbers in the **Annual Expenses** UserForm.

Annual Expenses					
Bank Charges	$ 200	Postage	$ 0		Clear Data
Building Materials	$ 0	Regulatory Cost	$ 0		
Chemicals & Testing	$ 8500	Rent	$ 0		
Computer/Internet	$ 0	Repairs & Maintenance	$ 6000		Save and Close
Contractural Labor	$ 0	Stipends	$ 0		
Copier Supplies	$ 0	Telephone	$ 0		Annual Expense Total:
Dues & Subscriptions	$ 0	Training	$ 1300		
Electricity	$ 12000	Travel	$ 2000		$ 353500
Equipment	$ 1500	Vehicles	$ 0		
Freight	$ 0	Worker's Comp. Insurance	$ 0		
Fuel Oil	$ 156000	Health Insurance	$ 6000		
Insurance & Bonding	$ 0	PERS	$ 4500		
Interest on Loans	$ 0	Other	$ 0		
Professional Fees	$ 0	Other	$ 0		
Office Supplies	$ 500	Other	$ 0		
Parts & Supplies	$ 0	Other	$ 0		
Payroll Benefits	$ 0	Other	$ 0		
Payroll Wages	$ 128000	Other	$ 0		
Payroll Taxes	$ 27000	Other	$ 0		
Per Diem	$ 0	Other	$ 0		

After the clerk saved her work, the **Water Rate Calculator** displayed **Total Annual Operating Expenses** of $353,500.

PART 1: ANNUAL WATER UTILITY EXPENSES

Section A - Operating Expenses

Expense Section: Annual Expenses

   Your Total Annual Operating Expenses: **$353,500**

The accounting clerk then asked the water plant operator for a list of parts that might need to be replaced in the next seven years. He called the remote maintenance worker to verify his list of parts, then gave it to the accounting clerk. She entered the equipment or part, along with the quantity needed, the cost per unit, and its useful life in years. The **Water Rate Calculator** added the annual cost for each part and displayed a running total of the costs per year for all the parts together.

Repair and Replacement Checklist

Equipment	Quantity	Cost	Years of Life	Annual Cost
Circulation Pump	4	$ 6000	6	$ 4000
Boiler	1	$ 4900	7	$ 700
Filter Media	6	$ 3000	6	$ 3000
Well Pump	4	$ 4000	5	$ 3200
Main Line Valve	1	$ 600	6	$ 100
Item 6	0	$ 0	1	$ 0
Item 7	0	$ 0	1	$ 0
Item 8	0	$ 0	1	$ 0
Item 9	0	$ 0	1	$ 0
Item 10	0	$ 0	1	$ 0
Item 11	0	$ 0	1	$ 0
Item 12	0	$ 0	1	$ 0
Item 13	0	$ 0	1	$ 0
Item 14	0	$ 0	1	$ 0
Item 15	0	$ 0	1	$ 0
Item 16	0	$ 0	1	$ 0
Item 17	0	$ 0	1	$ 0
Item 18	0	$ 0	1	$ 0
Item 19	0	$ 0	1	$ 0
Item 20	0	$ 0	1	$ 0

Clear Data

Save and Close

Annual Repair and Replacement Total:

$ 11000

Grand total for all the parts
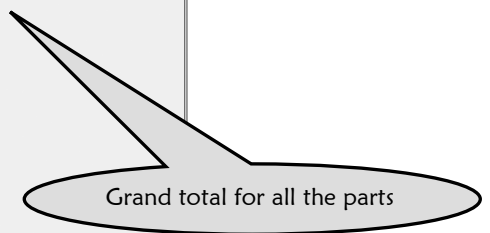
After the accounting clerk saved that information, the **Water Rate Calculator** displayed **Total Repair and Replacement Costs** of $11,000 per year.

Section B1 - Repair and Replacement Costs
Complete Section B1 only if your utility is a public utility.

Repair & Replacement

Your Total Repair and Replacement Costs Per Year: **$11,000** per year

The **Water Rate Calculator** then automatically totaled **Annual Operating Expenses** and **Total Annual Repair and Replacement Costs**. This new total became the **Annual Revenue Needed for Your Water Utility**. This number is displayed in Section C.

Section C – Annual Revenue Needed for Your Water Utility: $364,500
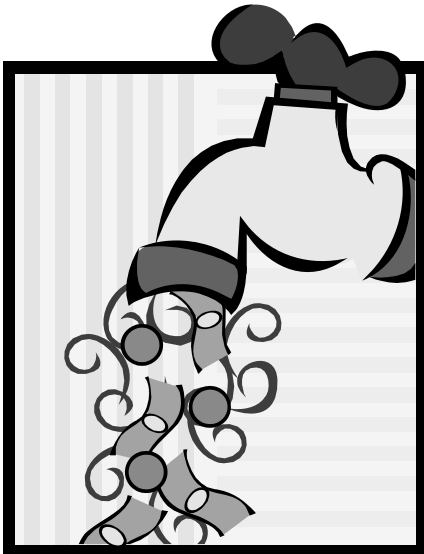
Part 2: Collection Rate

Some communities send out invoices each month, and most of their customers pay within a few weeks. When other communities send out invoices, some customers pay within a few weeks, some do not pay at all, and others pay only part of the invoice. In order for your water plant to be sustainable, your community needs to have all customers paying their invoices on time.

Billed and Collected Income – Knowing the Difference

Billed Income

Each month, your water utility invoices each water customer for water usage. If you add the total amount of the invoices for all your customers for any given month, you will arrive at your monthly billed income. Total the monthly billed income for the entire year and you will arrive at **annual billed income**.

Collected Income

Although you invoice all customers for their water usage every month, not all of them pay. As we said above, some pay part of their bill, some may not pay at all. Therefore, your collected income is the total amount of water income actually **received** in a month. Because customer payments may be sporadic and unpredictable, it is not enough to look at one month and then multiply by 12. It is best to calculate your collected income for the entire year.

In a perfect world, billed and collected income would be the same – in other words, all of your customers would pay their water bills on time. Unfortunately, this is rarely the case. To set a realistic water rate for your customers, you need to know what percentage of the total billed income you can count on receiving. A perfect collection rate is 100%. A collection rate of 0% means no one in your community pays the water bill. The closer the collection rate is to 100%, the better chance your water utility has of supporting itself.

Collection Rate

Your water utility collection rate is expressed as a percentage. The formula for this rate is:

Annual Collected Income divided by **Annual Billed Income** = **Collection Rate**

Calculating a Collection Rate – Example

Total amount of water invoices sent out from July 1 through June 30 $30,000

Total water income actually collected from July 1 through June 30 $25,000

Collection rate   83%

Here's how the percentage was calculated:

Annual Collected Income divided by **Annual Billed Income** = **Collection Rate**

    25,000   divided by   30,000   =   .83 (which is 83%)

The collection rate calculated above means that this water utility receives only 83% of the money that it asks for every month. Another way of looking at this is that for every dollar this utility is invoicing, it is receiving only 83 cents. The higher the collection rate, the better the chance a utility has of paying for its own expenses. A low collection rate means that your water utility will not be able to support itself.

Your Community's Collection Rate

You probably have a good idea of what your collection rate is before you even calculate the numbers. Think about all the invoices you mail out each month, and then think of the total amount of money you actually receive each month. Do most of your customers pay their water bills each month?

When you calculate a collection rate, you must use the same time period for both billed income and collected income. Using the numbers from the past year is best. If you do not have a year's worth of data, you may use a period of time less than one year, **but you must use the same period of time for billed income as you use for collected income.** Enter the numbers for your annual billed water utility income and your annual received water utility income in the blanks below.

