



# **SYSTEMS LOSS CALCULATIONS WORKSHEET**

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# AWWA Free Water Audit Software v5.0

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The water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels.

The software contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

## Please begin by providing the following information

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Triunfo Sanitation District/Oak Park Water Service	
Oak Park	
California (CA)	
JSA	
2014	Financial Year
07/2013	Enter MMYYYY numeric format
06/2014	Enter MMYYYY numeric format
1/28/2015	
acre-feet	
CA5610043	

## The following guidance will help you complete the Audit

All audit data are entered on the **Reporting Worksheet**

	Value can be entered by user
	Value calculated based on input data
	These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

<p><b>Reporting Worksheet</b></p> <p>Enter the required data on this worksheet to calculate the water balance and data grading</p>	<p><b>Comments</b></p> <p>Enter comments to explain how values were calculated or to document data sources</p>	<p><b>Performance Indicators</b></p> <p>Review the performance indicators to evaluate the results of the audit</p>	<p><b>Water Balance</b></p> <p>The values entered in the Reporting Worksheet are used to populate the Water Balance</p>	<p><b>Dashboard</b></p> <p>A graphical summary of the water balance and Non-Revenue Water components</p>
<p><b>Service Connection Diagram</b></p> <p>Diagrams depicting possible customer service connection line configurations</p>	<p><b>Definitions</b></p> <p>Use this sheet to understand the terms used in the audit process</p>	<p><b>Loss Control Planning</b></p> <p>Use this sheet to interpret the results of the audit validity score and performance indicators</p>	<p><b>Example Audits</b></p> <p>Reporting Worksheet and Performance Indicators examples are shown for two validated audits</p>	<p><b>Acknowledgements</b></p> <p>Acknowledgements for the AWWA Free Water Audit Software v5.0</p>

If you have questions or comments regarding the software please contact us via email at: [wlc@awwa.org](mailto:wlc@awwa.org)



# AWWA Free Water Audit Software Reporting Worksheet

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Click to access definition  
 Click to add a comment

Water Audit Report for: **Triunfo Sanitation District/Oak Park Water Service (CA5610043)**  
Reporting Year: **2014** **7/2013 - 6/2014**

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

### WATER SUPPLIED

	← Enter grading in column 'E' and 'J' →		Master Meter and Supply Error Adjustments
Volume from own sources: <input type="text" value="n/a"/>	<input type="text" value=""/>	acre-ft/yr	Pcnt: <input type="text" value=""/>
Water Imported: <input type="text" value="10"/>	<input type="text" value="2,856.000"/>	acre-ft/yr	Value: <input type="text" value="0.04%"/>
Water exported: <input type="text" value="n/a"/>	<input type="text" value=""/>	acre-ft/yr	acre-ft/yr
<b>WATER SUPPLIED:</b>		<b>2,854.858</b>	acre-ft/yr

Enter negative % or value for under-registration  
Enter positive % or value for over-registration

### AUTHORIZED CONSUMPTION

Billed metered: <input type="text" value="7"/>	<input type="text" value="2,561.000"/>	acre-ft/yr
Billed unmetered: <input type="text" value=""/>	<input type="text" value=""/>	acre-ft/yr
Unbilled metered: <input type="text" value=""/>	<input type="text" value=""/>	acre-ft/yr
Unbilled unmetered: <input type="text" value=""/>	<input type="text" value="35.686"/>	acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

**AUTHORIZED CONSUMPTION:**  acre-ft/yr

Click here: for help using option buttons below

Pcnt: <input type="text" value="1.25%"/>	Value: <input type="text" value=""/>	acre-ft/yr
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Use buttons to select percentage of water supplied OR value

### WATER LOSSES (Water Supplied - Authorized Consumption)

acre-ft/yr

#### Apparent Losses

Unauthorized consumption:   acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:   acre-ft/yr  
Systematic data handling errors:   acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