Collection Rate Worksheet

	Time Period	Total
Billed Water Income	From _____to _____	$_____
Collected Water Income	(Same period of time)	$_____
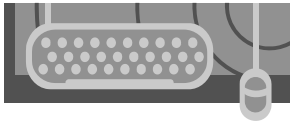
Entering the Numbers

After you have completed the **Collection Rate Worksheet** above, enter the numbers into **Part 2: Collection Rate** of the **Water Rate Calculator.**

- Enter Billed Water Income.
- Enter Collected Water Income.

Your collection rate will be automatically calculated for you.

PART 2: COLLECTION RATE

Income Section:

Determining Your Collection Rate:

Enter Your Total Billed Water Income:	$87,456
Enter Your Total Collected Water Income:	$74,382
Your Collection Rate:	85.1%

What is your water utility's collection rate? Remember, the closer the percentage is to 100%, the better off your utility is.

Later in this rate setting process you will see that your water utility's collection rate is a very significant number. Some communities may find that the expenses of their water plants exceed the revenues their plants are generating. If a community has a low collection rate, putting extra effort into improving the rate is the most effective way of generating more income for the water plant.

Remember, when you are trying to set your water rates, the total money collected from all of your customers must cover all expenses of the water plant. If some customers are not paying their water bills, the revenues may fall short of covering expenses.
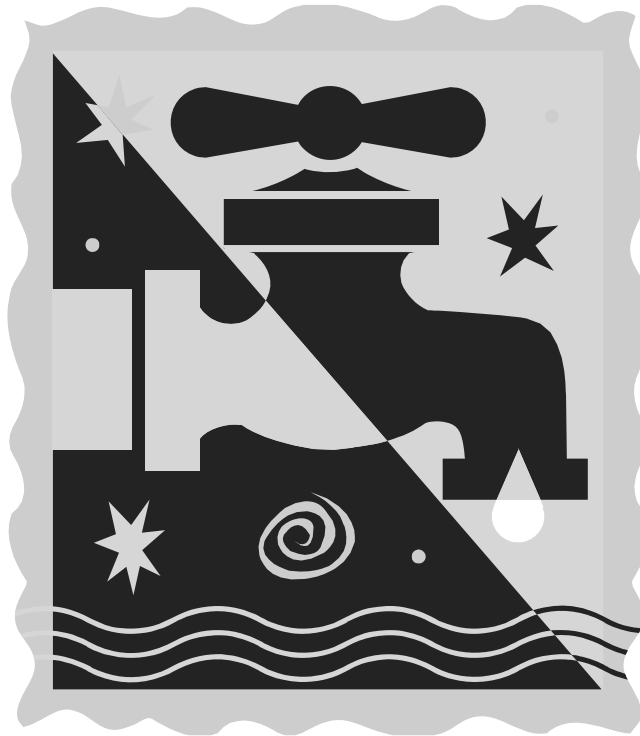
Salmon River – A Look at the Numbers

CALCULATING A COLLECTION RATE

The accounting clerk had an idea that the water utility collection rate was not great. Many customers did not pay on time, and several customers did not pay at all. She entered the total amount of all the invoices the utility sent out last year into the cell labeled **Total Billed Income**. Then the clerk totaled the money the utility actually collected from its customers for that same period of time. She was quite surprised that there was $30,000 in uncollected income. After she entered the **Total Collected Income**, the **Water Rate Calculator** immediately showed that Salmon River had a collection rate of 85%.

PART 2: COLLECTION RATE

Income Section:

Determining Your Collection Rate:

Enter Your Total Billed Water Income: $200,000

Enter Your Total Collected Water Income: $170,000

Your Collection Rate: 85.0%
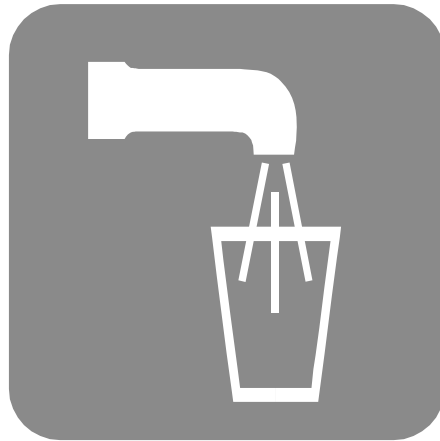
Part 3:
Annual Water Production and Water Usage

In Part 3, you will determine how much water is produced annually by your water plant and how much of that water is used by each customer account type. When you subtract the total water used by all of your customers from the total water produced at the plant, you will be left with a number that is called "calculated line loss." Line loss is a number representing the volume of water used for fighting fires, lost through leaks in the system, and used for flushing the system.

Section A - Annual Water Production

Water treatment plant operators keep detailed information on the amount of water produced every day, week, or month. The information might be in the form of a handwritten log or a spreadsheet on the computer. Find out how many gallons of water your utility produced last year. If you do not have that information readily available, ask your water plant operator to help you arrive at a figure.

If your community has a washeteria, you will not include it in this process. The water for the washeteria is taken out before the main meter that keeps track of water production. Therefore, it is not included in the water plant meter readings.

Complete the following:

Number of Gallons of Water Produced Annually   _____

Enter that number into **Part 3, Section A,** of the **Water Rate Calculator.**

Section A - Annual Water Production

Enter the Number of Gallons of Water Produced Annually: | 0 | gallons

Determining Residential Customer Types

In this section, you will identify your residential customers and figure out how much water they use on a yearly basis. There are generally three types of residential customers:

- Single-Family
- Elder
- Multi-Family

A residential customer is any family receiving water services. If a community has only one water rate for all of its families, you will have only one residential customer type.

If your community offers an elder discount, you will use two customer types – single family and elder. If your community also has multi-family dwellings with different rate structures for the families that live there, you will use this third customer type.

To start this process, locate a complete customer account list. This list should include the name of every customer currently receiving a water bill. For each customer on your list, place the appropriate letter from the choices below next to the customer name.

- "S" for a single-family residential customer.
- "E" for an elder single-family residential customer.
- "M" for each multi-family dwelling customer (if you have this type of customer in your community).

Residential Customer Type Worksheet

Total Number of Single-Family Residential Customers   _____

Total Number of Elder Single-Family Residential Customers   _____

Total Number of Multi-Family Residential Customers   _____

Total Number of Residential Customers   _____

Enter the single-family and elder residential customer totals into Section B and Section C of the **Water Rate Calculator**. Save your multi-family customers for a later section.

Section B - Single-Family Residential Customer Water Usage

How many single-family residential customers do you have?	0	customers
Enter the annual estimated gallon usage per home	0	gal/home
Estimated Annual Single-Family Residential Usage	0	gallons

Section C - Elder Residential Customer Water Usage

How many elder residential customers do you have?	0	customers
Enter the annual estimated gallon usage per elder home	0	gal/home
Estimated Annual Elder Residential Usage	0	gallons

Determining Residential Customer Water Usage

In this section you will calculate how much water your three residential customer types – single-family, elder and multi-family residential – actually use. If your community has water meters, you can determine the numbers by looking at your water records. Many communities do not have water meters for their residential customers. If this is the case in your community, you will have to estimate water usage for your residential customers.

Water meters provide a more accurate number for water usage than estimation. For this reason your community may consider installing a few water meters to assist you in arriving at accurate numbers for this rate-setting project. Water meters are inexpensive, generally around $100.00. You could meter three or four typical residences, read the meters for two or three months, and arrive at some reliable water usage numbers for your community in a short period of time.

Sections B & C – Single-Family and Elder Residential Customer Water Usage

Following are two worksheets for calculating annual residential water usage – one for metered customers and one for unmetered customers. The purpose of the worksheet is to find an annual water usage amount for an **average** residential customer. Each worksheet calculates an average based on small and large families both with and without washing machines. This average amount may be used for each of your residential customer types: single-family, elder, and multi-family.

Water Usage for Residential Customers with Water Meters

Select three or four families and find water readings for each family for one month. Suggested families to include are:

	Monthly Reading
Family with washing machine	_____
Family without washing machine	_____
Single or couple with washing machine	_____
Single or couple without washing machine	_____
Total of all the monthly readings	_____

Divide the total by the number of sample readings. In this case, there are 4 sample readings.

Total of readings divided by number of readings _____ average month

Multiply the "average month" number by 12 months _____ X 12

Average metered yearly water usage for one residential customer _____

If your community has no water meters, it is best to ask someone familiar with your water system for a realistic estimate. Try your water plant operator or your remote maintenance worker. If you have no better option, use 5,000 gallons as the estimate for monthly residential piped water usage.

Water Usage for Residential Customers with No Water Meters

	Expert Estimated Monthly Reading	Default Estimated Monthly Reading
Typical residential customer	_____	5,000
Multiply the number by 12 months	X 12	X 12
Estimated average yearly water usage for one residential customer	_____	60,000 gallons

- Enter the estimated average yearly water usage for one residential customer (from the table above) in the **Water Rate Calculator**, Sections B and C "annual estimated gallon usage per home."

After you have entered the number of customers and the annual estimated gallon usage, the estimated annual residential usage for those customers is calculated for you.

Section B - Single-Family Residential Customer Water Usage

How many single-family residential customers do you have?	155	customers
Enter the annual estimated gallon usage per home	60,000	gal/home
Estimated Annual Single-Family Residential Usage	9,300,000	gallons

Section C - Elder Residential Customer Water Usage

How many elder residential customers do you have?	20	customers
Enter the annual estimated gallon usage per elder home	64,000	gal/home
Estimated Annual Elder Residential Usage	1,280,000	gallons

Section D – Multi-Family Residential Customer Water Usage

Your community may have multi-family dwellings. Examples of multi-family dwellings are a duplex, a six-plex, and an apartment building. There may be one water meter for the entire dwelling, separate meters for each unit, or no meters at all.

Metered Multi-Family Customers

If your multi-family dwellings are metered, calculate an average rate using the worksheet below.

Water Usage for Multi-Family Residential Customers with Water Meters

Select three or four families and find water readings for each family for one month. Suggested families to include are:

<u>Monthly Reading</u>

Family with washing machine   _____

Family without washing machine   _____

Single or couple with washing machine   _____

Single or couple without washing machine   _____

Total of all the monthly readings   _____

Divide the total by the number of sample readings. In this case, there are 4 sample readings.

Total of readings divided by number of readings   _____ average month

Multiply this number by 12 months in the year   _____X 12

Average metered yearly water usage for one residential customer   _____

- Go to **Section D - Multi-Family Customer Water Usage.**
- Click on the **Metered** UserForm button.
- Fill in the UserForm using the total annual water usage calculated above.
- Click **Save and Close** when you have entered all the multi-family customers.

Compare the total number of connections to the total number of multi-family customers in the worksheet on page 42. The numbers should match. If the numbers are different, look for the mistake.

Enter the annual water usage per multi-family customer ☒

Enter the metered amount.

Type	# Connections	Annual Gallons	Est. Total Annual Usage
Multi-Family 1	6	55264	331584
Multi-Family 2	3	55264	165792
Multi-Family 3	8	55264	442112
Multi-Family 4	0	0	0
Multi-Family 5	0	0	0
Multi-Family 6	0	0	0
Multi-Family 7	0	0	0
Multi-Family 8	0	0	0
Multi-Family 9	0	0	0
Multi-Family 10	0	0	0
Multi-Family 11	0	0	0
Multi-Family 12	0	0	0
Multi-Family 13	0	0	0
Multi-Family 14	0	0	0
Multi-Family 15	0	0	0

Total:

939488

Clear Data

Save and Close

Unmetered Multi-Family Customers

If you have no water meters and your multi-family customers have water usage patterns similar to your single-family customers, use the worksheet on page 45 to calculate an estimated number.

- Go to **Section D - Multi-Family Customer Water Usage.**
- Click on the **Unmetered** UserForm button.
- Fill in the UserForm using the total annual water usage calculated for your residential customers.
- Click **Save and Close** when you have entered all the multi-family customers.

The example below shows three multi-plex dwellings in a community. One building has 5 apartments, another has 4 units and a third has 8 apartments. This totals 17 units. In this example, the suggested usage of 5,000 gallons for the month per home has been entered.

Compare the total number of connections to the total number of multi-family customers in the worksheet on page 42. The numbers should match. If the numbers are different, look for the mistake.

Enter the annual water usage per multi-family customer

Enter the unmetered amount.

Type	# Connections	Annual Gallons	Est. Total Annual Usage	
Multi-Family 1	5	60000	300000	
Multi-Family 2	4	60000	240000	Total:
Multi-Family 3	8	60000	480000	1020000
Multi-Family 4	0	0	0	
Multi-Family 5	0	0	0	Clear Data
Multi-Family 6	0	0	0	
Multi-Family 7	0	0	0	Save and Close
Multi-Family 8	0	0	0	
Multi-Family 9	0	0	0	
Multi-Family 10	0	0	0	
Multi-Family 11	0	0	0	
Multi-Family 12	0	0	0	
Multi-Family 13	0	0	0	
Multi-Family 14	0	0	0	
Multi-Family 15	0	0	0	

The **Water Rate Calculator** will display the total number of customers with annual water usage for all multi-family customers in Section D of the spreadsheet.

Section D - Multi-Family Customer Water Usage

[Metered]   [Unmetered]

Number of multi-family residential customers   17   customers

Calculated annual water usage for multi-family customers   1,020,000   gallons

Section E - Public Facility Customer Water Usage

After you have accounted for all your residential customers, the remaining customers in your community will be the public facility and commercial customers, both large and small. The local school is an example of a public facility customer. Public facility customers can be heavy water users. Most communities have meters for these customers.

List your public facility customers in the worksheet below, and check them off your master list as you enter them.

Water Usage for Public Facility Customers

Typical public facility customers include the school, post office, clinic, tribal building, and city buildings.

Public Facility Customer	Average Monthly Reading	Yearly Total
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

If your community does not have water meters for public facility users, contact your water plant operator or your remote maintenance worker to obtain an estimate. You could also contact another community and ask for the public facility water usage numbers for facilities similar to the ones in your community.

- Go to **Section E - Public Facility Customer Water Usage.**
- Select the **Metered** or **Unmetered** UserForm button.
- Enter the name and annual usage for each public facility customer.
- Click **Save and Close.**

Public Facility Usage

Enter the metered amount.

User	Annual Usage
School	2500000
Clinic	20000
City Hall	13000
Public Facility 4	0
Public Facility 5	0
Public Facility 6	0
Public Facility 7	0
Public Facility 8	0
Public Facility 9	0
Public Facility 10	0
Public Facility 11	0
Public Facility 12	0
Public Facility 13	0
Public Facility 14	0
Public Facility 15	0

Total:

2533000

Clear Data

Save and Close

The **Water Rate Calculator** will display the total annual water usage for all public facilities.

Section E - Public Facility Customer Water Usage

Metered		Unmetered

Calculated annual water usage for Public Facility customers   2,533,000   gallons

Section F - Small Commercial Customer Water Usage

The remaining customers on your list should be the large and small commercial customers in your community.   Next, you will select the small commercial customers and enter the information for them. Generally, these customers are metered.

Water Usage for Small Commercial Customers

Typical small commercial customers include stores, gift shops, bed and breakfasts, restaurants, and service businesses.

Small Commercial Customer	Average Monthly Reading	Yearly Total
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Again, if your community does not have water meters for your small commercial users, contact your water plant operator or your remote maintenance worker, or ask another community for information you can use for your small commercial customers.

- Go to **Section F - Small Commercial Customer Water Usage.**
- Select the **Metered** or **Unmetered** UserForm button.
- Enter the name and annual usage for each small commercial customer.
- Click **Save and Close.**

The **Water Rate Calculator** will display total annual water usage for all small commercial customers.