**Apparent Losses:**   acre-ft/yr

Pcnt:  Value: | acre-ft/yr |

| acre-ft/yr |

| acre-ft/yr |

#### Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:  acre-ft/yr

**WATER LOSSES:**  acre-ft/yr

### NON-REVENUE WATER

**NON-REVENUE WATER:**   acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

### SYSTEM DATA

Length of mains:   miles  
Number of active AND inactive service connections:    
Service connection density:   conn./mile main

Are customer meters typically located at the curbstop or property line?  (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:   psi

### COST DATA

Total annual cost of operating water system:   \$/Year  
Customer retail unit cost (applied to Apparent Losses):   \$/100 cubic feet (ccf)  
Variable production cost (applied to Real Losses):   \$/acre-ft  Use Customer Retail Unit Cost to value real losses

### WATER AUDIT DATA VALIDITY SCORE:

\*\*\* YOUR SCORE IS: 79 out of 100 \*\*\*

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

### PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

- 1: Customer metering inaccuracies
- 2: Billed metered
- 3: Unauthorized consumption

**AWWA Free Water Audit Software:  
System Attributes and Performance Indicators**

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Water Audit Report for: **Triunfo Sanitation District/Oak Park Water Service (CA5610043)**  
Reporting Year: **2014** | **7/2013 - 6/2014**

\*\*\* YOUR WATER AUDIT DATA VALIDITY SCORE IS: 79 out of 100 \*\*\*

Apparent Losses:	<input type="text" value="52.540"/>	acre-ft/yr
+ Real Losses:	<input type="text" value="205.633"/>	acre-ft/yr
= <b>Water Losses:</b>	<input type="text" value="258.172"/>	acre-ft/yr

Unavoidable Annual Real Losses (UARL):  acre-ft/yr

Annual cost of Apparent Losses:

Annual cost of Real Losses:

Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumption

Non-revenue water as percent by volume of Water Supplied:

Non-revenue water as percent by cost of operating system:  Real Losses valued at Variable Production Cost

Apparent Losses per service connection per day:  gallons/connection/day

Real Losses per service connection per day:  gallons/connection/day

Real Losses per length of main per day\*:

Real Losses per service connection per day per psi pressure:  gallons/connection/day/psi

From Above, Real Losses = Current Annual Real Losses (CARL):  acre-feet/year

Infrastructure Leakage Index (ILI) [CARL/UARL]:

Items with a low service connection density of less than 32 service connections/mile of pipeline

# AWWA Free Water Audit Software: Water Balance

WAS v5.0

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Water Audit Report for:	Triunfo Sanitation District/Oak Park Water Service (CA5610043)	
Reporting Year:	2014	7/2013 - 6/2014
Data Validity Score:	79	

Water Exported	Billed Water Exported			Revenue Water	
0.000				0.000	
Water Supplied  2,854.858	Authorized Consumption  2,596.686	Billed Authorized Consumption	Billed Metered Consumption (water exported is removed)	Revenue Water	
		2,561.000	2,561.000	2,561.000	
	Unbilled Authorized Consumption  35.686	Billed Unmetered Consumption	Billed Unmetered Consumption	Non-Revenue Water (NRW)	
		0.000	0.000		
	Water Losses  258.172	Apparent Losses  52.540	Unbilled Metered Consumption	Unbilled Metered Consumption	293.858
			0.000	0.000	
			Unbilled Unmetered Consumption	Unbilled Unmetered Consumption	
		35.686	35.686		
Real Losses  205.633		Unauthorized Consumption	Unauthorized Consumption		
	7.137	7.137			
	Customer Metering Inaccuracies	Customer Metering Inaccuracies			
		39.000			
		Systematic Data Handling Errors	Systematic Data Handling Errors		
		6.403			
		Leakage on Transmission and/or Distribution Mains	Leakage on Transmission and/or Distribution Mains		
		Not broken down	Not broken down		
		Leakage and Overflows at Utility's Storage Tanks	Leakage and Overflows at Utility's Storage Tanks		
		Not broken down	Not broken down		
		Leakage on Service Connections	Leakage on Service Connections		
		Not broken down	Not broken down		