Section G - Large Commercial Customer Water Usage

The remaining customers in your master list should be the large commercial customers in your community. They are also heavy users of water and are usually metered as well. Follow the same process as you did for small commercial customers. List your large commercial customers and their water usage in the worksheet below.

Water Usage for Large Commercial Customers

Typical large commercial customers include: hotels, fish processing plant, manufacturing plant and facility.

Large Commercial Customer	Average Monthly Reading	Yearly Total
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Again, if your community does not have water meters for your large commercial users, contact your water plant operator, your remote maintenance worker, or another community to obtain estimates to use for your large commercial customers.

- Go to **Section G - Large Commercial Customer Water Usage.**
- Select the **Metered** or **Unmetered** UserForm button.
- Enter the name and annual usage for each large commercial customer.
- Click **Save and Close.**

The **Water Rate Calculator** will show the total annual water usage for large commercial customers.

Before moving on, take a moment to add the total number of customers in each customer account type on your spreadsheet. Does this grand total equal the total number of customers on your master list? If not, make the necessary corrections.

Congratulations! You have divided all of your customers into account types and you now know how much water each group uses annually.

Section H – Calculated Line Loss

Look at **Section H - Calculated Line Loss** and you will see two numbers. The first number is the total number of gallons used annually by all of your water customers. The **Water Rate Calculator** added the totals for each customer type in Part 3, Sections B through G.

The total number of gallons used annually by all of your water customers was then subtracted from the Number of Gallons of Water Produced Annually from **Section A - Annual Water Production.** The resulting number is **Calculated Line Loss, Fire Usage, and Flushing Loss.**

Section H - Calculated Line Loss (if this number is red, you have made a mistake!)

Total Gallons of Water Used by All Customer Account Types	18,466,000 gallons
Calculated Line Loss, Fire Usage and Flushing Loss	3,534,000 gallons
Line Loss as a Percentage of Total Water Produced	16.06%

What is calculated line loss? As explained at the beginning of Part 3, calculated line loss is a volume of water lost to the utility and not used by customers. Water is lost through the following ways:

- Fighting fires.
- Flushing the system.
- Water line breaks.
- Water leaks.
- Estimation errors.

When your estimated water usage numbers vary from your actual water usage numbers, the result is an estimation error. Because all estimation errors will end up in the line loss number, it is important for you to be very careful in Sections B through G when you are developing your water usage estimates.

It is a good idea to look at this number and analyze it. Ask yourself whether it seems realistic. If this number is very high, ask your water plant operator some questions. Were there any major fires that could account for this water usage? Have people left hoses running at the dock or public spigots to prevent freezing? Were there any main line breaks? Are there any water leaks in the system? Try to explain this number. If you cannot explain this number, go back over your worksheets. Recheck the number of customers you entered into each account type. Recheck the water usage numbers.

If the number for line loss is negative, there is a mistake. You cannot use more water than you produce! Go back and carefully review all the numbers you have entered to find the mistake.

Salmon River – A Look at the Numbers

CALCULATING ANNUAL WATER PRODUCTION AND WATER USAGE

The accounting clerk for Salmon River looked at the master list of customers, and this is how she separated their customer types:

Customer Type	Number
Single-family residential	150 families
Elder residential	20 families
Multi-family residential	one four-plex & one six-plex – 10 families
Public facility	one school and the city hall
Small commercial	the store and the fuel station
Large commercial	the bingo hall and a fish processing plant

She then asked the water plant operator for the water production and usage figures. Salmon River produced 20 million gallons of water in the past 12 months. She entered that number into **Section A – Annual Water Production.**

PART 3: ANNUAL WATER PRODUCTION AND WATER USAGE

Section A - Annual Water Production

Enter the Number of Gallons of Water Produced Annually: **20,000,000 gallons**

The water plant operator said that the residential customers in Salmon River were not metered, and he did not have any usage data for them. The accounting clerk called the remote maintenance worker to see if he had a good estimate. He said that the estimate in this guidebook of 5,000 gallons per family per month was a little low for Salmon River, and he suggested that a monthly usage of 5,400 gallons per family would be more appropriate.

That worked out to 64,800 gallons of water per year for each single-family residential customer (5,400 X 12). The accounting clerk entered the total number of single-family residential customers and their yearly usage per family. The **Water Rate Calculator** showed the annual usage for those customers.

Section B - Single-Family Residential Customer Water Usage

How many single-family residential customers do you have?   **150**   cust

Enter the annual estimated gallon usage per home   **64,800**   gal/home

Estimated Annual Single-Family Residential Usage   **9,720,000**   gallons

> 5,400 gallons times 12 months

The accounting clerk did the same thing with the elder customers, and the **Water Rate Calculator** gave her the annual usage for the elder residential customers.

Section C - Elder Residential Customer Water Usage

How many elder residential customers do you have?	20	customers
Enter the annual estimated gallon usage per elder home	64,800	gal/home
Estimated Annual Elder Residential Usage	1,296,000	gallons

There are two multi-family dwellings in Salmon River – a four-plex and a six-plex, both are metered. The accounting clerk clicked on the **Metered** UserForm button and entered each multi-family dwelling.   She entered the number of connections (the number of water meters in each dwelling), which, in this case, is one connection per family. From meter readings, usage was calculated as an average of 5,500 gallons per month – 66,000 per year – for each connection.

Enter the annual water usage per multi-family customer

Enter the metered amount.

This multi-family dwelling has four families, so the number of connections is four.

Type	# Connections	Gallons	Annual Usage
Multi-Family 1	4	66000	264000
Multi-Family 2	6	66000	396000
Multi-Family 3	0	0	0
Multi-Family 4	0	0	0
Multi-Family 5	0	0	0
Multi-Family 6	0	0	0
Multi-Family 7	0	0	0
Multi-Family 8	0	0	0
Multi-Family 9	0	0	0
Multi-Family 10	0	0	0
Multi-Family 11	0	0	0
Multi-Family 12	0	0	0
Multi-Family 13	0	0	0
Multi-Family 14	0	0	0
Multi-Family 15	0	0	0

Total:

660000

Clear Data

Save and Close

After the accounting clerk saved her work, the **Water Rate Calculator** tallied the connections and displayed the annual usage for all multi-family customers.

Section D - Multi-Family Customer Water Usage

Metered   Unmetered

Number of multi-family residential customers   **10** customers

Calculated annual water usage for multi-family customers   **660,000** gallons

There are only two public buildings in Salmon River – the school and the city hall. The school, like many schools in rural Alaska, is the biggest water user in Salmon River. It is metered. Last year the school used 2,985,000 gallons of water. The city hall used 15,000 gallons.

Public Facility Usage

Enter the metered amount.

User	Annual Usage
School	2985000
City Hall	15000
Public Facility 3	0
Public Facility 4	0
Public Facility 5	0
Public Facility 6	0
Public Facility 7	0
Public Facility 8	0
Public Facility 9	0
Public Facility 10	0
Public Facility 11	0
Public Facility 12	0
Public Facility 13	0
Public Facility 14	0
Public Facility 15	0

Total:

3000000

Clear Data

Save and Close

The **Water Rate Calculator** brought forward the figure from the UserForm into the area for calculated annual water usage for public facility customers.

Section E - Public Facility Customer Water Usage

Metered		Unmetered

Calculated annual water usage for Public Facility customers   **3,000,000**   gallons

The store and the fuel station are the only small commercial businesses in Salmon River. Water usage information is available because they are both metered. The clerk entered their annual usage numbers, and the **Water Rate Calculator** added these figures.

Small Commercial Usage

Enter the metered amount.

User	Annual Usage
Store	900000
Fuel Store	640000
Small Commercial 3	0
Small Commercial 4	0
Small Commercial 5	0
Small Commercial 6	0
Small Commercial 7	0
Small Commercial 8	0
Small Commercial 9	0
Small Commercial 10	0
Small Commercial 11	0
Small Commercial 12	0
Small Commercial 13	0
Small Commercial 14	0
Small Commercial 15	0

Total:

1540000

Clear Data

Save and Close

After the accounting clerk saved her work, the **Water Rate Calculator** showed the annual usage for both small commercial customers.

Section F - Small Commercial Customer Water Usage

| Metered | | Unmetered |

Calculated annual water usage for Small Commercial customers   **1,540,000   gallons**

The fish processing plant is the second biggest water user after the school. The accounting clerk entered the metered numbers for it and the bingo hall. **The Water Rate Calculator** added the numbers as the accounting clerk entered them.

Large Commercial Usage   ☒

Enter the metered amount.

User	Annual Usage
Fish Processing Plant	1500000
Bingo Hall	750000
Place 1	0
Place 2	0
Place 3	0
Place 4	0
Place 5	0
Place 6	0
Place 7	0
Place 8	0
Place 9	0
Place 10	0
Place 11	0
Place 12	0
Place 13	0

Total:

2250000

| Clear Data |

| Save and Close |

After the final annual usage number was calculated for her, the clerk saw the total displayed next to annual water usage for large commercial customers.

Section G - Large Commercial Customer Water Usage

Metered   Unmetered

Calculated annual water usage for Large Commercial customers   2,250,000 gallons

When the accounting clerk looked at Section H, it was completely filled in.

Section H - Calculated Line Loss (if this number is red, you have made a mistake!)

Total Gallons of Water Used by All Customer Account Types	18,466,000 gallons
Calculated Line Loss, Fire Usage and Flushing Loss	1,534,000 gallons
Line Loss as a Percentage of Total Water Produced	**7.67%**

She now had the entire picture of water production and usage in Salmon River. She examined the following numbers more carefully:

Total gallons produced from Section A: 20,000,000 gallons

LESS

Total gallons used by all Salmon River customers: 18,466,000 gallons

EQUALS

Line loss, fire usage, and flushing loss: 1,534,000 gallons

Line loss as a percentage of total water produced: 7.67%

The line loss percentage showed that 7.67% of all the water produced in Salmon River was not used by customers. The accounting clerk was interested in finding out if this was a reasonable number. She gave this information to the water plant operator and asked him for his opinion. He told her that there had been no fires in Salmon River in the past year. He believed the number was reasonable, and that it represented minor leaks, water left running, and the water it took to routinely flush the system. He did not believe she had major errors in her customer water usage numbers. The line loss percentage was less than 10% – a pretty low rate. Line loss percentages greater than 20% are a red flag for further investigation.
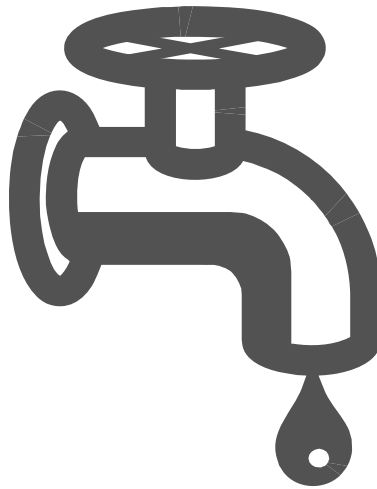
Part 4:

Customer Classes and Weights

All water utilities struggle with setting water rates. Water is a necessity and critical to life on so many levels.   Because of the different types of customers and their varying patterns of water usage, utilities create different rate structures. In rural Alaska, water plants must accommodate both the low water usage needs of single families and the very high water needs of public facilities such as the local school. Many communities see their water demand triple in the summer months as tourists arrive and lodges open for the short season.

Water treatment plants must be built to accommodate all of these heavy water users at the peak time of year. Rate structures are often created to mirror customer water usage. Sometimes, water utilities charge their heavy-use customers a higher rate per gallon to offset the cost of building and maintaining a larger water plant. Other communities charge their heavy-use customers less because they are using and paying for large quantities of water. Some communities extend discounted rates to ease the financial burden of certain customers such as elders. The purpose of Part 4 is to help you design a rate structure for the customer account types in your community.

The **Water Rate Calculator** uses a concept known as "weighting" to help you design a rate structure. A weight is a number greater than zero and less than four that causes the water rate of a certain customer account type to be higher or lower than the rate for other customer account types. A base weight of one is usually assigned to the residential class of customers. Other classes of customers may receive weights of less than one, which will result in a discounted water rate, or weights greater than one, which will result in higher water rates than the base rate.

If you give a discount to one group, that means the other groups will have to pay more to make up for it. **Remember, the goal is to raise enough money to cover your total expenses, and changing rates does not change expenses.**

When you load the **Water Rate Calculator,** all the customer types start out with the weight of 1.0, which would give all the customers the same rate per gallon of water used.

PART 4: CUSTOMER CLASSES AND WEIGHTS

Your Single-Family Residential Customer Weight	**1.0**
Your Elder Residential Customer Weight	**1.0**
Your Multi-Family Residential Customer Weight	**1.0**
Your Public Facility Customer Weight	**1.0**
Your Small Commercial Customer Weight	**1.0**
Your Large Commercial Customer Weight	**1.0**

Let's see how this works.

Weighting Customer Rates

Account Types	Weight	Rate		Monthly		Monthly Rate w/Weight
Single-Family Residential	1.0	X		35.00	=	35.00
Elder Residential	0 .5	X		35.00	=	17.50
Public Facility	2.0	X		35.00	=	70.00

In the above example, the community has decided that single-family residents will pay the base water rate. Elder customers will pay half the single-family rate, and public facility customers will pay twice as much as the single-family residents.

- The single-family residential customer becomes the base rate and receives a weight of 1.
- The elders will pay half as much as the base rate; therefore, the weight for elders is 0.5.
- The public facility customers receive a weight of 2, which means they will pay two times the base rate.

What weights should your community use? This question should be answered by the decision makers in your community. Using weighted rates should be discussed at a council meeting or by a specific group assigned to this task. Here are some guidelines to use:

- Weights are greater than zero but less than 4.
- Use a default weight of 1 for your residential customers.
- Decide if you are going to give a discount to any residential customer class. Some communities give elders a discount. As an example, a 50% discount in the elder residential account type gets a weight of 0.5. A 30% discount would be a weight of 0.7, a 40% discount would be a weight of 0.6.
- Higher weights are sometimes assigned to the heavy water users. A weight of 3 would mean that customer account type would pay three times the residential rate for its water.

Taking the above information into consideration, enter your weights into Part 4 of the **Water Rate Calculator**. If you are not using a particular customer account type, leave that weight as one.

PART 4: CUSTOMER CLASSES AND WEIGHTS

Your Single-Family Residential Customer Weight	1.0
Your Elder Residential Customer Weight	0.5
Your Multi-Family Residential Customer Weight	1.0
Your Public Facility Customer Weight	3.0
Your Small Commercial Customer Weight	2.0
Your Large Commercial Customer Weight	2.0

Salmon River – A Look at the Numbers

WEIGHTS ASSIGNED TO CUSTOMER CLASSES

Salmon River assigned weights in the following manner:

- The single-family residential customers pay the base rate – a weight of 1.
- The elder residential customers pay half of the base rate – a weight of 0.5.
- The multi-family residential customers pay the base rate – a weight of 1.
- The public facility customers pay three times the base rate – a weight of 3.
- The small commercial customers pay two times the base rate – a weight of 2.
- The large commercial customers also pay two times the base rate – a weight of 2.