# AWWA Free Water Audit Software: Dashboard

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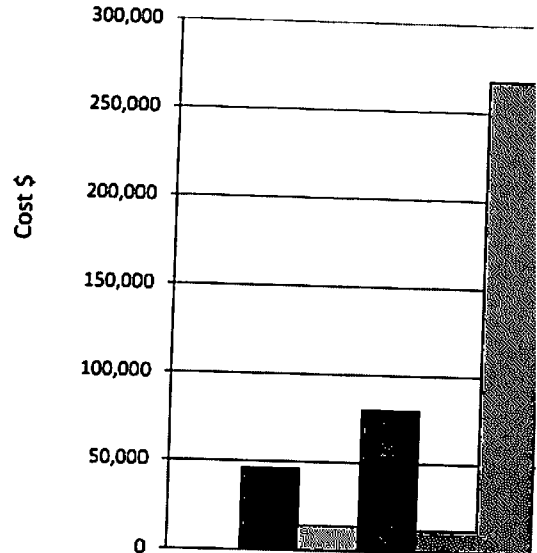
Water Audit Report for: **Triunfo Sanitation District/Oak Park Water Service (CA5610043)**

Reporting Year: **2014**      **7/2013 - 6/2014**

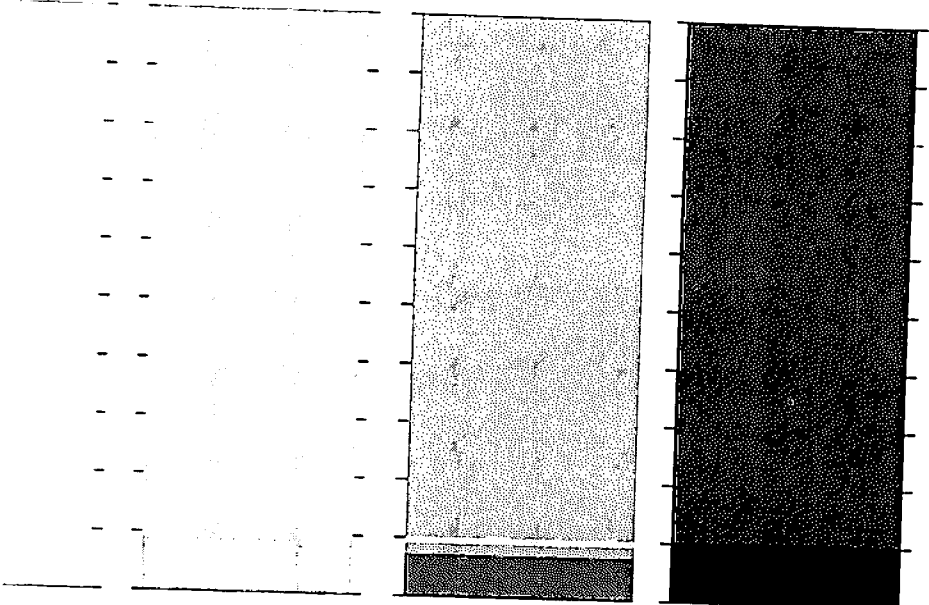
Data Validity Score: **79**

- Show me the VOLUME of Non-Revenue Water
- Show me the COST of Non-Revenue Water

Total Cost of NRW = \$423,831



- Unbilled metered (valued at Var. Prod. Cost)
- Unbilled unmetered (valued at Var. Prod. Cost)
- Unauth. consumption
- Cust. metering inaccuracies
- Syst. data handling errors
- Real Losses (valued at Var. Prod. Cost)



- Water Exported
- Authorized Consumption
- Water Losses
- Water Exported
- Billed Auth. Cons.
- Unbilled Auth. Cons.
- Apparent Losses
- Real Losses
- Water Exported
- Revenue Water
- Non Revenue Water