PART 4: CUSTOMER CLASSES AND WEIGHTS

Your Single-Family Residential Customer Weight	1.0
Your Elder Residential Customer Weight	0.5
Your Multi-Family Residential Customer Weight	1.0
Your Public Facility Customer Weight	3.0
Your Small Commercial Customer Weight	2.0
Your Large Commercial Customer Weight	2.0
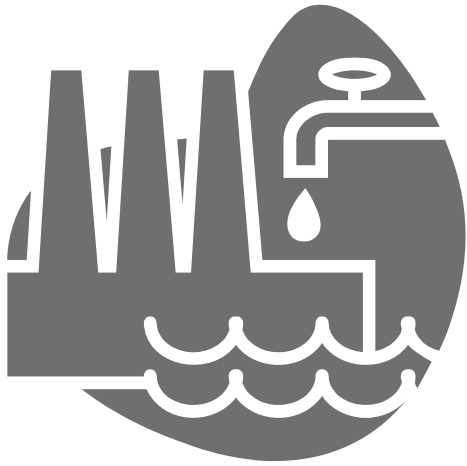
Part 5: Water Rates Needed to Break Even

Y ou have finished entering all of the data required by the **Water Rate Calculator**. Part 5 now displays your breakeven water rates.

What exactly is a breakeven water rate? A breakeven water rate is the rate your water utility must charge your customers in order to cover all of its expenses. A breakeven water rate represents the minimum monthly water charge per customer that will allow all of the utility's water expenses to be covered by its customers.

In Part 5, your **Water Rate Calculator** displays two columns of breakeven water rates. The first column shows your breakeven water rates assuming a 100% collection rate. If you use the water rates in this column, you will generate enough income to cover all of your expenses **only if all of your customers pay their water bills**. In Part 2, however, you discovered that very few communities have a 100% collection rate.

The second column of breakeven rates – the higher ones – reflects the situation in your community now – using your collection rate as calculated in Part 2. The difference between the two breakeven water rates is the amount of additional money you need to collect to account for the customers who do not pay their water bills.

Look at the two rates for your community and compare them. Are they quite different? Do the paying customers in your community have to pay a lot more to make up for the non-paying customers?

The community in the example below has an 85.4% collection rate. The breakeven rates for a residential customer break down like this:

	With 100% Collection Rate	With 85.4% Collection Rate	Difference
Class 1: Single-Family Residential	$63.07	$73.86	$10.79

In this community, each single-family residential customer would have to pay $10.79 more than the 100% breakeven rate to make up for the customers who do not pay their bills.

PART 5: WATER RATES NEEDED TO BREAK EVEN

Section A - Your Base Metered Rate: $0.014   per gallon

Section B - Your Monthly Breakeven Water Utility Rates

	WITH 100% COLLECTION RATE		WITH YOUR 85.4% COLLECTION RATE	REQUIRED REVENUE FOR EACH TYPE
Class 1: Single-Family Residential	$63.07	per month	$73.86	$102,902
Class 2: Elder Residential	$31.54	per month	$36.93	$5,445
Class 3: Multi-Family	$63.07	per month	$73.86	$17,294
Class 4: Public Facility	$0.038	per gallon	$0.045	$97,033
Class 5: Small Commercial	$0.025	per gallon	$0.029	$38,017
Class 6: Large Commercial	$0.025	per gallon	$0.029	$55,544
			TOTAL	$316,235

Let's say, for example, this community decided to charge its residential customers the breakeven rate with 100% collection: $63.07 per month. If even one customer did not pay its water bill, the utility would not make enough money to pay for itself. The community would then have to make up that shortfall with money from somewhere else.

You can now see that customers who do not pay their water bills place a burden on the entire community. Every customer will have to receive a higher water rate, as displayed in Column 2, to make up for the customers who get their water for free. Not only do some customers get away with paying nothing for their water, but the other customers must subsidize them. Essentially, you end up penalizing your faithful, reliable customers for the bad habits of others.

Although you may want to improve your collection rate by encouraging customers to pay their bills, you may never get to that perfect 100% collection rate. Part 6 will help you see how improving your utility's collection rate can bring breakeven water rates down to more manageable levels.

Salmon River – A Look at the Numbers

WATER RATES NEEDED TO BREAK EVEN

Decision makers in Salmon River realized the utility did not have a 100% collection rate and they noted the financial burden placed on the community by nonpaying customers. They were eager to identify breakeven rates for their water utility.

PART 5: WATER RATES NEEDED TO BREAK EVEN

Section A - Your Base Metered Rate: $0.013   per gallon

Section B - Your Monthly Breakeven Water Utility Rates

	WITH 100% COLLECTION RATE		WITH YOUR 85.0% COLLECTION RATE	REQUIRED REVENUE FOR EACH TYPE
Class 1: Single-Family Residential	$73.56	per month	$86.54	$131,674
Class 2: Elder Residential	$36.78	per month	$43.27	$9,452
Class 3: Multi-Family	$73.56	per month	$86.54	$8,941
Class 4: Public Facility	$0.039	per gallon	$0.045	$115,687
Class 5: Small Commercial	$0.026	per gallon	$0.031	$40,124
Class 6: Large Commercial	$0.026	per gallon	$0.031	$58,623
			TOTAL	$364,500

What can Salmon River do?

The mayor called a meeting where the following items were discussed:

- With the current collection rate of 85%, residential customers would have to pay an additional $12.98 per month to make up for lost income from nonpaying customers.
- All other customer classes would be charged an additional amount for nonpaying customers as well.
- Changing customer weights (shown in Part 4) was suggested. Perhaps increasing the weight on the public facility or large commercial customers would bring residential rates more in line. Perhaps the elder discount should be eliminated.
- Charging rates somewhere between the two rates (shown in Part 5) was recommended. If the utility did this, though, there would be a shortfall if the current collection rate did not improve. Where would the additional money come from?
- Decreasing overall water plant expenses was considered. New, lower figures were entered in **Part 1: Annual Expenses** to see how these numbers affected breakeven rates.
- Encouraging water conservation was discussed. If people shut their hoses off when not in use and tried to conserve on water use in general, the financial burden would lessen.
- A combination of several strategies was recommended. If the utility charged the higher breakeven water rate (shown in the 85% column above), and tried to improve its collection policy at the same time, it would have additional money to use for increases in

fuel costs or to make long-postponed repairs to the water plant.

- Ways to improve the collection rate were reviewed. Changing the utility collection policy or actually enforcing the policy it already has might be one way of keeping the rates down.
- During the meeting, the clerk entered information into Part 6 of the **Water Rate Calculator** to see how breakeven water rates would change when using different collection rates.
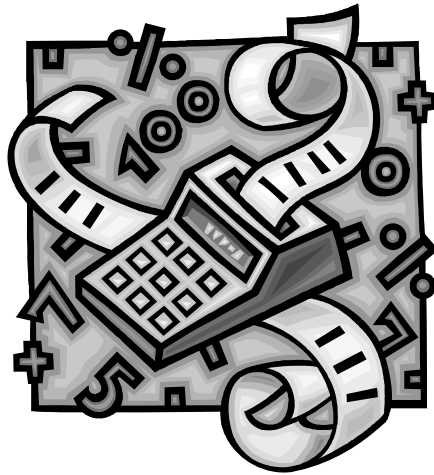
Calculating Flat Monthly Rates for Commercial Customers

The column farthest right in Part 5 of the **Water Rate Calculator** is labeled **Required Revenue for Each Type**. For each customer account type, an amount of revenue is needed to generate its portion of total water utility income. This revenue amount is determined by the **Water Rate Calculator** based on the following:

- Total number of customers in the customer account type.
- Total number of gallons used by the customer account type in a year.
- The weight assigned to the customer account type.

Notice that the total amount of all the required revenues for all customer types is equal to the total in **Part 1, Section C – Annual Revenue Needed for Your Water Utility.**

The **Water Rate Calculator** generates rates for public facility, small commercial and large commercial customers based on a per gallon cost of producing water. Some communities may wish to use flat monthly rates (like the residential rates) instead of per gallon rates for commercial customers. You can use the group revenue total for each customer type to help determine the flat monthly rates for your commercial customers.

PART 5: WATER RATES NEEDED TO BREAK EVEN

Section A - Your Base Metered Rate: $0.013   per gallon

Section B - Your Monthly Breakeven Water Utility Rates

	WITH 100% COLLECTION RATE		WITH YOUR 85.0% COLLECTION RATE	REQUIRED REVENUE FOR EACH TYPE
Class 1: Single-Family Residential	$73.56	per month	$86.54	$131,674
Class 2: Elder Residential	$36.78	per month	$43.27	$9,452
Class 3: Multi-Family	$73.56	per month	$86.54	$8,941
Class 4: Public Facility	$0.039	per gallon	$0.045	$115,687
Class 5: Small Commercial	$0.026	per gallon	$0.031	$40,124
Class 6: Large Commercial	$0.026	per gallon	$0.031	$58,623
			TOTAL	$364,500

In the example above, Salmon River decides to use a flat monthly rate for the large commercial customers instead of the $0 .026 per gallon rate given by the **Water Rate Calculator**. Salmon River has two large commercial customers, the fish processing plant and the bingo hall.

The third column shows Salmon River that the total amount of revenue required for this customer type is $58,623. To calculate a flat monthly breakeven commercial rate, Salmon River performs the following steps:

Step 1: Get the number of gallons used per year for each customer of that type from Part 3 of the Water Rate Calculator.

Customer	Gallons Used per Year	
Fish processing plant	1,500,000	
Bingo hall	750,000	
Total	2,250,000	total gallons used per year

Step 2: Calculate the percentage of the total water used for each customer.

Customer	Gallons Used/Total Gallons Used	=	Percentage of Water Used
Fish processing plant	1,500,000/2,250,000	=	0.67 or 67%
Bingo hall	750,000/2,250,000	=	0.33 or 33%

Thus, the fish processing plant uses 67% of all water used by the large commercial customers, and the bingo hall uses only 33% of the water in that customer account type.

Step 3: Calculate total annual revenue needed from each customer.

In this step, the percentages from Step 2 are multiplied by the total revenue needed for the large commercial customer type. This product is the yearly amount of revenue needed for each large commercial customer.

Customer	% Water Used X Total Revenue	=	$ Needed per Year
Fish processing plant	0.67 x $58,622.58	=	$39,277
Bingo hall	0.33 x $58,622.58	=	$19,345
Total revenue needed for this customer account type		=	$58,622

Step 4: Convert the yearly figures to monthly rates.

The figures for yearly revenue needed are converted into monthly rates simply by dividing the figure shown in dollars needed per year by 12.

Customer	$ Needed per Year/12	=	Monthly Flat Rate
Fish processing plant	$39,277/12 months	=	$3,273/mo
Bingo hall	$19,345/12 months	=	$1,612/mo

If you have no water meters, you will have to estimate water usage to determine a flat water rate.
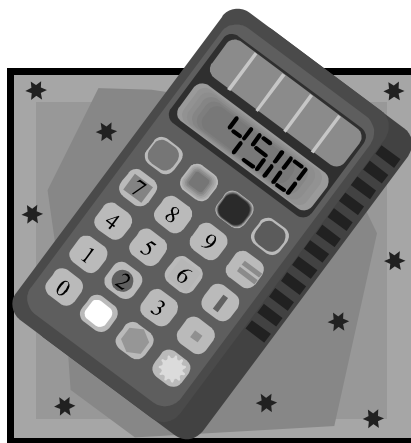
Part 6:
Testing Different Collection Rates

In Part 5 you received breakeven water rates for your water utility based on the data you entered into Parts 1 through 4. Depending on the collection rate in your community, there may be a small or a large difference between the two different breakeven water rates calculated in Part 5 – the 100% and the actual collection rates. The purpose of Part 6 is to show just how critical your collection rate is to the financing of your water utility. In Part 6, you will enter different collection rates and immediately see how your water rates change.

Understanding Collection Rates

The water rates calculated in Part 5 for Salmon River are shown below.

PART 5: WATER RATES NEEDED TO BREAK EVEN

Section A - Your Base Metered Rate: $0.013   per gallon

Section B - Your Monthly Breakeven Water Utility Rates

	WITH 100% COLLECTION RATE		WITH YOUR 85.0% COLLECTION RATE	REQUIRED REVENUE FOR EACH TYPE
Class 1: Single-Family Residential	$73.56	per month	$86.54	$131,674
Class 2: Elder Residential	$36.78	per month	$43.27	$9,452
Class 3: Multi-Family	$73.56	per month	$86.54	$8,941
Class 4: Public Facility	$0.039	per gallon	$0.045	$115,687
Class 5: Small Commercial	$0.026	per gallon	$0.031	$40,124
Class 6: Large Commercial	$0.026	per gallon	$0.031	$58,623
			TOTAL	$364,500

What does this tell us? If **everyone** in Salmon River paid their water bills, the water rates would be the rates represented in the first column. The income generated from these rates would cover all expenses of the Salmon River water utility – $364,500.

Annual Revenue Required   =   Annual Expenses +   Repair and Replacement Costs
        $364,500   = $353,500   + $11,000

However, Salmon River has an 85% collection rate, according to the amount of paid income and billed income entered in Part 2.

PART 2: COLLECTION RATE

Income Section:

    Determining Your Collection Rate:

    Enter Your Total Billed Water Income: $200,000

    Enter Your Total Collected Water Income: $170,000

    Your Collection Rate: 85.0%

If Salmon River charges the rates calculated in Part 5, Column 1, and 15% of that income (100% minus 85%) later turns out to be uncollectible, the utility will have a shortfall of $54,675.00. The 85% collection rate is now costing the water utility a whopping $54,675.00 in lost income.

In the second column, the **Water Rate Calculator** takes the 85% collection rate and adjusts the water rates to accommodate for that lost income. It displays new breakeven water rates adjusted for this collection rate. As you can see, the residential water rates have increased by $12.98 to cover this shortfall. The reliable customers are now being charged an additional $12.98 **every month** to subsidize the nonpaying customers!

Part 6 lets you participate in a process called "What if analysis." What if you start collecting from more of your customers? If you can raise your collection rates by 5%, how much less can you charge for water monthly? As you try out new collection rates, think of your nonpaying customers. Ask yourself what it would take to start collecting from these customers. How many more customers would have to start paying their bills to increase your collection rate by 5%? Using your understanding of collection rates, enter different rates to see the effect on your water rates.

PART 6: TESTING DIFFERENT COLLECTION RATES

Customer Type	Collection Rate	Monthly Rate with these collection rates	
Single-Family Residential	90.0%	$81.74	
Elder Residential	90.0%	$40.87	
Multi-Family Residential	90.0%	$81.74	
Public Facility	100.0%	$0.039	per gallon
Small Commercial	100.0%	$0.026	per gallon
Large Commercial	100.0%	$0.026	per gallon

Remember!   As your collection rate increases, your water rates decrease!

Conclusion

Now that you know how much a gallon of water costs in your community, can your customers afford these rates? If the breakeven rates calculated for your community seem too high, what options does your community have?

What are some things your community can do to support the water plant and make it sustainable? How can your water utility reach its full capacity, as mentioned in the introduction to this guidebook? As in the community of Salmon River, the decision makers in your community need to meet and plan for the future. Here are some planning guidelines:

- Charge the breakeven rates provided by the **Water Rate Calculator**. If they are much higher than your current rates, bite the bullet now to avoid losing even more money in the future.
- If the residential rates are too high, but the commercial rates are all right, can you increase the weights of the commercial customers to balance out the inequities?
- Take some real steps to improve your collection rate. Do people not pay because they cannot, or do they not pay because they do not have to? Does your utility need new payment policies or does it need to work on enforcing the existing ones?
- Take a look at your utility's collection policy. Are you enforcing it? Is it reasonable? Adopting a reasonable collection policy and enforcing it can improve your collection rate.
- If you cannot charge the breakeven rates, what can your utility charge its customers for water? Water utilities raise rates all the time to make up for rising costs. It is very reasonable to raise the rates on a regular basis – especially with the high fuel costs today.
- Keep in mind that if you charge less than the breakeven rates, you will need to find money from another source to subsidize your utility.
- Can your customers conserve water so that the plant does not have to produce as many gallons?
- Can water plant expenses be decreased? Are you paying a lot of overtime that is unnecessary?

- Finally, is there some combination of the strategies listed here that would work for your water utility?

This list provides only a sample of possible ways to achieve capacity and become sustainable. Do you know people in other communities with well-supported city services? Why not call them and find out what steps they have taken in their communities to promote water utility sustainability.

APPENDIX A: SETTING YOUR WATER RATES
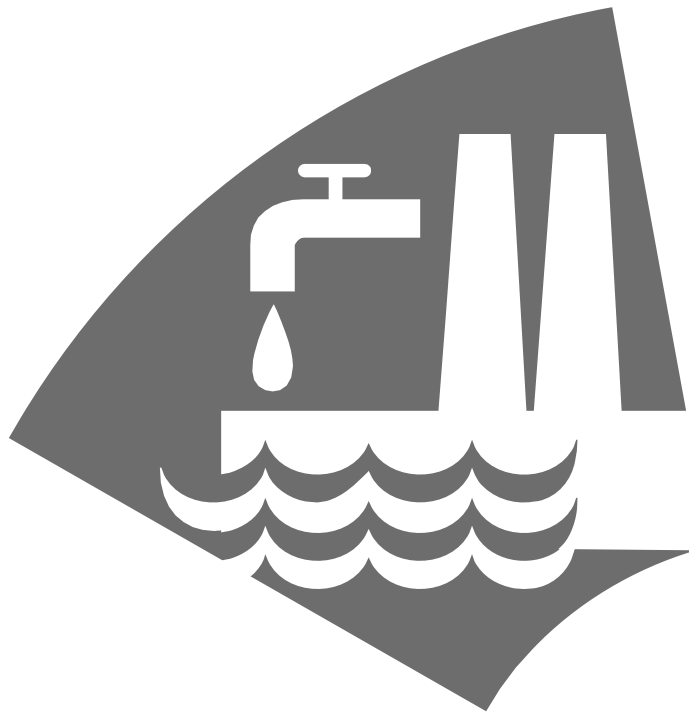
Appendix A: Setting Your Water Rates

Setting Your Water Rates is a management tool. The **Water Rate Calculator** has already showed you the rates you need to charge your customers to cover your expenses. The rates generated by the **Water Rate Calculator** are perhaps much higher than your current water rates. Perhaps the rates seem higher than your customers can even afford.

The purpose of this tool is to show you how your calculated water rates stack up against federal and state water rate standards. These standards are based on the Median Household Income (MHI) of each community. Every area of Alaska has an MHI figure. Look up your community's MHI in the website listed below:

http://www.ers.usda.gov/data/unemployment/RDList2.asp?ST=AK

If your MHI figure is $27,000, it means that if everyone in your community wrote down their yearly income, and you put all the numbers in order from lowest to highest, the number that was exactly in the middle would be the Median Household Income for your community. This means that half of the people in your community earn more than the MHI number, and half of them earn less.

- Click on Appendix A and enter the Median Household Income amount for your community that was shown on the website listed above.

APPENDIX A: SETTING YOUR WATER RATES

Median Household Income for Your Community: $0

Customer Type	2.5% Federal Standard	4.0% Alaska Standard	Breakeven Rates With your Collection Rate
Single-Family Residential	$0.00	$0.00	$0.00
Elder Residential	$0.00	$0.00	$0.00
Multi-Family Residential	$0.00	$0.00	$0.00

The federal standard and Alaska standard rate percentages appear below:

	Water Rates	Water/Sewer Rates
Federal Standard	2.5% of MHI	5% of MHI
Alaska Standard	4% of MHI	8% of MHI

To understand how these federal and state standards work, assume that the MHI for Salmon River is $27,000. Appendix A generated the following ceilings for federal and Alaska standards for water rates. (Remember, if you are using combined water/sewer rates, the standards are higher.)

Federal Standard

MHI ($27,000)   X   0.025 (2.5%)   =   Annual Federal Standard ($675)

Annual Federal Standard ($675) divided by 12 months = Monthly Federal Standard ($56.25)

Alaska Standard

MHI ($27,000)   X   0.04 (4%)   =   Annual Alaska Standard ($1,080)

Annual Alaska Standard ($1,080) divided by 12 months = Monthly Alaska Standard ($90.00)

APPENDIX A: SETTING YOUR WATER RATES

Median Household Income for Your Community: $27,000

Customer Type	2.5% Federal Standard	4.0% Alaska Standard	Breakeven Rates With your Collection Rate
Single-Family Residential	$56.25	$90.00	$86.54
Elder Residential	$56.25	$90.00	$43.27
Multi-Family Residential	$56.25	$90.00	$86.54

As you can see in this example, the water rates generated for Salmon River using an 85% collection rate fall between the federal and state standards. Salmon River's rates are higher than the federal standard for water rates and lower than the Alaska standard for water rates.

How do your breakeven rates compare with these standards?

What if the breakeven rates are lower than the rate standard for Alaska?

The number shown in the last column of Appendix A, **Breakeven Rates with Your Collection Rate**, may look high. However, if the rates are lower than the Alaska standard, they are considered affordable rates for your community. How do they compare to your current rates? If your utility can adopt these rates and support itself, it will reach sustainability – the goal for your utility.

What if your breakeven rates exceed the Alaska rate standard?

If the number shown in the last column of Appendix A, **Breakeven Rates with Your Collection Rate**, exceeds the Alaska standard, the rates may be unaffordable for your community. Yet your community still has to support the water plant.

If the rates exceed the Alaska rate standard, you may need to subsidize the water plant with money from somewhere else. This can be a dangerous thing to do – especially if you use Community Revenue Sharing, Raw Fish Tax, Payments in Lieu of Taxes or other monies from the State of Alaska.   Money from those programs has disappeared before, and could very well dry up again. Is there a continual source of money that could be dedicated to the water plant, such as gaming or surplus money from another city service? How can your community make your water plant sustainable?

Appendix B: Fuel Cost Calculator

The **Fuel Cost Calculator** is another management tool in your **Water Rate Calculator**. With the current rising trend in energy prices, communities in rural Alaska are severely challenged in meeting the costs of their energy needs.   Many community budgets prepared almost a year ago are woefully inadequate in anticipating the cost of fuel, and communities are finding it hard to come up with the additional revenue needed to pay their fuel bills.

This **Fuel Cost Calculator** is aimed at helping you anticipate the effects of rising fuel costs. It shows you how much additional revenue your utility will need if the costs of fuel rise. First, the tool brings in the amount of the annual fuel expense you entered in **Part 1, Section A – Operating Expenses**. Using this figure, you can enter possible fuel increases in percentages and find out how much more money your utility will need. There are two blanks for percentages, so you can compare the results of two different increases. In this example, Salmon River compared increases of 20% and 40%. The results are displayed below.

APPENDIX B: FUEL COST CALCULATOR

Your fuel costs last year were: $156,000.00

If the cost of fuel goes up   20%   the additional revenue you'll need is $31,200.00

If the cost of fuel goes up   40%   the additional revenue you'll need is $62,400.00

Enter the two different percentage fuel increases that you think are likely and see how much additional money your community will have to set aside to cover the rapidly rising expense of fuel.